| | Bidder Complies | |
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| | Yes | No |

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## SPECIFICATIONS FOR A TRACTOR-DRAWN AERIAL

Sealed bids shall be received by Ann Arbor Fire Department for the furnishing of all necessary labor, equipment and material for the Fire Apparatus and other equipment as outlined in the following specifications.

### INTENT OF SPECIFICATIONS

It shall be the intent of these specifications to cover the furnishing and delivery of a complete fire apparatus. These detailed specifications cover the requirements as to the type of construction, finish, equipment and tests to which the fire apparatus shall conform. Minor details of construction and materials, which are not otherwise specified, are left to the discretion of the contractor.

Images and illustrative material in this specification are as accurate as known at the time of publication, but are subject to change without notice. Images and illustrative material is for reference only, and may include optional equipment and accessories and may not include all standard equipment.

### INSTRUCTIONS TO BIDDERS

The purchaser's standards for bidding automotive fire apparatus must be strictly adhered to, and all bid forms and questions must be complete and submitted with the bid. **Omissions and variations shall result in immediate rejection of the bid.**

Bids shall only be considered from companies that have an established reputation in the field of fire apparatus construction and have been in business for a minimum of 20 years. Furthermore, in order to insure fair, ethical, and legal competition, neither the original equipment manufacturer (O.E.M.) nor parent company of the O.E.M. shall have ever been fined or convicted of price fixing, bid rigging, or collusion in any domestic or international fire apparatus market (no exception).

If a bidder represents more than one fire apparatus company or brands of apparatus, they must only bid the top of the line that meets specification.

Each bidder shall furnish satisfactory evidence of their ability to construct the apparatus specified.

Any apparatus manufacturer or their parent company who has had a performance bond called in the last 10 years, shall not be eligible to bid. Any bids from these manufactures shall be immediately rejected (no exception).

Each bid shall be accompanied by a set of manufacturer's set of specifications consisting of a detailed description of the apparatus, construction methods, and equipment proposed to which the apparatus furnished under contract shall conform. These specifications shall indicate size, type, model and make of all components parts and equipment, providing proof of compliance with each and every item in the departments advertised specifications. A letter only, even though written on company letterhead, shall not be sufficient. **An exception to this requirement shall not be acceptable.**

In accordance with the current edition of applicable NFPA standards, the proposal shall specify whether the fire department or apparatus dealership shall provide required loose equipment.

The purchaser shall utilize this advertised specification to compare all submitted bid proposals. To facilitate comparison, all bid proposal specifications shall be submitted in the same sequence as the advertised specification. Any bidder who fails to submit a set of bid proposal specifications, or who photo

| | Bidder Complies | |
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| | Yes | No |

copies and submits these specifications as their own construction details shall be considered non responsive. This shall render such proposal ineligible for award.

The purchaser's specification shall, in all cases, govern the construction of the apparatus, unless a properly documented exception or deviation was approved. Any bid indicating that the manufacturer's proposal shall supersede the purchaser's specification shall be considered a complete substitute and immediately rejected.

THE PURCHASER HAS THE RIGHT TO REJECT ANY BIDS WHICH DOES NOT MEET THESE SPECIFICATIONS AND IS THE SOLE DECIDER TO DEEM WHICH BID IS IN THE BEST INTEREST OF THE PURCHASER.

**EXCEPTIONS**

These specifications are based upon design and performance criteria which have been developed by the fire department as a result of extensive research and careful analysis. Subsequently these specifications reflect the only type of fire apparatus that is acceptable at this time and all specifications herein contained are considered as minimum. Therefore exceptions to the specifications may not be accepted.

Bidders shall indicate in the "yes/no" column if their bid complies on each item (paragraph) specified.

If a product brand name is specified and is commercially available to all bidders, an exception to such items is not acceptable and such bid may be rejected.

Exceptions shall be allowed if they are equal to or superior to that specified and provided they are listed and fully explained on a separate page. All deviations, no matter how slight, shall be clearly explained on a separate sheet, in the bid sequence, citing the page and paragraph number(s) of the specifications, how the proposal deviation is different, how the deviation meets or exceeds the specifications and why it is necessary, and entitled "EXCEPTIONS TO SPECIFICATIONS". The buyer reserves the right to require a bidder to provide proof in each case that a substituted item is equal to that specified. The buyer shall be the sole judge in determination of acceptable substitutes.

Proposals that are found to have deviations without listing them or bids taking total exceptions to these advertised specifications shall be rejected (no exception).

Bids not including all exceptions is a material breach and shall result in the bid being immediately rejected (no exception).

**GENERAL DESIGN AND CONSTRUCTION**

The cab, chassis, pump module, and body are to be entirely designed, assembled and painted by the prime vehicle manufacturer, which minimizes third party involvement on engineering, design, service and warranty issues.

All bidders shall provide a list of the company, manufacturing location, and engineering source for each individual major component, including but not limited to the welded cab assembly, the pumphouse module assembly, the chassis assembly, body and electrical system. Apparatus using any subcontracted cab, chassis, pump module, electrical system or body shall not be acceptable.

| | Bidder Complies | |
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| | Yes | No |

The apparatus shall be designed with due consideration to distribution of load between the front and rear axles. Weight balance and distribution shall be in accordance with the recommendations of the National Fire Protection Association.

The bidder shall make accurate statements as to the apparatus weight and dimensions.

**QUALITY AND WORKMANSHIP**

All steel welding shall follow American welding Society D1.1-2004 recommendations for structural steel welding. All aluminum welding shall follow American welding Society and ANSI D1.2-2003 requirements for structural welding of aluminum. All sheet metal welding shall follow American Welding Society B2.1-2000 requirements for structural welding of sheet metal. Flux core arc welding to use alloy rods, type 7000, American welding Society standards A5.20-E70T1. Employees classified as welders are tested and certified to meet the American Welding Society codes upon hire and every three (3) years thereafter. The manufacturer shall be required to have an American welding Society certified welding inspector in plant during working hours to monitor weld quality.

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

To demonstrate the quality of the product and service, each bidder shall provide a list of at least ten (10) fire departments/municipalities in the region that have bought a second time from the representing dealer. **An exception to this requirement shall not be acceptable**.

**DELIVERY**

Apparatus, to insure proper break in of all components while still under warranty, **shall be delivered under its own power** - rail or truck freight shall not be acceptable. A qualified delivery representative shall deliver the apparatus and remain for a sufficient length of time to instruct personnel in proper operation, care and maintenance of the equipment delivered.

**MANUALS AND SERVICE INFORMATION**

The manufacturer shall supply at time of delivery, complete operation and maintenance manuals covering the completed apparatus as delivered. A permanent plate shall be mounted in the driver's compartment which specifies the quantity and type of fluids required including engine oil, engine coolant, transmission, pump transmission lubrication, pump primer and drive axle.

**SAFETY VIDEO**

Documentation provided at the time of delivery shall also include an apparatus safety video, in DVD format. A link to the video is also available on the factory training website. This video shall address key safety considerations for personnel to follow when they are driving, operating, and maintaining the apparatus. Safety procedures for the following shall be included: vehicle pre-trip inspection, chassis operation, aerial operation, and maintenance.

**PERFORMANCE TESTS AND REQUIREMENTS**

A road test shall be conducted with the apparatus fully loaded and a continuous run of ten (10) miles or more shall be made under all driving conditions, during which time the apparatus shall show no loss of power or overheating. The transmission drive shaft or shafts, and rear axles shall run quietly and be free

| Bidder Complies | |
|---|---|
| Yes | No |

from abnormal vibration or noise throughout the operating range of the apparatus. Vehicle shall adhere to the following parameters:

A) The apparatus, when fully equipped and loaded, shall have not less than 25 percent nor more than 50 percent of the weight on the front axle, and not less than 50 percent nor more than 75 percent on the rear axle.

B) The apparatus shall be capable of accelerating to 35 mph from a standing start within 25 seconds on a level concrete highway without exceeding the maximum governed rpm of the engine.

C) The service brakes shall be capable of stopping a fully loaded vehicle in 35 feet at 20 mph on a level concrete highway. The air brake system shall conform to Federal Motor Vehicle Safety Standards (FMVSS) 121.

D) The apparatus, fully loaded, shall be capable of obtaining a speed of 50 mph on a level concrete highway with the engine not exceeding its governed rpm (full load).

**FAILURE TO MEET TEST**

In the event the apparatus fails to meet the test requirements of these specifications on the first trials, second trials may be made at the option of the bidder within 30 days of the date of the first trials. Such trials shall be final and conclusive and failure to comply with these requirements shall be cause for rejection. Failure to comply with changes, to conform to any clause of the specifications, within 30 days after notice is given to the bidder of such changes, shall also be cause for rejection of the apparatus. Permission to keep or store the apparatus in any building owned or occupied by the purchaser or its use by the purchaser during the above-specified period with the permission of the bidder shall not constitute acceptance.

**LIABILITY**

The successful bidder shall defend any and all suits and assume all liability for the use of any patented process including any device or article forming a part of the apparatus or any appliance furnished under the contract.

**INSURANCE PROVIDED BY BIDDER**

**Commercial General Liability Insurance**

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

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

Coverage shall be written on a Commercial General Liability form. The policy shall be written on an occurrence form and shall include Contractual Liability coverage for bodily injury and property damage

| Bidder Complies | |
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| Yes | No |

subject to the terms and conditions of the policy. The policy shall include Owner as an additional insured when required by written contract.

**Commercial Automobile Liability Insurance**

The successful bidder shall, during the performance of the contract, keep in force at least the following minimum limits of commercial automobile liability insurance and coverage shall be written on a Commercial Automobile liability form:

| | |
|---|---|
| Each Accident Combined Single Limit: | $1,000,000 |

**Umbrella/Excess Liability Insurance**

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

| | |
|---|---|
| Aggregate: | $3,000,000 |
| Each Occurrence: | $3,000,000 |

The umbrella policy shall be written on an occurrence basis and at a minimum provide excess to the bidder's General Liability and Automobile Liability policies.

The required limits can be provided by one (1) or more policies provided all other insurance requirements are met.

Coverage shall be provided by a carrier(s) rated A- or better by A.M. Best.

All policies shall provide a 30-day notice of cancellation to the named insured. The Certificate of Insurance shall provide the following cancellation clause: Should any of the above described polices be cancelled before the expiration date thereof, notice shall be delivered in accordance with the policy provisions.

Bidder agrees to furnish owner with a current Certificate of Insurance with the coverages listed above along with the bid. The certificate shall show the purchaser as certificate holder.

**INSURANCE PROVIDED BY MANUFACTURER**

**Product Liability Insurance**

The manufacturer shall, during the performance of the contract and for three (3) years following acceptance of the product, keep in force at least the following minimum limits of Product Liability insurance:

| | |
|---|---|
| Each Occurrence: | $1,000,000 |
| Products/Completed Operations Aggregate: | $1,000,000 |

Coverage shall be written on a Commercial General Liability form. The policy shall be written on an occurrence form. The manufacturer's policy shall include the owner as additional insured when required by written contract between the Owner and an authorized dealer.

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**Umbrella/Excess Liability Insurance**

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

| | |
|---|---|
| Each Occurrence: | $25,000,000 |
| Aggregate: | $25,000,000 |

The umbrella policy shall be written on an occurrence basis and provide excess to the manufacturer's General Liability/Products policies.

The required limits can be provided by one (1) or more policies provided all other insurance requirements are met.

Coverage shall be provided by a carrier(s) rated A- or better by A.M. Best.

All policies shall provide a 30-day notice of cancellation to the named insured. The Certificate of Insurance shall provide the following cancellation clause: Should any of the above described polices be cancelled before the expiration date thereof, notice shall be delivered in accordance with the policy provisions.

Manufacturer agrees to furnish owner with a current Certificate of Insurance with the coverages listed above along with the bid. The certificate shall show the purchaser as the certificate holder.

**SINGLE SOURCE MANUFACTURER**

Bids shall only be accepted from a single source apparatus manufacturer. The definition of single source is a manufacturer that designs and manufactures their products using an integrated approach, including the chassis, cab weldment, cab, pump house (including the sheet metal enclosure, valve controls, piping and operators panel) body and aerial device being designed, fabricated and assembled on the bidder's premises. The electrical system (hardwire or multiplex) shall be both designed and integrated by the same apparatus manufacturer. The warranties relative to these major components (excluding component warranties such as engine, transmission, axles, pump, etc.) must be from a single source manufacturer and not split between manufacturers (i.e. body, pump house, cab weldment, chassis and aerial). The bidder shall provide evidence that they comply with this requirement.

The bidder shall state the location of the factory where the apparatus is to be built.

**NFPA 2024 STANDARDS**

This unit shall comply with the NFPA standards effective January 1, 2024, except for fire department specifications that differ from NFPA specifications. These exceptions shall be set forth in the Statement of Exceptions.

Certification of slip resistance of all stepping, standing and walking surfaces shall be supplied with delivery of the apparatus.

All horizontal surfaces designated as a standing or walking surface that are greater than 48.00" above the ground must be defined by a 1.00" wide line along its outside perimeter. Perimeter markings and designated access paths to destination points shall be identified on the customer approval print and are

| | Bidder Complies | |
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shown as approximate. Actual location(s) shall be determined based on materials used and actual conditions at final build. Access paths may pass through hose storage areas and opening or removal of covers or restraints may be required. Access paths may require the operation of devices and equipment such as the aerial device or ladder rack.

A plate that is highly visible to the driver while seated shall be provided. This plate shall show the overall height, length, and gross vehicle weight rating.

The manufacturer shall have programs in place for training, proficiency testing and performance for any staff involved with certifications.

An official of the company shall designate, in writing, who is qualified to witness and certify test results.

**NFPA COMPLIANCY**

Apparatus proposed by the bidder shall meet the applicable requirements of the National Fire Protection Association (NFPA) as stated in current edition at time of contract execution. Fire department's specifications that differ from NFPA specifications shall be indicated in the proposal as "non-NFPA".

**INSPECTION CERTIFICATE**

A third party inspection certificate for the aerial device shall be furnished upon delivery of the aerial device. The certificate shall be Underwriters Laboratories Inc. Type 1 and shall indicate that the aerial device has been inspected on the production line and after final assembly.

Visual structural inspections shall be performed on all welds on both aluminum and steel ladders.

On critical weld areas, or on any suspected defective area, the following tests shall be conducted:

- Magnetic particle inspection shall be conducted on steel aerials to assure the integrity of the weldments and to detect any flaws or weaknesses. Magnets shall be placed on each side of the weld while iron powder is placed on the weld itself. The powder shall detect any crack that may exist. This test shall conform to ASTM E709 and be performed prior to assembly of the aerial device.
- A liquid penetrant test shall be conducted on aluminum aerials to assure the integrity of the weldments and to detect any flaws or weaknesses. This test shall conform to ASTM E165 and be performed prior to assembly of the aerial device.
- Ultrasonic inspection shall be conducted on all aerials to detect any flaws in pins, bolts and other critical mounting components.

In addition to the tests above, functional tests, load tests, and stability tests shall be performed on all aerials. These tests shall determine any unusual deflection, noise, vibration, or instability characteristics of the unit.

**PUMP TEST**

The pump shall be tested, approved and certified by Underwriter's Laboratory at the manufacturer's expense. The test results and the pump manufacturer's certification of hydrostatic test; the engine manufacturer's certified brake horsepower curve; and the manufacturer's record of pump construction details shall be forwarded to the Fire Department.

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**GENERATOR TEST**
If the unit has a generator, the generator shall be tested, approved, and certified by Underwriters Laboratories at the manufacturer's expense. The test results shall be provided to the Fire Department at the time of delivery.

**BREATHING AIR TEST**
If the unit has breathing air, the apparatus manufacturer shall draw an air sample from the air system and certify that the air quality meets the requirements of NFPA 1989, *Standard on Breathing Air Quality for Fire and Emergency Services Respiratory Protection.*

**VEHICLE INSPECTION PROGRAM CERTIFICATION**
To assure the vehicle is built to current NFPA 1900 standards, the apparatus, in its entirety, shall be third-party, independent, audit-certified through Underwriters Laboratory (UL) that it is built and complies to all applicable standards in the current edition. The certification includes: all design, production, operational, and performance testing of not only the apparatus, but those components that are installed on the apparatus (no exception).

A placard shall be affixed in the driver's side area stating the third party agency, the date, the standard and the certificate number of the whole vehicle audit.

**NEW VEHICLE ORIENTATION**
A qualified person from the manufacturer or sales agency shall be available at the discretion of the purchaser for orientation of the apparatus maintenance, chassis, pump and any other orientation required for equipment delivered. Trainer must have a minimum of 10 years in the repair, service and orientation of Fire Apparatus. Trainer shall be certified by the fire apparatus manufacture they represent. Proof of certification shall be made available upon request.

Orientation for the new fire apparatus shall be provided by the bidder. The orientation shall consist of three (3) session(s) for the Ann Arbor Fire Department. Each session shall be up to a maximum of eight (8) hours (Depending on class size). Session content shall include classroom and/or hands on orientation with the new vehicle. A session is considered to be each time the training material is presented by the instructor regardless of the total length of the individual session. The Fire Chief and the instructor shall agree on the class session(s) duration and required content. The orientation shall take place at the Fire Department. If more orientation sessions (classes) are required than specified in the specifications, the additional expense shall be billed to and paid for by the Fire Department.

**USA HELD PARENT COMPANY**
The Manufacturer of the apparatus must be fully owned and managed by a Parent Company, Corporation, or Individual(s) that is 100% held in the United States of America based Company, Corporation, or United States citizen(s) Proposals from any manufacturer that is fully or partially owned and/or operated by a foreign company, Corporation or Individual(s) under any type of ownership, partnership, or any similar type of agreement will be immediately rejected.

**LICENSED DEALER**
The dealer representing a fire apparatus manufacturer in the State of Michigan, shall be licensed to do business in the State of Michigan. The license must be issued to the bidder representing manufacturer as listed on the proposal submitted. Licenses submitted that are issued to a third party will not be accepted.

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Dealer Name as provided on License

**PRECONSTRUCTION MEETING**

A preconstruction meeting will take place at the manufacture. The meeting shall be scheduled at times mutually agreed upon between the manufacturer"s representative and the customer.

**PRODUCER PRICE INDEX (PPI) ALLOWANCE**

A contingency fund in the amount of $112,715.00 shall be built in to the overall price of the delivered vehicle. This shall be used for future and possible repricing after order entry. Repricing shall be based on the Producer Pricing Index of Components of Manufacturing (PPI). Based on the PPI calculation, any repricing overage shall be deducted from the allowance. Any unused portion shall be refunded back to the customer. If repricing is not required, then the entire allowance shall be refunded back to the customer. This allowance shall not be used for customer requested additions and changes to the order.

**THIRD-PARTY WEEKLY PROGRESS REPORTS**

The successful bidder shall also provide weekly photographic progress reports and inspection services, provided by an independent third party. These progress reports and inspection services shall begin once the apparatus starts the manufacturing and assembly process. The inspection service will **NOT** warranty any aspect of the apparatus operability or design, but shall confirm that the options on the apparatus at final inspection reasonably comport to those in the specification. In addition, after the final inspection has been completed by the customer, the third party inspector shall also review all items noted in the inspection for completion prior to the apparatus leaving the manufacturing facility for delivery local service area for pre-delivery service. **ANY BIDDER WHO DOES NOT COMPLY WITH THIS REQUIREMENT SHALL BE DEEMED NON-CONFORMING AND NOT CONSIDERED.**

**INSPECTION TRIP(S) - COMMERCIAL AIR TRAVEL**

The bidder shall provide two (2) factory inspection trip(s) for Four (4) customer representative(s). The inspection trip(s) shall be scheduled at times mutually agreed upon between the manufacturer's representative and the customer. All costs such as travel, lodging and meals shall be the responsibility of the bidder. Transportation shall be via commercial air travel.

**BID BOND**

All bidders shall provide a bid bond as security for the bid in the form of a 10 percent bid bond to accompany their bid. This bid bond shall be issued by a Surety Company who is listed on the U.S. Treasury Departments list of acceptable sureties as published in Department Circular 570. The bid bond shall be issued by an authorized representative of the Surety Company and shall be accompanied by a certified power of attorney dated on or before the date of bid. The bid bond shall include language, which assures that the bidder/principal shall give a bond or bonds as may be specified in the bidding or contract documents, with good and sufficient surety for the faithful performance of the contract, including the Basic One (1) Year Limited Warranty, and for the prompt payment of labor and material furnished in the prosecution of the contract.

Proposals received from bidders who do not manufacture the chassis shall provide a warranty that shall be issued jointly and severally by, and signed by, both the bidder and the chassis manufacturer.

If the successful bidder does not manufacture the chassis, the bidder shall supply a warranty bond, in addition to their performance bond, along with their signed contract. This warranty bond shall guarantee all terms and conditions of the Basic One (1) Year Limited Warranty and names both the bidder and

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chassis manufacturer as co-principals. This warranty bond shall be issued for the contract amount and shall remain in force for a term which is consistent with the term of the Basic One (1) Year Limited Warranty.

Notwithstanding any document or assertion to the contrary, any surety bond related to the sale of a vehicle shall apply only to the Basic One (1) Year Limited Warranty for such vehicle. Any surety bond related to the sale of a vehicle shall not apply to any other warranties that are included within this bid (OEM or otherwise) or to the warranties (if any) of any third party of any part, component, attachment or accessory that is incorporated into or attached to the vehicle. In the event of any contradiction or inconsistency between this provision and any other document or assertion, this provision shall prevail.

**PERFORMANCE BOND NOT REQUESTED**

A performance bond shall not be included. If requested at a later date, one shall be provided to you for an additional cost and the following shall apply:

The successful bidder shall furnish a Performance and Payment bond (Bond) equal to 100 percent of the total contract amount within 30 days of the notice of award. Such Bond shall be in a form acceptable to the Owner and issued by a surety company included within the Department of Treasury's Listing of Approved Sureties (Department Circular 570) with a minimum A.M. Best Financial Strength Rating of A and Size Category of XV. In the event of a bond issued by a surety of a lesser Size Category, a minimum Financial Strength rating of A+ is required.

Bidder and Bidder's surety agree that the Bond issued hereunder, whether expressly stated or not, also includes the surety's guarantee of the vehicle manufacturer's Bumper to Bumper warranty period included within this proposal. Owner agrees that the penal amount of this bond shall be simultaneously amended to 25 percent of the total contract amount upon satisfactory acceptance and delivery of the vehicle(s) included herein. Notwithstanding anything contained within this contract to the contrary, the surety's liability for any warranties of any type shall not exceed three (3) years from the date of such satisfactory acceptance and delivery, or the actual Bumper to Bumper warranty period, whichever is shorter.

Due to global supply chain constraints, any delivery date contained herein is a good faith estimate as of the date of this order/contract, and merely an approximation based on current information. Delivery updates shall be made available, and a final firm delivery date shall be provided as soon as possible.

If the Producer Price Index of Components for Manufacturing [www.bls.gov Series ID: WPUID6112] ("PPI") has increased at a compounded annual growth rate of 5.0% or more between the month the truck manufacturer accepts the order ("Order Month") and a month 14 months prior to the then predicted Ready For Pickup date ("Evaluation Month"), then pricing may be updated in an amount equal to the increase in PPI over 5.0% for each year or fractional year between the Order Month and the Evaluation Month. The seller shall document any such updated price for the customer's approval before proceeding and provide an option to cancel the order.

**APPROVAL DRAWING**

A drawing of the proposed apparatus shall be provided for approval before construction begins. The sales representative shall also have a copy of the same drawing. The finalized and approved drawing shall become part of the contract documents. This drawing shall indicate the chassis make and model, location of the lights, siren, horns, compartments, major components, etc.

| | Bidder Complies | |
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A "revised" approval drawing of the apparatus shall be prepared and submitted by the manufacturer to the purchaser showing any changes made to the approval drawing.

**DRAWING, CAB TOP VIEW**
On the sales drawing a top view of the cab seating shall be provided. The top view shall be a reference only of the seating in the order.

**DRAWING, COMPARTMENT LAYOUT**
A basic drawing shall be provided for the interior body compartments. This drawing shall be provided for graphic representation only and shall include such things as shelves, trays, reels, dividers, air control panels, air bottle storage bins, poly boxes, etc.

**ELECTRICAL WIRING DIAGRAMS**
Two (2) electrical wiring diagrams, prepared for the model of chassis and body, shall be provided.

**CHASSIS**
Chassis provided shall be a new, tilt-type custom fire apparatus. The chassis shall be manufactured in the apparatus body builder's facility eliminating any split responsibility. The chassis shall be designed and manufactured for heavy-duty service, with adequate strength and capacity for the intended load to be sustained and the type of service required.

**MAXIMUM OVERALL HEIGHT**
The maximum overall height of the apparatus shall be 11' 6" (138").

**MAXIMUM OVERALL LENGTH**
The maximum overall length of the apparatus shall be 61' (732").

**WHEELBASE**
The wheelbase of the vehicle shall be no greater than 168.5".

**GVW RATING**
The gross vehicle weight rating shall be a minimum of 77,000 lbs.

**FRAME**
The chassis frame shall be built with two (2) steel channels bolted to five (5) cross members or more, depending on other options of the apparatus.

The side rails shall have a 13.38" tall web over the front and mid sections of the chassis, with a continuous smooth taper to 10.75" over the rear axle.

Each rail shall have a section modulus of 25.992 cubic inches and a resisting bending moment (rbm) of 3,119,040 in-lb over the critical regions of the frame assembly, with a section modulus of 18.96 cubic inches with an rbm of 2,275,200 in-lb over the rear axle.

The frame rails shall be constructed of 120,000 psi yield strength heat-treated 0.38" thick steel with 3.50" wide flanges.

**FRAME REINFORCEMENT**
In addition, a mainframe internal liner shall be provided. The liner shall be an internal "C" design that steps to an internal "L" design over the rear axle. It shall be heat-treated steel measuring 12.50" x 3.00" x

| | Bidder Complies | |
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| | Yes | No |

0.25" through the front portion of the liner, stepping to 9.38" x 3.00" x 0.25" through the rear portion of the liner. Each liner shall have a section modulus of 13.58 cubic inches, yield strength of 110,000 psi, and rbm of 1,494,042 in-lb. Total rbm at wheelbase center shall be 4,391,869 in-lb.

The frame liner shall be mounted inside of the chassis frame rail and extend the full length of the frame.

**FRONT NON DRIVE AXLE**

The front axle shall be of the independent suspension design with a ground rating of 24.000 lb.

Upper and lower control arms shall be used on each side of the axle. Upper control arm castings shall be made of 100,000-psi yield strength 8630 steel and the lower control arm casting shall be made of 55,000-psi yield ductile iron.

The center cross members and side plates shall be constructed out of 80,000-psi yield strength steel.

Each control arm shall be mounted to the center section using elastomer bushings. These rubber bushings shall rotate on low friction plain bearings and be lubricated for life. Each bushing shall also have a flange end to absorb longitudinal impact loads, reducing noise and vibrations.

There shall be nine (9) grease fittings supplied, one (1) on each control arm pivot and one (1) on the steering gear extension.

The upper control arm shall be shorter than the lower arm so that wheel end geometry provides positive camber when deflected below rated load and negative camber above rated load.

Camber at load shall be 0 degrees for optimum tire life.

The ball joint bearing shall be of low friction design and be maintenance free.

Toe links that are adjustable for alignment of the wheel to the center of the chassis shall be provided.

The wheel ends must have little to no bump steer when the chassis encounters a hole or obstacle.

The steering linkage shall provide proper steering angles for the inside and outside wheel, based on the vehicle wheelbase.

The axle shall have a turning angle of up to 45 degrees.

**FRONT SUSPENSION**

Front independent suspension shall be provided with a minimum ground rating of 24,000 lb.

The independent suspension system shall be designed to provide maximum ride comfort. The design shall allow the vehicle to travel at highway speeds over improved road surfaces and at moderate speeds over rough terrain with minimal transfer of road shock and vibration to the vehicle's crew compartment.

Each wheel shall have a torsion bar type spring. In addition, each front wheel end shall also have energy absorbing jounce bumpers to prevent bottoming of the suspension.

The suspension design shall be such that there is at least 10.00" of total wheel travel and a minimum of 3.75" before suspension bottoms.

| | Bidder Complies | |
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| | Yes | No |

The torsion bar anchor lock system allows for simple lean adjustments, without the use of shims. One can adjust for a lean within 15 minutes per side. Anchor adjustment design is such that it allows for ride height adjustment on each side.

The independent suspension shall have gone through a durability test that simulated a minimum of 140,000 miles of inner city driving.

**FRONT SHOCK ABSORBERS**
KONI heavy-duty telescoping shock absorbers shall be provided on the front suspension.

**FRONT OIL SEALS**
Oil seals with viewing window shall be provided on the front axle.

**FRONT TIRES**
Front tires shall be Michelin 445/65R22.50 radials, 20 ply all-position XZY3 wide base tread, rated for 25,600 lb maximum axle load and 65 mph maximum speed.

The tires shall be mounted on Alcoa 22.50" x 13.00" polished aluminum disc type wheels with a ten (10) stud, 11.25" bolt circle.

**TURNING RADIUS REPORT**
Supplied with the bid shall be a turning radius analysis of the vehicle being proposed. This analysis shall provide the inside turning radius, the outside turning radius, the curb to curb turning radius, and the wall to wall turning radius.

**REAR AXLE**
The rear axle shall be a Meritor™, Model RS-30-185, with a capacity of 31,000 lb.

**TOP SPEED OF VEHICLE**
A rear axle ratio shall be furnished to allow the vehicle to reach a top speed of 60 mph/96KPH.

**REAR SUSPENSION**
Rear suspension shall be a Hendrickson FMX 312 EX, air ride with a ground rating of 31,000 lb. The suspension shall have the following features:

- Heavy-duty shock absorbers to protect air springs from overextension

- Heavy-duty torque rods and bushings

- Premium, heavy-duty rubber bushings require no lubrication

- Integrated stabilizer design results in greater stability

- Low spring rate air springs for excellent ride quality

- Dual height control valves to maintain level vehicle from side to side

**REAR OIL SEALS**
Oil seals shall be provided on the rear axle(s).

| | Bidder Complies | |
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| | Yes | No |

**REAR TIRES**
Rear tires shall be four (4) Michelin radials 315/80R22.50, 20 ply all position XZU-S2 tread, rated for 33,080 lb maximum axle load and 65 mph maximum speed.

The tires shall be mounted on Alcoa 22.50" x 9.00" Dura-Bright® aluminum disc wheels with a ten (10) stud, 11.25" bolt circle.

**TIRE BALANCE**
All tires shall be balanced with Counteract balancing beads. The beads shall be inserted into the tire and eliminate the need for wheel weights.

**TIRE PRESSURE MANAGEMENT**
There shall be a RealWheels LED AirSecure™ tire alert pressure management system provided, that shall monitor each tire's pressure. A sensor shall be provided on the valve stem of each tire for a total of eight (8) tires.

The sensor shall calibrate to the tire pressure when installed on the valve stem for pressures between 10 and 200 psi. The sensor shall activate an integral battery operated LED when the pressure of that tire drops 5 to 8 psi.

Removing the cap from the sensor shall indicate the functionality of the sensor and battery. If the sensor and battery are in working condition, the LED shall immediately start to flash.

**CHROME LUG NUT COVERS**
Chrome lug nut covers shall be supplied on front and rear wheels.

**FRONT HUB COVERS**
Stainless steel hub covers shall be provided on the front axle. An oil level viewing window shall be provided.

**MUD FLAPS**
Mud flaps shall be installed behind the front and rear wheels of the apparatus.

**MUD FLAPS**
Mud flaps shall be installed behind the tiller trailer wheels of the apparatus.

**WHEEL CHOCKS**
There shall be one (1) pair of Worden Safety Products, Model HWG-SB, wheel chocks provided.

Heavy Duty, large molded aluminum wheel chock with solid bottom, natural cast aluminum finish.

**WHEEL CHOCK BRACKETS**
There shall be one (1) pair of Worden Safety, Model U815T, mounting wheel chock brackets provided. The brackets shall be mounted behind the rear axle of the tractor.

**ANTI-LOCK BRAKE SYSTEM**
The vehicle shall be equipped with a Wabco tractor 4S4M and tiller tractor 2S2M anti-lock braking system. The ABS shall provide a four (4) channel anti-lock braking control on both the front, rear tractor axle, and a two (2) channel system on the tiller axle. It shall be a digitally controlled system that utilizes microprocessor technology to control the anti-lock braking system. Each wheel shall be monitored by the

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

system. When any particular wheel begins to lockup, a signal shall be sent to the control unit. This control unit then shall reduce the braking of that wheel for a fraction of a second and then reapply the brake. This anti-lock brake system shall eliminate the lockup of any wheel thus helping to prevent the apparatus from skidding out of control.

**AUTOMATIC TRACTION CONTROL**

An anti-slip feature shall be included with the ABS. The Automatic Traction Control shall be used for traction in poor road and weather conditions. The Automatic Traction Control shall act as an electronic differential lock which shall not allow a driving wheel to spin, thereby supplying traction at all times. The ABS electronic control unit (ECU) shall work with the engine ECU, sharing information concerning wheel slip. Engine ECU shall use information to control engine speed, allowing only as much throttle application as required for the available traction, regardless of how much the driver is asking for. An "Off-road traction" switch shall be provided on the instrument panel. Activation of the switch shall allow additional tire slip to let the truck climb out and get on top of deep snow or mud.

**BRAKES**

The service brake system shall be full air type.

The front brakes shall be Knorr/Bendix disc type with a 17.00" ventilated rotor for improved stopping distance.

The brake system shall be certified, third party inspected, for improved stopping distance.

The rear brakes shall be Meritor™ 16.50" x 8.63" cam operated with automatic slack adjusters. Dust shields cannot be provided.

**BRAKE SYSTEM AIR COMPRESSOR**

The air compressor shall be a Cummins/WABCO with 18.7 cubic feet per minute output.

**BRAKE SYSTEM**

The brake system shall include:

- Brake treadle valve
- Heated automatic moisture ejector on air dryer
- Total air system minimum capacity of 5,376 cubic inches
- Two (2) air pressure gauges with a red warning light and an audible alarm, that activates when air pressure falls below 60 psi
- Spring set parking brake system
- Parking brake operated by a push-pull style control valve
- A parking "brake on" indicator light on instrument panel
- Park brake relay/inversion and anti-compounding valve, in conjunction with a double check valve system, with an automatic spring brake application at 40 psi
- A pressure protection valve to prevent all air operated accessories from drawing air from the air system when the system pressure drops below 80 psi (550 kPa)
- 1/4 turn drain valves on each air tank

The air tank shall be primed and painted to meet a minimum 750 hour salt spray test.

The air tanks shall be painted same as frame color.

| | Bidder Complies | |
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| | Yes | No |

To reduce the effects of corrosion, the air tank shall be mounted with stainless steel brackets (no exception).

**BRAKE SYSTEM AIR DRYER**
The air dryer shall be WABCO System Saver 1200 with spin-on coalescing filter cartridge and 100 watt heater.

**BRAKE LINES**
Color-coded nylon brake lines shall be provided per SAE J2580.

- Supply -Black
- Primary - Green
- Secondary - Orange
- Park - Red

The lines shall be wrapped in a heat protective split loom where necessary in the chassis.

**ALL WHEEL LOCK-UP**
An additional all wheel lock-up system shall be installed which applies air to the front brakes only. The standard spring brake control valve system shall be used for the rear.

**ADDITIONAL AIR TANK**
An additional air tank with 1454 cubic inch displacement shall be provided to increase the capacity of the main air brake system. This tank shall be plumbed into the rear half of the brake system.

The air tank shall be primed and painted to meet a minimum 750 hour spray test. To reduce the effects of corrosion, the air tank shall be mounted with stainless steel brackets (no exception).

The air tank(s) shall be painted same as frame color.

The output flow of the engine air compressor shall vary with engine rpm. Full compressor output shall only be achieved at governed engine speed. Engine speed shall be limited by generators, pumps and other PTO driven options.

**AIR COMPRESSOR - BRAKE SYSTEM MAINTENANCE**
A Gast, Model 3HBB-10-M300X, air compressor shall be provided. It shall be driven by the 110-volt shoreline electrical system. The compressor shall maintain the air pressure in the chassis air brake system while the vehicle is not in use. A pressure switch shall sense when the system pressure drops and automatically start the compressor, which then shall run until pressure is restored. It shall be located in compartment behind driver's seat.

**GLAD-HANDS**
There shall be two (2) glad-hands securely mounted below the front bumper.

The glad-hands shall plumbed into the brake system, allowing a tow vehicle to apply the service brakes.

The glad-hands shall be color coded. Blue is for service brakes and red is for parking brakes.

A blank cover shall be provided on the glad-hand for protection when not in use.

| Bidder Complies | |
|---|---|
| Yes | No |

Glad-hands shall be in accordance with SAE J318.

**U-BOLT GUARD OVER PARKING BRAKE KNOB**
There shall be one (1) U-bolt type protective guard(s) installed over the "Parking Brake" knob to prevent accidental activation of the brake. The guard shall be located on the passenger's side.

**PARK BRAKE CONTROL (ADDITIONAL)**
A second park brake control valve shall be installed on the officer side of the instrument panel. This valve shall only activate the brakes if manually pulled out; low air pressure shall not activate this valve.

**COMPRESSION FITTINGS ONLY**
Any nylon hose on the apparatus that is pneumatic shall be plumbed with compression type fittings where applicable. Push lock fittings shall not be acceptable for any pneumatic nylon hose plumbing.

**ENGINE**
The chassis shall be powered by an electronically controlled engine as described below:

| | |
|---|---|
| Make: | Cummins® |
| Model: | X15 |
| Power: | 565 hp at 1700 rpm |
| Torque: | 1850 lb-ft at 1150 rpm |
| Governed Speed: | 2100 rpm |
| Emissions Level: | EPA 2027 |
| Fuel: | Diesel |
| Cylinders: | Six (6) |
| Displacement: | 912 cubic inches (14.9L) |
| Starter: | Delco 39MT+™ |
| Fuel Filters: | Frame mounted spin-on style filter from Cummins®. |

The engine shall include On-board diagnostics (OBD), which provides self diagnostic and reporting. The system shall give the owner or repair technician access to state of health information for various vehicle sub systems. The system shall monitor vehicle systems, engine and after treatment. The system shall illuminate a malfunction indicator light on the dash console if a problem is detected.

The engine shall be filled with FA-4 10W30 oil as required by Cummins.

**REMOTE MOUNTED ENGINE FILTERS**
The engine fuel and oil filters shall be remote mounted for ease of maintenance.

**HIGH IDLE**
A high idle switch shall be provided, inside the cab, on the instrument panel, that shall automatically maintain a preset engine rpm. A switch shall be installed, at the cab instrument panel, for activation/deactivation.

The high idle shall be operational only when the parking brake is on and the truck transmission is in neutral. A green indicator light shall be provided, adjacent to the switch. The light shall illuminate when the above conditions are met. The light shall be labeled "OK to Engage High Idle."

| | Bidder Complies | |
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| | Yes | No |

**ENGINE BRAKE**
A Jacobs® engine brake is to be installed with the controls located on the instrument panel within easy reach of the driver.

The driver shall be able to turn the engine brake system on/off and have a high, medium and low setting.

The engine brake shall activate when the system is on and the throttle is released.

The high setting of the brake application shall activate and work simultaneously with the variable geometry turbo (VGT) provided on the engine.

The engine brake shall be installed in such a manner that when the engine brake is slowing the vehicle the brake lights are activated.

The ABS system shall automatically disengage the auxiliary braking device, when required.

**CLUTCH FAN**
A Horton® fan clutch shall be provided. The fan clutch shall be automatic when the pump transmission is in "Road" position, and fully engaged in "Pump" position.

**ENGINE AIR INTAKE**
The engine air intake shall be located above the engine cooling package. It shall draw fresh air from the front of the apparatus through the radiator grille.

The ember separator is designed to prevent road dirt and recirculating hot air from entering the engine.

The ember separator shall be easily accessible by tilting the cab.

**EXHAUST SYSTEM**
The exhaust system shall be stainless steel from the turbo to the engine's aftertreatment device. The exhaust system shall include an aftertreatment device to meet current EPA standards. An insulation wrap shall be provided on all exhaust pipe between the turbo and the aftertreatment device to minimize the transfer of heat to the cab.

The exhaust shall terminate horizontally ahead of the right side rear wheels and will extend 2.00" past the body rub rail. The exhaust pipes shall be aluminized steel.

There shall be an aluminized steel exhaust diffuser with a standard straight tip on the end provided to reduce the temperature of the exhaust as it exits. Heat deflector shields shall be provided to isolate chassis and body components from the heat of the tailpipe diffuser.

**RADIATOR**
The radiator and the complete cooling system shall meet or exceed the current edition of applicable NFPA and engine manufacturer cooling system standards.

For maximum corrosion resistance and cooling performance, the entire radiator core shall be constructed using long life aluminum alloy. The radiator core shall consist of aluminum fins, having a serpentine design, brazed to aluminum tubes. No solder joints or leaded material of any kind shall be acceptable in the core assembly.

| | Bidder Complies | |
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| | Yes | No |

The radiator core shall have a minimum front area of 1060 square inches.

Supply tank shall be made of heavy duty glass-reinforced nylon and the return tank shall be made of aluminum. Both tanks shall be crimped onto the core assembly using header tabs and a compression gasket to complete the radiator core assembly. There shall be a full steel frame around the inserts to enhance cooling system durability and reliability.

The radiator shall be compatible with commercial antifreeze solutions.

The radiator assembly shall be isolated from the chassis frame rails with rubber isolators to prevent the development of leaks caused by twisting or straining when the apparatus operates over uneven terrain.

The radiator shall include a de-aeration/expansion tank. For visual coolant level inspection, the radiator shall have a built-in sight glass. The radiator shall be equipped with a 15 psi pressure relief cap.

A drain port shall be located at the lowest point of the cooling system and/or the bottom of the radiator to permit complete flushing of the coolant from the system.

Shields or baffles shall be provided to prevent recirculation of hot air to the inlet side of the radiator.

**COOLANT LINES**

Gates, or Goodyear, rubber hose shall be used for all engine coolant lines installed by the chassis manufacturer.

Hose clamps shall be stainless steel constant torque type to prevent coolant leakage. They shall react to temperature changes in the cooling system and expand or contract accordingly while maintaining a constant clamping pressure on the hose.

**RADIATOR SKID PLATE**

A lower radiator skid plate shall be supplied for protection. The skid plate shall be constructed of 0.25" steel plate.

**FUEL TANK**

A 50 gallon fuel tank shall be provided and mounted at rear of chassis. The tank shall be constructed of 12-gauge, hot rolled steel. It shall be equipped with swash partitions and a vent. To eliminate the effects of corrosion, the fuel tank shall be mounted with stainless steel straps. (no exception).

A .75" drain plug shall be provided in a low point of the tank for drainage.

A fill inlet shall be located on the left hand side rear of the chassis on the vertical portion of the fender skirting area. The inlet shall be covered with a hinged, spring loaded, stainless steel door that is marked "Ultra Low Sulfur - Diesel Fuel Only".

A .50" diameter vent shall be provided running from top of tank to just below fuel fill inlet.

The tank shall meet all FHWA 393.67 requirements, including a fill capacity of 95 percent of tank volume.

All fuel lines shall be of the wire braided type. Reusable fittings shall be provided.

| | Bidder Complies | |
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| | Yes | No |

**DIESEL EXHAUST FLUID TANK**
A 4.5 gallon diesel exhaust fluid (DEF) tank shall be provided and mounted in the driver's side body forward of the rear axle.

A 0.50" drain plug shall be provided in a low point of the tank for drainage.

A fill inlet shall be located on the driver's side of the body and be covered with a hinged painted door that is marked "Diesel Exhaust Fluid Only".

The tank shall meet the engine manufacturers requirement for 10 percent expansion space in the event of tank freezing.

The tank shall include an integrated heater unit that utilizes engine coolant to thaw the DEF in the event of freezing.

**FUEL PRIMING PUMP**
A Cummins automatic electronic fuel priming pump shall be integrated as part of the engine.

**FUEL SHUTOFF**
A fuel line shutoff valve shall be installed on both the inlet and outlet of the primary fuel filter.

**FUEL COOLER**
An air to fuel cooler shall be installed in the engine fuel return line.

**FUEL LINES**
The fuel lines for the fuel tank shall be a minimum of 4' longer than standard. This shall allow the lines to be coiled above the fuel tank and aid in an easier removal of the fuel tank if necessary.

**FUEL SEPARATOR**
The engine shall be equipped with a Racor in-line spin-on fuel and water separator in addition to the engine fuel filters.

**TRANSMISSION**
An Allison 6th generation, Model EVS 4500P, electronic, torque converting, automatic transmission shall be provided.

The transmission shall be equipped with prognostics to monitor oil life, filter life, and transmission health. A wrench icon on the shift selector's digital display shall indicate when service is due.

Two (2) PTO openings shall be located on left side and top of converter housing (positions 8 o'clock and 1 o'clock).

A transmission temperature gauge with amber light and buzzer shall be installed on the cab instrument panel.

**TRANSMISSION SHIFTER**
A six (6)-speed push button shift module shall be mounted to right of driver on console. Shift position indicator shall be indirectly lit for after dark operation.

| | Bidder Complies | |
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| | Yes | No |

The transmission ratio shall be: 1st - 4.70 to 1.00, 2nd - 2.21 to 1.00, 3rd - 1.53 to 1.00, 4th - 1.00 to 1.00, 5th - 0.76 to 1.00, 6th - 0.67 to 1.00, R - 5.55 to 1.00.

**TRANSMISSION COOLER**
A Modine plate and fin transmission oil cooler shall be provided using engine coolant to control the transmission oil temperature.

**TRANSMISSION PROGRAM**
The transmission shall shift to neutral when parking brake is set.

**DRIVELINE**
Drivelines shall be a heavy-duty metal tube and be equipped with Spicer® 1810 universal joints.

The shafts shall be dynamically balanced before installation.

A splined slip joint shall be provided in each driveshaft where the driveline design requires it. The slip joint shall be coated with Glidecoat® or equivalent.

**STEERING**
Dual Sheppard, Model M110, steering gears, with integral heavy-duty power steering, shall be provided. For reduced system temperatures, the power steering shall incorporate an air to oil cooler and an Eaton, Model VN20, hydraulic pump with integral pressure and flow control. All power steering lines shall have wire braded lines with crimped fittings.

A tilt and telescopic steering column shall be provided to improve fit for a broader range of driver configurations.

**STEERING WHEEL**
The steering wheel shall be 18.00" in diameter, have tilting and telescoping capabilities, and a 4-spoke design.

**LOGO AND CUSTOMER DESIGNATION ON DASH**
The dash panel shall have an emblem containing the fire apparatus manufacturer's logo and customer name. The emblem shall have three (3) rows of text for the customer's department name. There shall be a maximum of eight (8) characters in the first row, 11 characters in the second row and 11 characters in the third row.

The first row of text shall be: Ann Arbor

The second row of text shall be: Fire

The third row of text shall be: Department

**BUMPER**
A one (1)-piece, 0.25" thick steel channel bumper, a minimum 10.00" high shall be attached to the front of the chassis frame. The bumper shall be painted job color.

A 9.00" formed steel channel shall be mounted directly behind bumper for additional strength.

The bumper shall be extended 10.00" from front face of cab.

| | Bidder Complies | |
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| | Yes | No |

**Gravel Pan**
A gravel pan, constructed of bright aluminum treadplate, shall be furnished between the bumper and cab face. The gravel pan shall be properly supported from the underside to prevent flexing and vibration of the aluminum treadplate.

**LIFT AND TOW MOUNTS**
Mounted to the frame extension shall be lift and tow mounts. The lift and tow mounts shall be designed and positioned to adapt to certain tow truck lift systems.

The lift and tow mounts with eyes shall be painted the same color as the frame.

**TOW HOOKS**
Two (2) painted steel tow hooks shall be installed under the bumper and attached to the front frame members. The tow hooks shall be painted to match the chassis frame assembly.

The tow hooks shall be designed and positioned to allow up to a 6,000 lb straight horizontal pull in line with the centerline of the vehicle. The tow hooks shall not be used for lifting of the apparatus.

**FRONT BUMPER NOTCH**
The front bumper shall be notched for recessing of the Q2B siren. The notch shall be designed so that the bumper is one continuous piece. The notch shall be welded in place for strength with a continuous top and bottom flange. All welds shall be metal finished for appearance. The siren shall be located left side, bumper position #7 of the bumper.

**FRONT BUMPER UL-LX COATING**
Protective black UL-LX® coating shall be provided on the outside exterior of the top front bumper flange. It shall not be sprayed on the underside of the flange.

The lining shall be properly installed by an authorized UL-LX dealer.

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

The cab shall be built by the apparatus manufacturer in a facility located on the manufacturer's premises (no exception).

For reasons of structural integrity and enhanced occupant protection, the cab shall be a heavy duty design, constructed to the following minimal standards.

The cab shall have 12 main vertical structural members located in the A-pillar (front cab corner posts), B-pillar (side center posts), C-pillar (rear corner posts), and rear wall areas. The A-pillar shall be constructed of solid A356-T5 aluminum castings. The B-pillar and C-pillar shall be constructed from 0.13" wall extrusions. The rear wall shall be constructed of two (2) 2.00" x 2.00" outer aluminum extrusions and two (2) 2.00" x 1.00" inner aluminum extrusions. All main vertical structural members shall run from the floor to 4.625" x 3.864" x 0.090" thick roof extrusions to provide a cage-like structure with the A-pillar and roof extrusions being welded into a 0.25" thick corner casting at each of the front corners of the roof assembly.

| | Bidder Complies | |
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| | Yes | No |

The front of the cab shall be constructed of a 0.13" firewall plate, covered with a minimum 0.090" front skin thickness, and reinforced with a full width x 0.50" thick cross-cab support located just below the windshield and fully welded to the engine tunnel. The cross-cab support shall run the full width of the cab and weld to each A-pillar, the 0.13" firewall plate, and the front skin.

The cab floors shall be constructed of 0.125" thick aluminum plate and reinforced at the firewall with an additional 0.25" thick cross-floor support providing a total thickness of 0.375" of structural material at the front floor area. The front floor area shall also be supported with two (2) triangular 0.30" wall extrusions that also provides the mounting point for the cab lift. This tubing shall run from the floor wireway of the cab to the engine tunnel side plates, creating the structure to support the forces created when lifting the cab.

The cab shall be 96.00" wide (outside door skin to outside door skin) to maintain maximum maneuverability (no exception).

The centerline of front axle to the rear of the cab shall be 60.00" long.

The cab shall have an overall height (from the cab roof to the ground) of approximately 99.00". The overall height listed shall be calculated based on a truck configuration with the lowest suspension weight rating, the smallest diameter tires for the suspension, no water weight, no loose equipment weight, and no personnel weight. Larger tires, wheels, and suspension shall increase the overall height listed.

The floor to ceiling height inside the crew cab shall be 54.50" in the center and outboard positions.

The crew cab floor shall measure 36.00" from the rear wall to the front of the rear facing seat risers.

The medium block engine tunnel, at the rearward highest point (knee level), shall measure 51.50" to the rear wall. The big block engine tunnel shall measure 41.50" to the rear wall.

The crew cab shall be a totally enclosed design with the interior area completely open to improve visibility and verbal communication between the occupants.

The cab shall be a full tilt cab style.

A 3-point cab mount system with rubber isolators shall improve ride quality by isolating chassis vibrations from the cab.

**CAB ROOF DRIP RAIL**

For enhanced protection from inclement weather, a drip rail shall be furnished on the sides of the cab. The drip rail shall be painted to match the cab roof, and bonded to the sides of the cab. The drip rail shall extend the full length of the cab roof.

**FENDER LINERS**

Full circular inner fender liners in the wheel wells shall be provided.

**PANORAMIC WINDSHIELD**

A one (1)-piece safety glass windshield shall be provided with over 2,775 square inches of clear viewing area. The windshield shall be full width and shall provide the occupants with a panoramic view. The windshield shall consist of three (3) layers: outer light, middle safety laminate, and inner light. The outer light layer shall provide superior chip resistance. The middle safety laminate layer shall prevent the

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

windshield glass pieces from detaching in the event of breakage. The inner light shall provide yet another chip resistant layer. The cab windshield shall be bonded to the aluminum windshield frame using a urethane adhesive. A custom frit pattern shall be applied on the outside perimeter of the windshield for a finished automotive appearance.

**WINDSHIELD WIPERS**

Three (3) electric windshield wipers with washer shall be provided that meet FMVSS and SAE requirements.

The washer reservoir shall be able to be filled without raising the cab.

**ENGINE TUNNEL**

Engine tunnel side walls shall be constructed of 0.375" aluminum. The top shall be constructed of 0.125" aluminum and shall be tapered at the top to allow for more driver and passenger elbow room.

The engine tunnel shall be insulated for protection from heat and sound. Perforated foil faced insulation shall be over a 1.00" thick closed cell foam affixed with pressure sensitive adhesive and further secured with mechanical fasteners. Thermal rating for this insulation shall be -40 degrees Fahrenheit to 300 degrees Fahrenheit. The noise insulation keeps the dBA level within the limits stated in the current edition of applicable NFPA standards.

The engine tunnel shall be no higher than 18.00" off the crew cab floor (no exception).

**INTERIOR CAB INSULATION**

The cab shall include 1.00" insulation in the ceiling, 1.50" insulation in the side walls, a minimum of 1.00" insulation in the crew cab floor, and 2.00" insulation in the rear wall to maximize acoustic absorption and thermal insulation.

**INTERIOR CREW CAB REAR WALL ADJUSTABLE SEATING (PATENT PENDING)**

The interior rear wall of the crew cab shall have mounting holes every 2.75" to allow for adjustability of the forward facing crew cab seating along the rear wall. Seats shall be adjustable with use of simple hand tools allowing departments flexibility of their seating arrangement should their department needs change.

**CAB REAR WALL EXTERIOR COVERING**

The exterior surface of the rear wall of the cab shall be painted job color.

**CAB LIFT**

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

Hydraulic pump shall have a manual override for backup in the event of electrical failure.

Lift controls shall be located on the right side pump panel or front area of the body in a convenient location.

The cab shall be capable of tilting 43 degrees to accommodate engine maintenance and removal.

The cab shall be locked down by a 2-point normally closed spring loaded hook type latch that fully engages after the cab has been lowered. The system shall be hydraulically actuated to release the normally closed locks when the cab lift control is in the raised position and cab lift system is under

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

pressure. When the cab is completely lowered and system pressure has been relieved, the spring loaded latch mechanisms shall return to the normally closed and locked position.

The hydraulic cylinders shall be equipped with a velocity fuse that protects the cab from accidentally descending when the control is located in the tilt position.

For increased safety, a redundant mechanical stay arm shall be provided that must be manually put in place on the left side between the chassis and cab frame when the cab is in the raised position. This device shall be manually stowed to its original position before the cab can be lowered.

**Cab Lift Interlock**
The cab lift system shall be interlocked to the parking brake. The cab tilt mechanism shall be active only when the parking brake is set and the ignition switch is in the on position. If the parking brake is released, the cab tilt mechanism shall be disabled.

**GRILLE**
A bright finished aluminum mesh grille screen, inserted behind a bright finished grille surround, shall be provided on the front center of the cab.

**DOOR JAMB SCUFFPLATES**
All cab door jambs shall be furnished with a 1.00" brushed stainless steel scuffplate, mounted on the striker side of the jamb.

**SCUFFPLATES, REAR CAB CORNER GUARDS**
Both rear cab corners shall be furnished with a full height, brushed stainless steel corner guard scuffplate. The guard shall extend 1.00" from the corner to protect paint from damage when pulling items (such as booster hose) around the cab.

**MIRRORS**
A Retrac, Model 613423, dual vision, motorized, west coast style mirror, with chrome finish, shall be mounted on each side of the front cab door with spring loaded retractable arms. The flat glass and convex glass shall be heated and adjustable with remote control within reach of the driver.

**FRONT CROSS VIEW MIRROR**
An 8.00" diameter convex mirror shall be provided over the officer's side front corner of the cab. The mirror shall provide the driver with a view of the front bumper and the area several feet in front of the truck.

The mirror housing, tubing, clamps, and hardware shall be constructed of corrosion resistant stainless steel.

**DOORS**
To enhance entry and egress to the cab, the forward cab door openings shall be a minimum of 37.50" wide x 63.37" high. The crew cab doors shall be located on the sides of the cab and shall be constructed in the same manner as the forward cab doors. The crew cab door openings shall be a minimum of 34.30" wide x 63.37" high.

The forward cab and crew cab doors shall be constructed of extruded aluminum with a nominal material thickness of 0.093". The exterior door skins shall be constructed from 0.090" aluminum.

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| | Yes | No |

A customized, vertical, pull-down type door handle shall be provided on the exterior of each cab door. The finish of the door handle shall be chrome/black. The exterior handle shall be designed specifically for the fire service to prevent accidental activation, and shall provide 4.00" wide x 2.00" deep hand clearance for ease of use with heavy gloved hands.

Each door shall also be provided with an interior flush, open style paddle handle that shall be readily operable from fore and aft positions, and be designed to prevent accidental activation. The interior handles shall provide 4.00" wide x 1.25" deep hand clearance for ease of use with heavy gloved hands.

The cab doors shall be provided with both interior (rotary knob) and exterior (keyed) locks exceeding FMVSS standards. The keys shall be Model 751. The locks shall be capable of activating when the doors are open or closed. The doors shall remain locked if locks are activated when the doors are opened, then closed.

A full length, heavy duty, stainless steel, piano-type hinge with a 0.38" pin and 11 gauge leaf shall be provided on all cab doors. There shall be double automotive-type rubber seals around the perimeter of the door framing and door edges to ensure a weather-tight fit.

A chrome handle shall be provided on the inside of each cab door for ease of entry.

A red webbed grab handle shall be installed on the crew cab door stop strap. The grab handles shall be securely mounted.

The bottom cab step at each cab door location shall be located below the cab doors and shall be exposed to the exterior of the cab.

**Door Panels**
The inner cab door panels shall be constructed out of brushed stainless steel.

**ELECTRIC OPERATED CAB DOOR WINDOWS**
All four (4) cab doors shall be equipped with electric operated windows with one (1) flush mounted automotive style switch on each door. The driver's door shall have four (4) switches, one (1) to control each door window.

Each switch shall allow intermittent or auto down operation for ease of use. Auto down operation shall be actuated by holding the window down switch for approximately 1 second.

**ELECTRIC CAB DOOR LOCKS**
The front driver and officer doors shall have a door lock master switch that shall control all front and rear crew cab door locks. Each rear crew cab door shall have its own lock control.

There shall be one (1) concealed switch located DS pump panel.

**CAB STEPS**
The forward cab and crew cab access steps shall be a full size two (2) step design to provide largest possible stepping surfaces for safe ingress and egress. The bottom steps shall be designed with a grip pattern punched into bright aluminum treadplate material to provide support, slip resistance, and drainage. The bottom steps shall be a bolt-in design to minimize repair costs should they need to be

| | Bidder Complies | |
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| | Yes | No |

replaced. The forward cab steps shall be a minimum 25.00" wide, and the crew cab steps shall be 21.65" wide with an 8.00" minimum depth. The inside cab steps shall not exceed 16.50" in height.

The vertical surfaces of the step well shall be aluminum treadplate.

**CAB EXTERIOR HANDRAILS**

A 1.25" diameter slip-resistant, knurled aluminum handrail shall be provided adjacent to each cab and crew cab door opening to assist during cab ingress and egress.

**STEP LIGHTS**

There shall be six (6) white LED step lights with chrome housing installed for cab and crew cab access steps.

- One (1) light for the left side cab access steps.
- Two (2) lights for the left side crew cab access steps.
- Two (2) lights for the right side crew cab access steps.
- One (1) light for the right side cab access step.

In order to ensure exceptional illumination, each light shall provide a minimum of 25 foot-candles (fc) covering an entire 15" x 15" square placed ten (10) inches below the light and a minimum of 1.5 fc covering an entire 30" x 30" square at the same ten (10) inch distance below the light.

The lights shall be activated when the battery switch is on and the adjacent door is opened.

**FENDER CROWNS**

Stainless steel fender crowns shall be installed at the cab wheel openings.

**FIFTH WHEEL**

The fifth wheel shall be designed to allow the tiller trailer to pivot fore & aft and be rotated. The fifth wheel shall also be capable of full operation up to a 14 degree break over angle.

A fill and a gauge port shall be provided on the top of the trailer goose neck for maintenance.

**LOCKOUT**

A fifth wheel lockout system shall be provided to limit motion during aerial operations.

The fifth wheel lockout system, when activated, shall prevent movement between the upper and lower plates of the fifth wheel assembly.

In the normal road travel condition the cylinder mounted solenoid valves shall be open and shall allow transfer of oil between the front and rear pair of cylinders.

When the stabilizers are in their proper supporting position and as the aerial leaves the boom support, the solenoid valves shall close.

The closed valves shall allow no oil to be transferred and the fifth wheel assembly shall become rigid.

There shall be a cylinder lockout indicator located in the cab.

| | Bidder Complies | |
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| | Yes | No |

**FENDER PANELS**
The chassis behind the cab shall be assembled with fender panels over the wheels.

The fender panels shall be fabricated of .125"-5052 aluminum with a 38,000 psi tensile strength.

Fender design shall be provided for prevention of rust pockets and ease of maintenance.

**FENDER CROWNS**
Stainless steel fender crowns shall be provided around the rear wheel openings.

A rubber welting shall be provided between the body and the crown to seal the seam and restrict moisture from entering.

A dielectric barrier shall be provided between the fender crown fasteners (screws) and the fender sheet metal to prevent corrosion.

**WALKWAY**
The area over the frame rails between the cab and fifth wheel shall be covered with aluminum treadplate to serve as a walkway area.

The walkway area shall be properly reinforced with a steel substructure attached to the frame rails.

**RUNNING BOARDS**
Running boards shall be installed on each side directly behind the cab for access to the walkway area behind the cab and the turntable.

The running boards shall be covered with aluminum treadplate.

**HANDRAILS BELOW CAB WINDSHIELD**
A 10.00" long x 1.25" diameter handrail shall be mounted below the front cab windshield, one (1) on each side. The handrails shall be extruded aluminum with a ribbed design to provide a positive gripping surface.

**WEBBED GRAB HANDLE ON INTERIOR CAB DOORS**
Installed on the interior of the driver and officer cab door stop strap shall be a red webbed grab handle. The grab handles shall be securely mounted.

**CREW CAB WINDOWS**
One (1) fixed window with tinted glass shall be provided on each side of the cab, to the rear of the front cab door. The windows shall be sized to enhance light penetration into the cab interior. The windows shall measure 18.70" wide x 23.75" high.

**LEFT SIDE ROLLUP CREW CAB DOOR WINDOW TINT**
The rollup window in the left side crew cab door shall be tinted privacy dark gray.

**BEHIND LEFT SIDE CAB DOOR WINDOW TINT**
The window behind the left side front cab door shall be tinted privacy dark gray.

**BEHIND RIGHT SIDE CAB DOOR WINDOW TINT**
The window behind the right side front cab door shall be tinted privacy dark gray.

| | Bidder Complies | |
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| | Yes | No |

**RIGHT SIDE ROLLUP CREW CAB DOOR WINDOW TINT**
The rollup window in the right side crew cab door shall be tinted privacy dark gray.

**WINDOW PROTECTOR BARS, CREW CAB DOORS**
A knurled window protector bar shall be installed on each crew cab door, 2.00" above the bottom of the window opening. The bar shall extend from the front of the crew cab door to the rear of the crew cab door, mounted as close to the door frame as possible.

**CAB DOOR OPEN**
All cab doors to open 90 degrees.

**CAB DASH**
The driver side dash, switch panel located to the right of the driver, and center console shall be constructed of metal and painted fire smoke gray.

The officer side dash shall be a flat top design with an upper beveled edge to provide easy maintenance and shall be constructed out of aluminum and painted to match the cab interior.

The instrument gauge cluster shall be surrounded with a high impact ABS plastic contoured to the same shape of the instrument gauge cluster.

**WORK SURFACE**
There shall be a work surface provided on the engine tunnel. The work surface shall contour to match the lower area at the front of the engine tunnel (if applicable). The rest of the work surface shall be flat. It shall not contour to the engine tunnel. The work surface shall be spaced off the engine tunnel 1.00". The work surface shall cover the entire engine tunnel and shall be constructed of 0.25" aluminum to allow for the mounting of equipment. The rear of the work surface shall be enclosed on the left and right sides and open at the rear to allow for storage under the work surface. The rear of the work surface shall be enclosed with one (1) drop down door, painted to match the cab interior with two (2) non-locking flush lift and turn latches.

The work surface shall be painted to match the cab interior.

**CAB INTERIOR**
The cab interior shall be constructed of primarily metal (painted aluminum) to withstand the severe duty cycles of the fire service.

The engine tunnel shall be painted aluminum to match the cab interior.

For durability and ease of maintenance, the cab interior side walls shall be painted aluminum. The rear wall shall be painted aluminum.

Headliner shall be installed in both forward and rear cab sections. Headliner material shall be vinyl. A sound barrier shall be part of its composition. Material shall be installed on aluminum sheet and securely fastened to interior cab ceiling.

Forward portion of cab headliner shall permit easy access for service of electrical wiring or other maintenance needs.

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| | Yes | No |

All wiring shall be placed in metal raceways. Routing through holes in tubing shall not be accepted due to chaffing that installation shall cause.

**CAB INTERIOR UPHOLSTERY**
The cab interior upholstery shall be 36 oz dark silver gray vinyl.

**CAB INTERIOR PAINT**
The cab interior metal surfaces, excluding the rear heater panels, shall be painted fire smoke gray, vinyl texture paint.

The rear heater panels shall be painted black, vinyl textured paint.

**CAB FLOOR**
The cab and crew cab floor areas shall be aluminum treadplate and covered with UL-LX® polyurethane/polyurea elastomer abrasive resistant material.

UL-LX covering shall be dark gray in color.

**DEFROST/AIR CONDITIONING SYSTEM**
A ceiling mounted combination heater, defroster and air conditioning system shall be installed in the cab above the engine tunnel area.

**Cab Defroster**
A 54,000 BTU heater-defroster unit with 690 SCFM of air flow shall be provided inside the cab. The heater-defrost shall be installed in the forward portion of the cab ceiling. Air outlets shall be strategically located in the cab header extrusion per the following:

- One (1) adjustable outlet directed towards the left side cab window.
- One (1) adjustable outlet directed towards the right side cab window.
- Six (6) fixed outlets directed at the windshield.

The defroster shall be capable of clearing 98 percent of the windshield and side glass when tested under conditions where the cab has been cold soaked at 0 degrees Fahrenheit for 10 hours, and a 2 ounce per square inch layer of frost/ice has been able to build up on the exterior windshield. The defroster system shall meet or exceed SAE J382 requirements.

**Cab/Crew Auxiliary Heater**
There shall be no auxiliary heater provided in the rear facing seat risers.

**Air Conditioning**
A 19.10 cubic inch compressor shall be installed on the engine.

A roof-mounted condenser with a 78,000 BTU output at 2,400 SCFM that meets and exceeds the performance specification shall be installed on the cab roof. Mounting the condenser below the cab or body would reduce the performance of the system and shall not be acceptable. The condenser cover to be painted to match the cab roof.

The air conditioning system shall be capable of cooling the average cab temperature from 100 degrees Fahrenheit to 75 degrees Fahrenheit at 50 percent relative humidity within 30 minutes. The cooling

| | Bidder Complies | |
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| | Yes | No |

performance test shall be run only after the cab has been heat soaked at 100 degrees Fahrenheit for a minimum of 4 hours.

The evaporator unit shall be installed in the rear portion of the cab ceiling over the engine tunnel. The evaporator shall include one (1) high performance heating core, one (1) high performance cooling core with (1) plenum directed to the front and one (1) plenum directed to the rear of the cab. The rear plenum shall be covered with a metal cover painted to match the cab interior.

The evaporator unit shall have a 52,000 BTU at 690 SCFM rating that meets and exceeds the performance specifications.

Adjustable air outlets shall be strategically located on the forward plenum cover per the following:

- Four (4) outlets directed towards the seating position on the left side of the cab.
- Four (4) outlets directed towards the seating position on the right side of the cab.

Adjustable air outlets shall be strategically located on the rear plenum cover per the following:

- Minimum of five (5) outlets directed towards crew cab area.

A high efficiency particulate air (HEPA) filter shall be included for the system. Access to the filter cover shall be secured with four (4) screws.

The air conditioner refrigerant shall be R-134A and shall be installed by a certified technician.

**Climate Control**

An automotive style controller shall be provided to control the heat and air conditioning system within the cab. The controller shall have three (3) functional knobs for fan speed, temperature, and air flow distribution (front to rear) control.

The system shall control the temperature of the cab and crew cab automatically by pushing the center of the fan speed control knob. Rotate the center temperature control knob to set the cab and crew cab temperature.

The AC system shall be manually activated by pushing the center of the temperature control knob. Pushing the center of the air flow distribution knob shall engage the AC for max defrost, setting the fan speeds to 100 percent and directing all air flow to the overhead forward position.

The system controller shall be located within panel position #13.

**Gravity Drain Tubes**

Two (2) condensate drain tubes shall be provided for the air conditioning evaporator. The drip pan shall have two (2) drain tubes plumbed separately to allow for the condensate to exit the drip pan. No pumps shall be provided.

**SUN VISORS**

There shall be two (2) vinyl covered sun visors provided. The sun visors shall be located above the windshield with one (1) mounted on each side of the cab.

There shall be a black plastic thumb latch provided to help secure each sun visor in the stowed position.

| | Bidder Complies | |
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| | Yes | No |

**GRAB HANDLES**
A black rubber covered grab handle shall be mounted on the door post of the driver and officer's side cab door to assist in entering the cab. The grab handles shall be securely mounted to the post area between the door and windshield.

**ENGINE COMPARTMENT LIGHTS**
There shall be one (1) Whelen, Model 3SC0CDCR, 12 volt DC, 3.00" white LED light(s) with Whelen, Model 3FLANGEC, chrome flange kit(s) installed under the cab to be used as engine compartment illumination.

These light(s) shall be activated automatically when the cab is raised.

**ACCESS TO ENGINE DIPSTICKS**
For access to the engine oil and transmission fluid dipsticks, there shall be a door on the engine tunnel, inside the crew cab. The door shall be on the rear wall of the engine tunnel, on the vertical surface.

The engine oil dipstick shall allow for checking only. The transmission dipstick shall allow for both checking and filling.

The door shall have a rubber seal for thermal and acoustic insulation. One (1) flush lift and turn latch shall be provided on the access door.

**SEATING CAPACITY**
The seating capacity of the vehicle (including tiller cab and belted seat positions in the rescue body) shall be seven (7).

**DRIVER SEAT**
A seat shall be provided in the cab for the driver. The seat design shall be a cam action type, with air suspension. For increased convenience, the seat shall include a manual control to adjust the horizontal position (6.00" travel). The manual horizontal control shall be a towel-bar style located below the forward part of the seat cushion. To provide flexibility for multiple driver configurations, the seat shall have an adjustable reclining back. The seat back shall be a high back style with side bolster pads for maximum support. For optimal comfort, the seat shall be provided with 17.00" deep foam cushions designed with EVC (elastomeric vibration control).

The seat shall be furnished with a 3-point, shoulder type seat belt.

**OFFICER SEAT**
A seat shall be provided in the cab for the passenger. The seat shall be a fixed type with no suspension. For optimal comfort, the seat shall be provided with 17.00" deep foam cushions designed with EVC (elastomeric vibration control).

The seat back shall be an SCBA back style with 5 degree fixed recline angle. The SCBA cavity shall be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity shall be accomplished by unbolting, relocating, and re-bolting it in the desired location.

The seat shall be furnished with a 3-point, shoulder type seat belt.

| | Bidder Complies | |
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| | Yes | No |

**RADIO COMPARTMENT**
A radio compartment shall be provided under the officer's seat.

The inside compartment dimensions shall be 16.00" wide x 7.50" high x 15.00" deep, with the back of the compartment angled up to match the cab structure.

A drop-down door with one (1) flush lift and turn latch shall be provided for access.

The compartment shall be constructed of smooth aluminum and painted to match the cab interior.

**REAR FACING DRIVER SIDE OUTBOARD SEAT**
There shall be one (1) rear facing seat provided at the driver side outboard position in the crew cab. For optimal comfort, the seat shall be provided with 17.00" deep foam cushions designed with EVC (elastomeric vibration control).

The seat back shall be an SCBA back style with 5 degree fixed recline angle. The SCBA cavity shall be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity shall be accomplished by unbolting, relocating, and re-bolting it in the desired location.

The seat shall be furnished with a 3-point, shoulder type seat belt.

**REAR FACING PASSENGER SIDE OUTBOARD SEAT**
There shall be one (1) rear facing seat provided at the passenger side outboard position in the crew cab. For optimal comfort, the seat shall be provided with 17.00" deep foam cushions designed with EVC (elastomeric vibration control).

The seat back shall be an SCBA back style with 5 degree fixed recline angle. The SCBA cavity shall be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity shall be accomplished by unbolting, relocating, and re-bolting it in the desired location.

The seat shall be furnished with a 3-point, shoulder type seat belt.

**FORWARD FACING CENTER SEATS**
There shall be two (2) forward facing foldup seats provided at the center position in the crew cab. The seat back shall be a high back style with 9 degree fixed recline angle. For optimal comfort, the seats shall be provided with 15.00" deep foam cushions designed with EVC (elastomeric vibration control).

The seats shall be furnished with a 3-point, shoulder type seat belt.

**ARMREST CUSHION**
There shall be one (1) padded armrest cushion(s) provided Drivers Side engine tunnel for the drivers right arm. The foam provided shall be denser than standard. The cushions shall be 1.50" thick and 4.00" wide x 26.00" long.

The upholstery padding shall match the cab interior upholstery.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**SEAT UPHOLSTERY**
All seat upholstery shall be leather grain 36 oz dark silver gray vinyl resistant to oil, grease and mildew. The cab shall have six (6) seating positions.

**AIR BOTTLE HOLDERS**
All SCBA type seats in the cab shall have a "Hands-Free" auto clamp style bracket in its backrest. For efficiency and convenience, the bracket shall include an automatic spring clamp that allows the occupant to store the SCBA bottle by simply pushing it into the seat back. For protection of all occupants in the cab, in the event of an accident, the inertial components within the clamp shall constrain the SCBA bottle in the seat and shall exceed the NFPA standard of 9G. Bracket designs with manual restraints (belts, straps, buckles) that could be inadvertently left unlocked and allow the SCBA to move freely within the cab during an accident, shall not be acceptable.

There shall be a quantity of three (3) SCBA brackets.

**SEAT MOUNT**
All crew cab and officer seats shall be mounted as far rearward on the seat riser as possible.

**SEAT BELTS**
All cab and tiller cab (if applicable) seating positions shall have red seat belts. To provide quick, easy use for occupants wearing bunker gear, the female buckle and seat belt webbing length shall meet or exceed the current edition of applicable NFPA and CAN/ULC - S515 standards.

The 3-point shoulder type seat belts shall include height adjustment. This adjustment shall optimize the belts effectiveness and comfort for the seated firefighter. The 3-point shoulder type seat belts shall be furnished with dual automatic retractors that shall provide ease of operation in the normal seating position.

The 3-point shoulder type belts shall also include the ReadyReach® D-loop assembly to the shoulder belt system. The ReadyReach feature adds an extender arm to the D-loop location placing the D-loop in a closer, easier to reach location.

Any flip up seats shall include a 3-point shoulder type belts only.

To ensure safe operation, the seats shall be equipped with seat belt sensors in the seat cushion and belt receptacle that shall activate an alarm indicating a seat is occupied but not buckled.

**HELMET STORAGE PROVIDED BY DEALER**
NFPA 1900, 2024 edition, section 11.1.8.4.1 and CAN/ULC S515:2024 edition, section 5.2, requires a location for helmet storage be provided.

There is no helmet storage on the apparatus as manufactured. The dealer shall provide a location for storage of helmets.

**CAB DOME LIGHTS**
There shall be four (4) dual LED dome lights with black bezels provided. Two (2) lights shall be mounted above the inside shoulder of the driver and officer and two (2) lights shall be installed and located, one (1) on each side of the crew cab.

| | Bidder Complies | |
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| | Yes | No |

The color of the LED's shall be red and white.

The white LED's shall be controlled by the door switches and the lens switch.

The color LED's shall be controlled by the lens switch.

In order to ensure exceptional illumination, each white LED dome light shall provide a minimum of 10.1 foot-candles (fc) covering an entire 20.00" x 20.00" square seating position when mounted 40.00" above the seat.

**ENHANCED SOFTWARE FOR CAB AND CREW CAB DOME LIGHTS**

The cab and crew cab dome lights shall remain on for 10 seconds for improved visibility after the doors are closed.

The dome lights shall dim after 10 seconds or immediately if the vehicle's transmission is put into gear.

**PORTABLE HAND LIGHTS PROVIDED BY FIRE DEPARTMENT**

The hand lights are not on the apparatus as manufactured. The fire department shall provide and mount these hand lights.

**CAB INSTRUMENTATION**

The cab instrument panel include gauges, an LCD display, telltale indicator lamps, control switches, alarms, and a diagnostic panel. The function of the instrument panel controls and switches shall be identified by a label adjacent to each item. Actuation of the headlight switch shall illuminate the labels in low light conditions. Telltale indicator lamps shall not be illuminated unless necessary. The cab instruments and controls shall be conveniently located within the forward cab section, forward of the driver. The gauge assembly and switch panels are designed to be removable for ease of service and low cost of ownership.

**Gauges**

The gauge panel shall include the following ten (10) black faced gauges with black bezels to monitor vehicle performance:

- Voltmeter gauge (volts):
  - Low volts (11.8 VDC)
    - Amber caution indicator on the information center with intermittent alarm
    - Amber caution light on gauge assembly
  - High volts (15.5 VDC)
    - Amber caution indicator on the information center with intermittent alarm
    - Amber caution light on gauge assembly
  - Very low volts (11.3 VDC)
    - Red warning indicator on the information center with a steady alarm
    - Amber caution light on gauge assembly
  - Very high volts (16.0 VDC)
    - Red warning indicator on the information center with a steady alarm
    - Amber caution light on gauge assembly
- Engine Tachometer (RPM)
- Speedometer MPH (Major Scale), KM/H (Minor Scale)
- Fuel level gauge (Empty - Full in fractions):

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

- Low fuel (1/8 full)
  - Amber caution indicator on the information center with intermittent alarm
  - Amber caution light on gauge assembly
- Very low fuel (1/32 full)
  - Red caution indicator on the information center with steady alarm
  - Amber caution light on gauge assembly

- Engine Oil pressure Gauge (PSI):
  - Low oil pressure to activate engine warning lights and alarms
    - Red caution indicator on the information center with steady alarm
    - Amber caution light on gauge assembly
- Front Air Pressure Gauges (PSI):
  - Low air pressure to activate warning lights and alarm
    - Red warning indicator on the information center with a steady alarm
    - Amber caution light on gauge assembly
- Rear Air Pressure Gauges (PSI):
  - Low air pressure to activate warning lights and alarm
    - Red warning indicator on the information center with a steady alarm
    - Amber caution light on gauge assembly
- Transmission Oil Temperature Gauge (Fahrenheit):
  - High transmission oil temperature activates warning lights and alarm
    - Amber caution indicator on the information center with intermittent alarm
    - Amber caution light on gauge assembly
- Engine Coolant Temperature Gauge (Fahrenheit):
  - High engine temperature activates an engine warning light and alarms
    - Amber caution indicator on the information center with intermittent alarm
    - Amber caution light on gauge assembly
- Diesel Exhaust Fluid Level Gauge (Empty - Full in fractions):
  - Low fluid (1/8 full)
    - Amber indicator light in gauge dial

All gauges shall perform prove out at initial power-up to ensure proper performance.

**Indicator Lamps**

To promote safety, the following telltale indicator lamps shall be located on the instrument panel in clear view of the driver. The indicator lamps shall be "dead-front" design that is only visible when active. The colored indicator lights shall have descriptive text or symbols.

The following amber telltale lamps shall be present:

- Low coolant
- Trac cntl (traction control) (where applicable)
- Check engine
- Check trans (check transmission
- Aux brake overheat (Auxiliary brake overheat
- Air rest (air restriction)
- Caution (triangle symbol)
- Water in fuel

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

- DPF (engine diesel particulate filter regeneration)
- Trailer ABS (where applicable)
- Wait to start (where applicable)
- HET (engine high exhaust temperature) (where applicable)
- ABS (antilock brake system)
- MIL (engine emissions system malfunction indicator lamp) (where applicable)
- Side roll fault (where applicable)
- Front air bag fault (where applicable)

The following red telltale lamps shall be present:

- Warning (stop sign symbol)
- Seat belt
- Parking brake
- Stop engine
- Rack down

The following green telltale lamps shall be provided:

- Left turn
- Right turn
- Battery on

The following blue telltale lamp shall be provided:

- High beam

**Alarms**

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

Audible pulsing tone caution alarm: A pulsing audible tone alarm (chime/chirp) shall be provided whenever a caution message is present without a warning message being present.

Alarm silence: Any active audible alarm shall be able to be silenced by holding the ignition switch at the top position for three (3) to five (5) seconds. For improved safety, silenced audible alarms shall intermittently chirp every 30 seconds until the alarm condition no longer exists. The intermittent chirp shall act as a reminder to the operator that a caution or warning condition still exists. Any new warning or caution condition shall enable the steady or pulsing tones respectively.

**Indicator Lamp and Alarm Prove-Out**

A system shall be provided which automatically tests telltale indicator lights and alarms located on the cab instrument panel. Telltale indicators and alarms shall perform prove-out at initial power-up to ensure proper performance.

**Control Switches**

For ease of use, the following controls shall be provided immediately adjacent to the cab instrument panel within easy reach of the driver. All switches shall have backlit labels for low light applications.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

Headlight/Parking light switch: A three (3)-position maintained rocker switch shall be provided. The first switch position shall deactivate all parking and headlights. The second switch position shall activate the parking lights. The third switch shall activate the headlights.

Panel back lighting intensity control switch: A three (3)-position momentary rocker switch shall be provided. Pressing the top half of the switch, "Panel Up" increases the panel back lighting intensity and pressing the bottom half of the switch, "Panel Down" decreases the panel back lighting intensity. Pressing the half or bottom half of the switch several times shall allow back lighting intensity to be gradually varied from minimum to maximum intensity level for ease of use.

Ignition switch: A three (3)-position maintained/momentary rocker switch shall be provided. The first switch position shall turn off and deactivate vehicle ignition. The second switch position shall activate vehicle ignition and shall perform prove-out on the telltale indicators and alarms for 3 to 5 seconds after the switch is turned on. A green indicator lamp is activated with vehicle ignition. The third momentary position shall temporarily silence all active cab alarms. An alarm "chirp" may continue as long as alarm condition exists. Switching ignition to off position shall terminate the alarm silence feature and reset function of cab alarm system.

Engine start switch: A two (2)-position momentary rocker switch shall be provided. The first switch position is the default switch position. The second switch position shall activate the vehicle's engine. The switch actuator is designed to prevent accidental activation.

Hazard switch shall be provided on the instrument panel or on the steering column.

Heater, defroster, and air conditioning control panel.

Turn signal arm: A self-canceling turn signal with high beam headlight controls shall be provided.

Windshield wiper control shall include high, low, and intermittent modes.

Parking brake control: An air actuated push/pull park brake control valve shall be provided.

Chassis horn control: Activation of the chassis horn control shall be provided through the center of the steering wheel.

High idle engagement switch: A momentary rocker switch with integral indicator lamp shall be provided. The switch shall activate and deactivate the high idle function. The "OK To Engage High Idle" indicator lamp must be active for the high idle function to engage. A green indicator lamp integral to the high idle engagement switch shall indicate when the high idle function is engaged.

"OK To Engage High Idle" indicator lamp: A green indicator light shall be provided next to the high idle activation switch to indicate that the interlocks have been met to allow high idle engagement.

Emergency switching shall be controlled by a single Emergency Master switch which controls all emergency warning lights including lightbars, cab warning lights, body warning lights and high beam flash if applicable.

An additional "Emergency Master" button shall be provided on the lower left hand corner of the gauge panel to allow convenient control of the "Emergency Master" system from inside the driver's door when standing on the ground.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**Custom Switch Panels**
The design of cab instrumentation shall allow for emergency lighting and other switches to be placed within easy reach of the operator thus improving safety. There shall be positions for up to four (4) switch panels in the lower instrument console and up to six (6) switch panels in the overhead visor console. All switches have backlit labels for low light conditions.

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

The diagnostic panel shall include the following:

- Engine diagnostic port
- Transmission diagnostic port
- ABS diagnostic port
- Roll sensor diagnostic port
- Command Zone USB diagnostic port
- ABS diagnostic switch (blink codes flashed on ABS telltale indicator)
- Diesel particulate filter regeneration switch (where applicable)
- Diesel particulate filter regeneration inhibit switch (where applicable)

**Cab LCD Display**
A digital four (4)-row by 20-character dot matrix display shall be integral to the gauge panel. The display shall be capable of showing simple graphical images as well as text. The display shall be split into three (3) sections. Each section shall have a dedicated function. The upper left section shall display the outside ambient temperature.

The upper right section shall display the following, along with other configuration specific information:

- Odometer
- Trip mileage
- PTO hours
- Fuel consumption
- Engine hours

The bottom section shall display INFO, CAUTION, and WARNING messages. Text messages shall automatically activate to describe the cause of an audible caution or warning alarm. The LCD shall be capable of displaying multiple text messages should more than one caution or warning condition exist.

**AIR RESTRICTION INDICATOR**
A high air restriction warning indicator light LCD message with amber warning indicator and audible alarm shall be provided.

- Pulsing audible alarm shall be provided in the cab to indicate low DEF fluid.

- Officer Speedometer, An analog speedometer shall be provided on the officer side.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**"DO NOT MOVE APPARATUS" INDICATOR**

A flashing red indicator light, located in the driving compartment, shall be illuminated automatically per the current NFPA requirements. The light shall be labeled "Do Not Move Apparatus If Light Is On."

The same circuit that activates the Do Not Move Apparatus indicator shall activate a steady tone alarm when the parking brake is released.

**DO NOT MOVE TRUCK MESSAGES**

Messages shall be displayed on the Command Zone™, color display located within sight of the driver whenever the Do Not Move Truck light is active. The messages shall designate the item or items not in the stowed for vehicle travel position (parking brake disengaged).

The following messages shall be displayed (where applicable):

- Do Not Move Truck
- DS Cab Door Open (Driver Side Cab Door Open)
- PS Cab Door Open (Passenger's Side Cab Door Open)
- DS Crew Cab Door Open (Driver Side Crew Cab Door Open)
- PS Crew Cab Door Open (Passenger's Side Crew Cab Door Open)
- DS Body Door Open (Driver Side Body Door Open)
- PS Body Door Open (Passenger's Side Body Door Open)
- Rear Body Door Open
- DS Ladder Rack Down (Driver Side Ladder Rack Down)
- PS Ladder Rack Down (Passenger Side Ladder Rack Down)
- Deck Gun Not Stowed
- Lt Tower Not Stowed (Light Tower Not Stowed)
- Fold Tank Not Stowed (Fold-A-Tank Not Stowed)
- Aerial Not Stowed (Aerial Device Not Stowed)
- Stabilizer Not Stowed
- Steps Not Stowed
- Handrail Not Stowed

Any other device that is opened, extended, or deployed that creates a hazard or is likely to cause major damage to the apparatus if the apparatus is moved shall be displayed as a caution message after the parking brake is disengaged.

**SWITCH PANELS**

The built-in switch panels shall be located in the lower console or overhead console of the cab.

The switches shall be rocker-type and include an integral indicator light. For quick, visual indication the switch shall be illuminated whenever the switch is active. A 2-ply, scratch resistant laser engraved Gravoply label indicating the use of each switch shall be placed below the switches. The label shall allow light to pass through the letters for improved visibility in low light conditions. Switches and light source are integral to the switch panel assembly.

**WIPER CONTROL**

Wiper control shall consist of a two (2)-speed windshield wiper control with intermittent feature and windshield washer controls. The control shall be located on the left side of the center instrument panel.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

The wipers shall be interlocked to the parking brake. The wipers shall terminate operation when the parking brake is set.

**HOURMETER - AERIAL DEVICE**
The following aerial hour meter messages shall be included in the information centers:

- Aerial Hours, that keeps track of the time the aerial device is in motion.
- Aerial PTO Hours, that keeps track of the time the aerial master switch is on and the aerial PTO is engaged.

**AERIAL MASTER**
There shall be a master switch for the aerial operating electrical system provided.

**SPARE CIRCUIT**
There shall be one (1) pair of wires, including a positive and a negative, installed on the apparatus.

The above wires shall have the following features:

- The positive wire shall be connected directly to the battery power.
- The negative wire shall be connected to ground.
- Wires shall be protected to 20 amps at 12 volts DC.
- Power and ground shall terminate front of dash.
- Termination shall be to a Blue Sea System, Model 5025, 6 circuit with negative bus bar. The terminal block shall include a cover with circuit labels.

Wires shall be sized to 125% of the protection.

Battery direct loads cannot be Load Managed

**SPARE CIRCUIT**
There shall be one (1) pair of wires, including a positive and a negative, installed on the apparatus.

The above wires shall have the following features:

- The positive wire shall be connected directly to the battery power.
- The negative wire shall be connected to ground.
- Wires shall be protected to 20 amps at 12 volts DC.
- Power and ground shall terminate in front of the officer dash panel.
- Termination shall be to a Blue Sea System, Model 5025, 6 circuit with negative bus bar. The terminal block shall include a cover with circuit labels.

Wires shall be sized to 125% of the protection.

This circuit(s) may be load managed when the parking brake is set.

**SPARE CIRCUIT**
There shall be two (2) dual USB fast charge socket mounts installed on the apparatus.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

The above wires shall have the following features:

- The positive wire shall be connected directly to the battery power.
- The negative wire shall be connected to ground.
- Wires shall be protected to 4.8 amps at 12 volts DC.
- The USB socket mount shall be One (1) on the center of the cab dash and one (1) in the tiller cab.
- Termination shall be a Blue Sea Systems part number 1045 dual USB charger socket.
- Wires shall be sized to 125% of the protection.

Battery direct loads cannot be Load Managed

**INSTRUMENT PANEL MOUNTING BRACKET**

A mounting bracket shall be provided near the officer dash as marked with blue tape for the mounting of officer speedometer The bracket shall be fabricated from smooth aluminum and painted to match work surface.

**INFORMATION CENTER**

An information center employing a 7.00" diagonal touch screen color LCD display shall be encased in an ABS plastic housing.

The information center shall have the following specifications:

- Operate in temperatures from -40 to 158 degrees Fahrenheit
- LCD optically bonded to hardened AR glass lens
- Five weather resistant user interface switches
- Grey with black accents
- Sunlight Readable
- Linux operating system
- Minimum of 1000nits rated display
- Display can be changed to an available foreign language
- A LCD display integral to the cab gauge panel shall be included as outlined in the cab instrumentation area.
- Programmed to read US Customary

**General Screen Design**

Where possible, background colors shall be used to provide "At a Glance" vehicle information. If information provided on a screen is within acceptable limits, a green background shall be used.

If a caution or warning situation arises the following shall occur:

- An amber background/text color shall indicate a caution condition
- A red background/text color shall indicate a warning condition
- The information center shall utilize an "Alert Center" to display text messages for audible alarm tones. The text messages shall be written to identify the item(s) causing the audible alarm to sound. If more than one (1) text message occurs, the messages shall cycle every second until the problem(s) have been resolved. The background color for the "Alert Center" shall change to

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

indicate the severity of the "warning" message. If a warning and a caution condition occur simultaneously, the red background color shall be shown for all alert center messages.

- A label for each button shall exist. The label shall indicate the function for each active button for each screen. Buttons that are not utilized on specific screens shall have a button label with no text or symbol.

**Home/Transit Screen**

This screen shall display the following:

- Vehicle Mitigation (if equipped)
- Water Level (if the water level system includes compatible communications to the information center)
- Foam Level (if the foam level system includes compatible communications to the information center)
- Seat Belt Monitoring Screen
- Tire Pressure Monitoring (if equipped)
- Digital Speedometer
- Active Alarms

**On Scene Screen**

This screen shall display the following and shall be auto activated with pump engaged (if equipped):

- Battery Voltage
- Fuel
- Oil Pressure
- Coolant Temperature
- RPM
- Water Level (if equipped)
- Foam Level (if equipped)
- Foam Concentration (if equipped)
- Water Flow Rate (if equipped)
- Water Used (if equipped)
- Active Alarms

**Virtual Buttons**

There shall be four (4) virtual switch panel screens that match the overhead and lower lighting and HVAC switch panels.

**Page Screen**

The page screen shall display the following and allow the user to progress into other screens for further functionality:

- Diagnostics
  - Faults
    - Listed by order of occurrence
    - Allows to sort by system
  - Interlock

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

        - Throttle Interlocks
        - Pump Interlocks (if equipped)
        - Aerial Interlocks (if equipped)
        - PTO Interlocks (if equipped)
    - Load Manager
        - A list of items to be load managed shall be provided. The list shall provide a description of the load.
        - The lower the priority numbers the earlier the device shall be shed should a low voltage condition occur.
        - The screen shall indicate if a load has been shed (disabled) or not shed.
        - "At a glance" color features are utilized on this screen.
    - Systems
        - Command Zone
            - Module type and ID number
            - Module Version
            - Input or output number
            - Circuit number connected to that input or output
            - Status of the input or output
            - Power and Constant Current module diagnostic information
        - Foam (if equipped)
        - Pressure Controller (if equipped)
        - Generator Frequency (if equipped)
    - Live Data
        - General Truck Data
- Maintenance
    - Engine oil and filter
    - Transmission oil and filter
    - Pump oil (if equipped)
    - Foam (if equipped)
    - Aerial (if equipped)
- Setup
    - Clock Setup
    - Date & Time
        - 12 or 24 hour format
        - Set time and date
    - Backlight
        - Daytime
        - Night time
        - Sensitivity
    - Unit Selection
    - Home Screen
    - Virtual Button Setup
    - On Scene Screen Setup
    - Configure Video Mode
        - Set Video Contrast
        - Set Video Color

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

        - Set Video Tint
- Do Not Move
    - The screen shall indicate the approximate location and type of item that is open or is not stowed for travel. The actual status of the following devices shall be indicated
        - Driver Side Cab Door
        - Passenger's Side Cab Door
        - Driver Side Crew Cab Door
        - Passenger's Side Crew Cab Door
        - Driver Side Body Doors
        - Passenger's Side Body Doors
        - Rear Body Door(s)
        - Ladder Rack (if applicable)
        - Deck Gun (if applicable)
        - Light Tower (if applicable)
        - Hatch Door (if applicable)
        - Stabilizers (if applicable)
        - Steps (if applicable)
- Notifications
    - View Active Alarms
        - Shows a list of all active alarms including date and time of the occurrence is shown with each alarm
        - Silence Alarms - All alarms are silenced
- Timer Screen
- HVAC (if equipped)
- Tire Information (if equipped)
- Ascendant Set Up Confirmation (if equipped)

Button functions and button labels may change with each screen.

**JACKKNIFE WARNING INDICATOR**

The Command Zone™ touch screen shall display a jackknife warning indicator or message when the jackknife alarm is active.

**VEHICLE DATA RECORDER**

There shall be a vehicle data recorder (VDR) capable of reading and storing vehicle information provided.

The information stored on the VDR can be downloaded through a USB port mounted in a convenient location determined by cab model. A USB cable can be used to connect the VDR to a laptop to retrieve required information. The program to download the information from the VDR will be available to download on-line.

The vehicle data recorder shall be capable of recording the following data via hardwired and/or CAN inputs:

- Vehicle Speed - MPH
- Acceleration - MPH/sec
- Deceleration - MPH/sec
- Engine Speed - RPM

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

- Engine Throttle Position - % of Full Throttle
- ABS Event - On/Off
- Seat Occupied Status - Yes/No by Position
- Seat Belt Buckled Status - Yes/No by Position
- Master Optical Warning Device Switch - On/Off
- Internal clock syncs the time and date when a laptop is connected

**Seat Belt Monitoring System**

A seat belt monitoring system (SBMS) shall be provided on the color display and in the center overhead of the cab instrument panel. The SBMS shall be capable of monitoring up to 10 seating positions indicating the status of each seat position per the following:

- Seat Occupied & Buckled = Green LED indicator illuminated
- Seat Occupied & Unbuckled = Red LED indicator with audible alarm
- No Occupant & Buckled = Red LED indicator with audible alarm
- No Occupant & Unbuckled = No indicator and no alarm

The seat belt monitoring screen shall become active on the color display when:

- The home screen is active:
  - and there is any occupant seated but not buckled or any belt buckled with an occupant.
  - and there are no other Do Not Move Apparatus conditions present. As soon as all Do Not Move Apparatus conditions are cleared, the SBMS shall be activated.

The SBMS shall include an audible alarm that shall warn that an unbuckled occupant condition exists and the parking brake is released, or the transmission is not in park.

**SEAT BELT DISPLAY IN CAB**

The seat belt display in the cab shall be located in the left side overhead switch panel per the switch panel layouts. An extension harness shall be provided to allow the display to be relocated from the standard center location.

**INTERCOM SYSTEM**

There shall be digital, dual radio interface, intercom located PS Overhead Panel Position B in the cab. The front panel shall have master volume, and squelch controls with illuminated indicators, allowing for independent level setting of radio and auxiliary audio devices.

There shall be two (2) radio listen only / transmit controls, allowing for simulcast interoperability with select, monitor, receive, and transmit indicators. There shall be two (2) auxiliary audio inputs with select, and receive indicators.

There shall be one (1) wireless base station for up to five (1-5) radio transmit headset users provided.

The wireless base station shall have a 100' to 1100' range, line of sight. Objects between the transmitter and receiver affect range.

The following Firecom components shall be provided:

- One (1) 5200D Intercom

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

- One (1) WB505R wireless base station (1-5 wireless positions)
- All necessary power and station cabling

**RADIO / INTERCOM INTERFACE CABLE**

The apparatus manufacturer shall supply and install one (1) radio interface cable before delivery of the vehicle.

The radio equipment to be used by the customer shall be:

- Motorola High Power, Model number APX 6500.

**WIRELESS UNDER HELMET, RADIO TRANSMIT HEADSET**

There shall be five (5) Firecom™, Model UHW-505.V2, wireless under the helmet, radio transmit headset(s) provided. A heavy duty, coiled 12 volt charging pigtail with plug shall be provided driver's seat, officer seat, driver's side outboard rear facing seat, passenger's side outboard rear facing seat and tiller cab.

Each headset shall feature:

- Noise cancelling electric microphone
- Flexible microphone boom
- Ear seals with 20 dB noise reduction
- Stereo Listen-Through Ear dome microphones
- Radio Push To Transmit button (Left or Right Side)
- Rechargeable battery operates for 24 hours on a full charge
- IP-66 when worn

**HEADSET HANGERS**

There shall be four (4) headset hanger(s) installed driver's seat, officer's seat, driver's side outboard rear facing seat and passenger's side outboard rear facing seat. The hanger(s) shall meet the current edition of applicable NFPA and ULC standards for equipment mounting.

**WIRELESS HEADSET CHARGING CABLE**

There shall be two (2) Firecom, 108-0087-00 coil cord, wireless headset charging cable(s) installed For the Forward Facing Seats .

**INTERFACE EXTENSION CABLE**

There shall be one (1) Firecom, 108-0086-00, radio interface extension cable(s) routed to Per Precision up to 19.00' from the intercom.

**TWO WAY RADIO INSTALLATION**

There shall be one (1) customer supplied two way radio(s) sent to the apparatus manufacturers preferred radio installer to be installed In the rear engine tunnel opening, see picture in EFolder Stage 4 per the shipping document.

No antenna mount or whip shall be included in this option.

Specific shipping requirements shall be followed.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**MOBILE MODEM INSTALLATION**
There shall be one (1) customer supplied modem(s) sent to the apparatus manufacturers preferred installer to be installed on the back the of the engine tunnel mounting plate in the open rear enclosed area per option 0816400.

Specific shipping requirements shall be followed.

**GPS / MULTIMODE ANTENNA INSTALLATION**
There shall be one (1) customer supplied GPS / Multimode antenna(s) with stud mount for thick roof material to be installed on the roof. The antenna coax cable(s) shall be run per the packing list / instructions provided to the third party installer.

Specific shipping requirements shall be followed. The GPS / Multimode antenna shall be sent to the apparatus manufacturers preferred installer prior to cab fabrication.

**MG90 W/SWITCH INSTALLATION**
There shall be one customer supplied Sierra Wireless AirLink® MG90 router sent to the apparatus manufacturers preferred installer to be installed In the rear engine tunnel opening, see picture in EFolder Stage 4. Installation shall include a momentary guarded switch mounted near the router to reset the router.

Specific shipping requirements shall be followed.

**TWO WAY RADIO SPEAKER INSTALLATION**
There shall be one (1) customer supplied two way radio speakers sent to the apparatus manufacturers preferred third party installer to be installed high and centered on the back wall.

Specific shipping requirements shall be followed.

**RADIO ANTENNA MOUNT**
There shall be one (1) standard 1.125", 18 thread, NMO Type antenna mounting base(s) installed right side on the cab roof with high efficiency, low loss, coaxial cable(s) routed within the cab / crew area to In the rear engine tunnel opening, see picture in EFolder Stage 4 . A weatherproof cap shall be installed on the mount.

**RADIO ANTENNA MOUNT**
There shall be one (1) standard 1.125", 18 thread antenna-mounting base(s) installed on the right side on the cab roof with high efficiency, low loss, coaxial cable(s) routed to the instrument panel area. A weatherproof cap shall be installed on the mount.

**VEHICLE CAMERA SYSTEM**
There shall be a color vehicle camera system provided with the following:

- One (1) Standard Definition (SD) camera located at the rear of the apparatus, pointing rearward, displayed automatically with the vehicle in reverse.

The camera images shall be displayed on the left side vehicle information center display. Audio from the microphone on the rear camera shall be not provided.

The following components shall be included:

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

- One (1) SV-CW134639CAI Camera
- All necessary cables

**Camera Switcher**
A camera switcher is not required.

**TILLER CAMERA SYSTEM**
There shall be two (2) Ramco Renegade camera systems provided. Each system shall have a side mount video camera and 5.00" LCD display.

The cameras shall be located one (1) on the right and one (1) on the left side of the tiller body, located top rear corners of LS3 and RS3 exterior aiming forward and downward. approximately 45 degree downward forward facing angle, facing forward. The displays shall be attached to adjustable height brackets, one (1) each side of the tiller cab and connected to that side camera to display whenever the ignition switch is on.

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

Distribution centers located throughout the vehicle shall contain battery powered studs for supplying customer installed equipment thus providing a lower cost of ownership.

Circuit protection devices, which conform to SAE standards, shall be utilized to protect electrical circuits. All circuit protection devices shall be rated per NFPA requirements to prevent wire and component damage when subjected to extreme current overload. General protection circuit breakers shall be Type-I automatic reset (continuously resetting). When required, automotive type fuses shall be utilized to protect electronic equipment. Control relays and solenoid shall have a direct current rating of 125 percent of the maximum current for which the circuit is protected per NFPA.

**Solid-State Control System**
A solid-state electronics based control system shall be utilized to achieve advanced operation and control of the vehicle components. A fully computerized vehicle network shall consist of electronic modules, electronic control modules to include black housings, a power indicator and status indicator located near their point of use to reduce harness lengths and improve reliability. The control system shall comply with SAE J1939-11 recommended practices.

The control system shall operate as a master-slave system whereas the main control module instructs all other system components. The system shall contain patented Mission Critical software that maintains critical vehicle operations in the unlikely event of a main controller error. The system shall utilize a Real Time Operating System (RTOS) fully compliant with OSEK/VDX™ specifications providing a lower cost of ownership.

For increased reliability and simplified use the control system modules shall include the following attributes:

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

- Green LED indicator light for module power
- Red LED indicator light for network communication stability status
- Control system self test at activation and continually throughout vehicle operation
- No moving parts due to transistor logic
- Software logic control for NFPA mandated safety interlocks and indicators
- Integrated electrical system load management without additional components
- Integrated electrical load sequencing system without additional components
- Customized control software to the vehicle's configuration
- Factory and field programmable to accommodate changes to the vehicle's operating parameters

To assure long life and operation in a broad range of environmental conditions, the solid-state control system modules shall meet the following specifications:

- Module circuit board shall meet SAE J771 specifications
- Operating temperature from -40 degrees Celsius to +70 degrees Celsius
- Storage temperature from -40 degrees Celsius to +70 degrees Celsius
- Vibration to 50g
- IP67 rated enclosure (Totally protected against dust and also protected against the effect of temporary immersion between 15 centimeters and one (1) meter)
- Operating voltage from eight (8) volts to 32 volts DC

The main controller shall activate status indicators and audible alarms designed to provide warning of problems before they become critical.

**Circuit Protection and Control Diagram**

Copies of all job-specific, computer network input and output (I/O) connections shall be provided with each chassis. The sheets shall indicate the function of each module connection point, circuit protection information (where applicable), wire numbers, wire colors and load management information.

**On-Board Electrical System Diagnostics**

The on-board information center shall include the following diagnostic information:

- Text description of active warning or caution alarms
- Simplified warning indicators
- Amber caution indication with intermittent alarm
- Red warning indication with steady tone alarm

Advanced diagnostic feature shall be provided in this control system. From the Command Zone display or connected wireless device, these features allow the user to monitor the real-time status of every input or output on the vehicle. It also allows users logged in as an administrator to force on inputs or outputs to assist the troubleshooting process.

**TCU Module with WiFi**

An in cab module shall provide WiFi wireless interface and data logging capability (no exception). The WiFi interface shall comply with IEEE 802.11 b/g/n capabilities while communicating at 2.4 Gigahertz. The module shall communicate through a white WiFi antenna allowing a line of site communication range of up to 300 feet with a roof mounted antenna.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

The module shall transmit a password protected web page to a WiFi enabled device (i.e. most smart phones, tablets or laptops) allowing two levels of user interaction. The firefighter level shall allow vehicle monitoring of the vehicle and firefighting systems on the apparatus. The technician level shall allow diagnostic access to inputs and outputs installed on the Command Zone™, control and information system.

The TCU capability shall record faults from the engine, transmission, ABS and Command Zone™, control and information systems as they occur. No other data shall be recorded at the time the fault occurs. The data TCU shall provide up to 2 Gigabytes of data storage.

The TCU shall provide a means to download the TCU information and update software in the device.

**Indicator Light and Alarm Prove-Out System**

A system shall be provided which automatically tests basic indicator lights and alarms located on the cab instrument panel.

**Voltage Monitor System**

A voltage monitoring system shall be provided to indicate the status of the battery system connected to the vehicle's electrical load. The system shall provide visual and audible warning when the system voltage is below or above optimum levels.

The alarm shall activate if the system falls below 11.8 volts DC for more than two (2) minutes.

**Dedicated Radio Equipment Connection Points**

There shall be three (3) studs provided in the primary power distribution center located in front of the officer for two-way radio equipment. The studs shall consist of the following:

- 12-volt 40-amp battery switched power
- 12-volt 60-amp ignition switched power
- 12-volt 60-amp direct battery power

There shall also be a 12-volt 100-amp ground stud located in or adjacent to the power distribution center.

**EMI/RFI Protection**

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

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

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

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

**ELECTRICAL SYSTEM PROGNOSTICS**

There shall be a software based vehicle tool provided to predict remaining life of the vehicles critical fluid and events.

The system shall send automatic indications to the information center and/or wireless enabled devices to proactively alert of upcoming service intervals.

Prognostics shall include the following:

- Engine oil and filter
- Transmission oil and filter

**ELECTRICAL**

All 12-volt electrical equipment installed by the apparatus manufacturer shall conform to modern automotive practices. All wiring shall be high temperature crosslink type. Wiring shall be run, in loom or conduit, where exposed and have grommets where wire passes through sheet metal. Automatic reset circuit breakers shall be provided which conform to SAE Standards. Wiring shall be color, function and number coded. Function and number codes shall be continuously imprinted on all wiring harness conductors at 2.00" intervals. Exterior exposed wire connectors shall be positive locking, and environmentally sealed to withstand elements such as temperature extremes, moisture and automotive fluids.

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

1. All holes made in the roof shall be caulked with silicon, rope caulk is not acceptable. Large fender washers, liberally caulked, shall be used when fastening equipment to the underside of the cab roof.
2. Any electrical component that is installed in an exposed area shall be mounted in a manner that shall not allow moisture to accumulate in it. Exposed area shall be defined as any location outside of the cab or body.
3. Electrical components designed to be removed for maintenance shall not be fastened with nuts and bolts. Metal screws shall be used in mounting these devices. Also a coil of wire shall be provided behind the appliance to allow them to be pulled away from mounting area for inspection and service work.
4. Corrosion preventative compound shall be applied to all terminal plugs located outside of the cab or body. All non-waterproof connections shall require this compound in the plug to prevent corrosion and for easy separation (of the plug).
5. All lights that have their sockets in a weather exposed area shall have corrosion preventative compound added to the socket terminal area.
6. All electrical terminals in exposed areas shall have silicon applied completely over the metal portion of the terminal.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

All lights and reflectors, required to comply with Federal Motor Vehicle Safety Standard #108, shall be furnished. Rear identification lights shall be recessed mounted for protection. Lights and wiring mounted in the rear bulkheads shall be protected from damage by installing a false bulkhead inside the rear compartments.

An operational test shall be conducted to ensure that any equipment that is permanently attached to the electrical system is properly connected and in working order.

The results of the tests shall be recorded and provided to the purchaser at time of delivery.

**BATTERY SYSTEM**

There shall be four (4) 12 volt Stryten/Exide, Model 31S950X5W, batteries that include the following features provided:

- 950 CCA, cold cranking amps
- 195 amp reserve capacity
- High cycle
- Group 31
- Rating of 1140 CA at 32 degrees Fahrenheit
- 195 minutes of reserve capacity
- Threaded stainless steel studs

Each battery case shall be a black polypropylene material with a vertically ribbed container for increased vibration resistance. The cover shall be manifold vented with a central venting location to allow a 45 degree tilt capacity.

The inside of each battery shall consist of a "maintenance free" grid construction with poly wrapped separators and a flooded epoxy bottom anchoring for maximum vibration resistance.

**ISOLATED BATTERYS**

There shall be two (2) 12 volt Exide, Model 31S950X5W, batteries provided for customer installed radio components. The batteries shall be located together on the same side and be labeled. A battery isolator appropriately suited for the group 31 battery capacity shall be supplied.

**BATTERY SYSTEM**

There shall be a single starting system with an ignition switch and starter button provided and located on the cab instrument panel.

**MASTER BATTERY SWITCH**

There shall be a master battery switch provided within the cab within easy reach of the driver to activate the battery system.

An indicator light shall be provided on the instrument panel to notify the driver of the status of the battery system.

**BATTERY COMPARTMENTS**

Batteries shall be placed on non-corrosive mats and be stored in well ventilated compartments located under the cab and bolted directly to the chassis frame. The battery boxes shall have reinforced sides. The battery compartments shall be constructed of 0.188" steel plate and be designed to accommodate a

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

maximum of three (3) group 31 batteries in each compartment. The battery hold-downs shall be of a non-corrosive material. All bolts and nuts shall be stainless steel.

Heavy-duty battery cables shall be used to provide maximum power to the electrical system. Cables shall be color coded.

Battery terminal connections shall be coated with anti-corrosion compound. Battery solenoid terminal connections shall be encapsulated with semi-permanent rubberized compound.

**JUMPER STUDS**

One (1) set of battery jumper studs with plastic color-coded covers shall be included on the battery compartments.

**BATTERY CHARGER**

There shall be an IOTA, Model DLS-75, 75 amp battery charger with IQ4 controller provided.

The battery charger shall be wired to the AC shoreline inlet through an AC receptacle adjacent to this battery charger.

The battery charger shall be located in the cab behind the driver seat.

**REMOTE CONTROL PANEL - BATTERY CHARGER**

There shall be a Kussmaul™, Model 091-94-12 universal display panel included. It shall be wired directly to the chassis batteries.

The battery charger indicator/remote panel shall be displayed through the window behind the driver seat. The display shall be mounted on a bracket so that it is visible from outside the apparatus in the lower corner of the window.

**AUTO EJECT FOR SHORELINE**

There shall be one (1) Kussmaul™, Model 091-55-20-120, 20 amp 120 volt AC shoreline inlet(s) provided to operate the dedicated 120 volt AC circuits on the apparatus.

The shoreline inlet(s) shall include red weatherproof flip up cover(s).

There shall be a release solenoid wired to the vehicle's starter to eject the AC connector when the engine is starting.

The shoreline(s) shall be connected to Transfer Switch.

There shall be a mating connector body supplied with the loose equipment.

There shall be a label installed near the inlet(s) that state the following:

- Line Voltage
- Current Ratting (amps)
- Phase
- Frequency

The shoreline receptacle shall be located in the driver side lower step well of cab.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**GENERATOR TO SHORELINE TRANSFER SWITCH**

There shall be an automatic transfer switch between the onboard generator and the shoreline inlet. The loads connected to the transfer switch shall be power from the onboard generator when the generator is running.

**ALTERNATOR**

A Delco Remy®, Model 55SI, alternator shall be provided. It shall have a rated output current of 430 amps, as measured by SAE method J56. The alternator shall feature an integral regulator and rectifier system that has been tested and qualified to an ambient temperature of 257 degrees Fahrenheit (125 degrees Celsius). The alternator shall be connected to the power and ground distribution system with heavy-duty cables sized to carry the full rated alternator output.

**TOWING PROVISIONS WIRING**

There shall be a one (1) 7-way, solid pin socket provided under the front bumper for connecting a towing service vehicle to control the rear of body stop/tail/directional/clearance lights of the truck. The 7-way socket shall be mounted in an aluminum box that is easily accessible, but not visible from the exterior of the vehicle, with a label that states "Battery Switch Must Be OFF".

Other clearance/marker lights may activate with the circuits provided, but are not required.

**ELECTRONIC LOAD MANAGER**

An electronic load management (ELM) system shall be provided that monitors the vehicles 12-volt electrical system, automatically reducing the electrical load in the event of a low voltage condition, and automatically restoring the shed electrical loads when a low voltage condition expires. This ensures the integrity of the electrical system.

For improved reliability and ease of use, the load manager system shall be an integral part of the vehicle's solid state control system requiring no additional components to perform load management tasks. Load management systems which require additional components shall not be allowed.

The system shall include the following features:

- System voltage monitoring.
- A shed load shall remain inactive for a minimum of five minutes to prevent the load from cycling on and off.
- Sixteen available electronic load shedding levels.
- Priority levels can be set for individual outputs.
- High Idle to activate before any electric loads are shed and deactivate with the service brake.
    - If enabled:
        - "Load Man Hi-Idle On" shall display on the information center.
        - Hi-Idle shall not activate until 30 seconds after engine start up.
- Individual switch "on" indicator to flash when the particular load has been shed.
- The information center indicates system voltage.

The information center, where applicable, includes a "Load Manager" screen indicating the following:

- Load managed items list, with priority levels and item condition.
- Individual load managed item condition:

| Bidder Complies | |
|---|---|
| Yes | No |

- ON = not shed
- SHED = shed

**SEQUENCER**

A sequencer shall be provided that automatically activates and deactivates vehicle loads in a preset sequence thereby protecting the alternator from power surges. This sequencer operation shall allow a gradual increase or decrease in alternator output, rather than loading or dumping the entire 12 volt load to prolong the life of the alternator.

For improved reliability and ease of use, the load sequencing system shall be an integral part of the vehicle's solid state control system requiring no additional components to perform load sequencing tasks. Load sequencing systems which require additional components shall not be allowed.

Emergency light sequencing shall operate in conjunction with the emergency master light switch. When the emergency master switch is activated, the emergency lights shall be activated one by one at half-second intervals. Sequenced emergency light switch indicators shall flash while waiting for activation.

When the emergency master switch is deactivated, the sequencer shall deactivate the warning light loads in the reverse order.

Sequencing of the following items shall also occur, in conjunction with the ignition switch, at half-second intervals:

- Cab Heater and Air Conditioning
- Crew Cab Heater (if applicable)
- Crew Cab Air Conditioning (if applicable)
- Exhaust Fans (if applicable)
- Third Evaporator (if applicable)

**HEADLIGHTS WITH HALO FLASH**

There shall be a HiViz part number FT-4X6-4KIT, that includes four (4) 4.00" high x 6.00" long rectangular LED lights with "Halo" parking lamp illumination around the outside of the lamps mounted in the front quad style housing. The headlights to include chrome bezels on each side of the cab grille:

- the outside lamp on each side shall contain a part number FT-4X6-HL with low beam LEDs
- the inside lamp on each side shall contain a part number FT-4X6-H with high beam LEDs
- the "Halo" around the headlights shall be controlled by the headlight/parking light switch
- the lights shall be controlled through the headlight switch

The "Halo" around the headlights shall flash alternately from driver side to passenger side when emergency master switch is on, a "Halo Flash" switch in the cab is on, and the parking brake is released.

**DIRECTIONAL LIGHTS**

There shall be two (2) Whelen 600 series, LED combination directional/marker lights provided. The lights shall be located on the outside cab corners, next to the headlights.

The color of the lenses shall be the same color as the LED's.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**ADDITIONAL DIRECTIONAL LIGHTS**
There shall be two (2) Whelen®, Model 604T, amber LED populated arrow directional lights provided on the rear of LS7/RS7 compartments of the tractor, one (1) on each side.

These lights shall be mounted in 15 degree recessed angle brackets.

**INTERMEDIATE LIGHT**
There shall be two (2) Weldon, Model 9186-8580-29, amber LED turn signal marker lights furnished, one (1) each side, in the rear fender panel. The light shall double as a turn signal and marker light.

**CAB CLEARANCE/MARKER/ID LIGHTS**
There shall be two (2) Truck-Lite Model 35200Y, 1.00" high x 4.00" wide x 1.25" deep lights with amber LEDs and amber lenses provided to indicate the presence and overall length of the vehicle in the following locations:

- Two (2) lights installed as front side clearance lights shall be installed, one (1) on each side above the cab doors.

The lights shall be installed with no guard.

All other forward facing clearance lights will be included with the visor scene light.

**FRONT CAB SIDE DIRECTIONAL LIGHTS**
There shall be two (2) Truck-Lite®, Model 19036Y, amber LED lights installed to the outside of the chrome wrap around bezel, one (1) on each side of the cab.

The lights shall activate as additional directional lights with the corresponding directional circuit.

**REAR CLEARANCE/MARKER/ID LIGHTING**
There shall be three (3) LED lights used as identification lights that are integral to the rear HiViz® scene light assembly (see rear work/scene) at the rear of the apparatus.

There shall be two (2) Truck-Lite®, Model 33050R, LED lights recessed at the rear of the apparatus used as clearance lights located at the rear of the apparatus per the following:

- To indicate the overall width of the vehicle
- One (1) each side of the vertical centerline
- As near the top as practical
- Red in color
- To be visible from the rear
- All at the same height

There shall be two (2) Truck-Lite®, Model 33050R, LED lights recessed on the side of the apparatus as marker lights as close to the rear as practical per the following:

- To indicate the overall length of the vehicle
- One (1) each side of the vertical centerline
- As near the top as practical
- Red in color

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

- To be visible from the side
- All at the same height

There shall be two (2) red reflectors located on the rear of the truck facing to the rear. One (1) each side, as far to the outside as practical, at a minimum of 15.00", but no more than 60.00", above the ground.

There shall be two (2) red reflectors located on the side of the truck facing to the side. One (1) each side, as far to the rear as practical, at a minimum of 15.00", but no more than 60.00", above the ground.

Per FMVSS 108 and CMVSS 108 requirements.

**MARKER LIGHTS**

There shall be one (1) pair of amber and red LED marker lights with rubber arm, located each side rear trailer fender panel, behind LS1/RS1. The amber lens shall face the front and the red lens shall face the rear of the truck.

These lights shall be activated with the running lights of the vehicle.

**REAR FMVSS LIGHTING**

The rear stop/tail and directional lighting shall include the following:

- Two (2) Whelen®, Model M62BTT, 4.30" high x 6.70" wide x 1.40" deep brake/tail lights with red LEDs
- Two (2) Whelen, Model M62T, 4.30" high x 6.70" wide x 1.40" deep directional lights with amber LEDs. The directional lights shall be set to Steady On (Arrow) flash pattern.
- The lens color(s) to be the same as the LEDs.
- The lights to include chrome trim.

There shall be two (2) Whelen® Model M62BU, 4.31" high x 6.75" wide x 1.37" deep backup lights with white LEDs, clear lenses and chrome trim provided.

**LICENSE PLATE BRACKET**

One (1) license plate bracket constructed of stainless steel shall be provided at the rear of the apparatus.

One (1) white LED light with chrome housing shall be provided to illuminate the license plate. A stainless steel light shield shall be provided over the light that shall direct illumination downward, preventing white light to the rear.

**ADDITIONAL BRAKE/TAIL LIGHT**

There shall be one (1) Whelen, Model M92BTT*, 6.5" high x 10.4" wide x 1.4" deep red LED brake/tail light(s) with color lenses and chrome trim provided at the rear of the body, centered on back of tiller cab, directly below window.

The light shall activate when the service brake is depressed.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**BACK-UP ALARM**
A PRECO, Model 1040, solid-state electronic audible back-up alarm that actuates when the truck is shifted into reverse shall be provided. The device shall sound at 60 pulses per minute and automatically adjust its volume to maintain a minimum ten (10) dBA above surrounding environmental noise levels.

**AXLE LOCTION LIGHTS**
There shall be two (2) Whelen Model 0SB00SCR, blue LED lights installed through the top body flange directly above the rear axle. This light is intended to show the tiller man where the rear axle pivot will be to aid is steering the tiller trailer.

The lights shall be activated when the battery switch and the ignition switch is on.

**TILLER CORNERING LIGHTS**
There shall be two (2) Ziamatic Corporation SKU ZQL-SS-LED, 450 lumens 7.75" high x 8.62" wide lights with white LEDs and polished stainless steel housing installed per the following:

- One (1) light shall be installed on the left side in front of the trailer axle
- One (1) light shall be installed on the right side in front of the trailer axle

The lights shall be activated by the high beam function of the directional switch on the tiller cab steering column and the chassis directional light circuit when the emergency master switch is on.

**CAB PERIMETER SCENE LIGHTS**
There shall be four (4) Amdor, Model AY-LB-12HW012, 190 lumens each, 12.00" white LED strip lights provided.

- One (1) under the driver's side cab access step.
- One (1) under the passenger's side cab access step.
- One (1) under the passenger's side crew cab access step.
- One (1) under the driver's side crew cab access step.

The lights shall be activated when the battery switch is on and the respective door is open and whenever control has been selected for the body perimeter lights.

**PUMP HOUSE PERIMETER LIGHTS**
There shall be one (1) Amdor, Model AY-LB-12HW020, 350 lumens, 20.00" LED weatherproof strip light with bracket provided under the passenger's side pump panel running board.

If the combination of options in the vehicle does not permit clearance for a 20.00" light, a 12.00" version of the Amdor light shall be installed.

The light shall be activated when the battery switch is on, and controlled by the same means as the body perimeter lights.

**PERIMETER SCENE LIGHTS, BODY**
There shall be four (4) Amdor LED lights with brackets provided.

The lights shall be mounted in the following locations:

| Bidder Complies | |
|---|---|
| Yes | No |

- One (1) Model AY-LB-12HW020, 350 lumens, 20.00" long light shall be provided under the driver's side turntable access steps.
- One (1) Model AY-LB-12HW020, 350 lumens, 20.00" long light shall be provided under the driver's side tiller cab access steps.
- One (1) Model AY-LB-12HW020, 350 lumens, 20.00" long light shall be provided under the passenger's side tiller cab access steps.
- One (1) Model AY-LB-12HW012, 190 lumens, 12.00" long light shall be provided under the passenger's side turntable access steps.

The perimeter scene lights shall be activated when the battery switch is on, and a switch within reach of the driver is activated, the parking brake is applied, either directional light is activated, activating all side facing perimeter lights and a switch within reach of the tiller driver is activated.

**ADDITIONAL PERIMETER LIGHTS**

There shall be eight (8) lights Amdor®, Model AY-LB-12HW012, 190 lumens each, 12.00" white LED perimeter light(s) provided one (1) light under compartment LS1, one (1) light under compartment LS3, one (1) light under compartment RS1, one (1) light under compartment RS2, one (1) light under compartment RS3, one (1) light under compartment LS2, one (1) light under compartment LS5 and one (1) light under compartment RS5.

These lights shall be activated the same as the body perimeter lights.

**ENHANCED SOFTWARE FOR PERIMETER LIGHTS**

All perimeter lights shall be deactivated when the parking brake is released unless alternate control is selected.

The cab and crew cab perimeter lights shall remain on for ten (10) seconds for improved visibility after the doors closed.

**STEP LIGHTS**

There shall be a total of sixteen (16) white LED step lights provided for access to the tiller cab and turntable.

In order to ensure exceptional illumination, each light shall provide a minimum of 25 foot-candles (fc) covering an entire 15" x 15" square placed ten (10) inches below the light and a minimum of 1.5 fc covering an entire 30" x 30" square at the same ten (10) inch distance below the light.

The step lights shall be activated when parking brake is applied.

The trim shall be chrome.

All other steps on the apparatus shall be illuminated per the current edition of applicable NFPA standards.

**LIGHT GUARD**

There shall be six (6) aluminum treadplate guard(s), provided to protect the HiViz light bar(s), for the Hi-Viz lights on the trailer, three (3) each side .

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**12 VOLT LIGHT BRACKET**
There shall be two (2), aluminum treadplate installed Under the rearmost Hi Viz lights on trailer each side to clear side stacked ladders for the light(s). The bracket(s) shall be designed to raise the light(s) 2.00" from the mounting surface.

**CENTERING LIGHT**
There shall be one (1) Whelen®, Model 0S*00MCR, 1.00" high x 1.50" long x 0.50" deep 12 volt DC light(s) with amber LEDs and chrome trim installed on a collapsible bracket. The bracket(s) shall be 6.00" tall depending on the over all height restrictions. The light(s) shall be mounted at the rear of the crew cab on the rear of the cab roof, centered and shall be used by the tillerman to center the tiller trailer to the tractor.

The light(s) shall be activated with the headlights.

**12 VOLT LIGHTING**
There shall be a HiViz Model FT-B-72-ML-*, 2.56" high x 75.20" long x 3.31" deep 28,158 raw lumens 12 volt DC light provided on the front cab roof as far forward as practical. The light shall include white scene LEDs, two (2) amber LEDs as clearance lights and three (3) amber LEDs as identification lights.

The painted parts of the light housing and brackets to be white.

The clearance and identification LEDs shall be activated with the headlight switch.

The scene LEDs shall be activated when the battery switch is on and by a switch at the driver's side switch panel, by a switch at the passenger's side switch panel and Tiller Cab Switch Panel.

The white LEDs may be load managed when the parking brake is applied.

**12 VOLT LIGHTING**
There shall be one (1) HiViz Model FT-MB-15-*-*, 2.06" high x 19.77" long x 2.45" deep, 5,544 effective lumens 12 volt DC light(s) with a combination of flood and spot optics and adjustable mounting bracket(s) installed on the cab Above the DS Crew Cab Door.

The painted parts of the light housing and brackets to be white.

The light(s) shall be activated by a switch at the driver's side switch panel, by a switch at the passenger's side switch panel and by a switch in the tiller cab.

The light(s) may be load managed when the parking brake is applied.

**12 VOLT LIGHTING**
There shall be one (1) HiViz Model FT-MB-15-*-*, 2.06" high x 19.77" long x 2.45" deep, 5,544 effective lumens 12 volt DC light(s) with a combination of flood and spot optics and adjustable mounting bracket(s) installed on the cab Above the PS Crew Cab Door.

The painted parts of the light housing and brackets to be white.

The light(s) shall be activated by a switch at the driver's side switch panel, by a switch at the passenger's side switch panel and by a switch in the tiller cab.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

The light(s) may be load managed when the parking brake is applied.

**12 VOLT LIGHTING ON TILLER CAB**
There shall one (1) HiViz®, Model FT-MB-2.9-*-*, 6,652.8 effective lumens 11.10" long x 3.00" high x 3.3" deep 12 volt DC light(s) with white LEDs, FT-MBKIT-PX-* end cap mounting brackets, and flood optics provided on the tiller cab located, right side of tiller cab, forward above the drip rail.

The painted parts of the light housing and brackets to be black.

The light(s) shall be controlled by the same control that has been selected for the passenger's side scene light(s).

The light(s) may be load managed when the parking brake is applied.

**12 VOLT LIGHTING ON TILLER CAB**
There shall one (1) HiViz®, Model FT-MB-2.9-*-*, 6,652.8 effective lumens 11.10" long x 3.00" high x 3.3" deep 12 volt DC light(s) with white LEDs, FT-MBKIT-PX-* end cap mounting brackets, and flood optics provided on the tiller cab located, left side of tiller cab, forward above the drip rail.

The painted parts of the light housing and brackets to be black.

The light(s) shall be controlled by the same control that has been selected for the driver's side scene light(s).

The light(s) may be load managed when the parking brake is applied.

**12 VOLT LIGHTING ON TILLER CAB**
There shall be one (1) HiViz Model FT-B-27-ML3R-*, 11,088 raw lumens 2.06" high x 34.89" long x 2.45" deep 12 volt light(s) with white and red LEDs. The white scene LEDs shall be set up in a combination of flood and spot optics. The painted parts of the light housing and brackets to be black, and located on the rear of the tiller cab, centered on the back of the tiller cab. The light(s) shall be installed with Model P-MB-LFOOT-* vertical surface mount brackets.

The white LEDs shall be controlled by a switch at the driver's side switch panel, by a switch at the passenger's side switch panel and by a switch in the tiller cab.

The red LEDs shall be controlled through the head light switch as identification lights.

The light(s) may be load managed when the parking brake is applied.

**WHITE WARNING LIGHT CONTROL**
There shall be switch(es) installed in the cab on the switch panel that shall allow the operator to activate/deactivate all the white warning lights whenever the emergency master switch is activated and the parking brake is released. The headlight flash option is included in this white warning light control if applicable. Each time the emergency master switch is activated, and the parking brake is released, the white warning light control switch and the white warning lights shall default to off.

**MASTER SWITCH FOR 12 VOLT LIGHTS**
A master "on/off" switch shall be provided for the 12 volt light(s) located For Lights in Options 0774470, 0890081, 0890083, 0740839, 0741196, 0897334, 0891833 and 0897333.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

A total of two (2) switch(es) shall be provided switch panels #3 and #5.

**WATER TANK**

It shall have a capacity of 200 gallons and shall be constructed of polypropylene plastic in a rectangular shape.

The water tank shall be mounted directly above the water pump.

The joints and seams shall be nitrogen welded inside and out.

The tank shall be baffled in accordance with the current edition of applicable NFPA standards.

The baffles shall have vent openings at both the top and bottom of each baffle to permit movement of air and water between compartments.

The longitudinal partitions shall be constructed of .38" polypropylene plastic and extend from the bottom of the tank through the top cover to allow positive welding.

The transverse partitions extend from 4" off the bottom to the underside of the top cover.

All partitions interlock and shall be welded to the tank bottom and sides.

The tank top shall be constructed of .50" polypropylene.

It shall be supported to keep it rigid during fast filling conditions.

Construction shall include 2.00" polypropylene dowels spaced no more than 30.00" apart and welded to the transverse partitions.

Two of the dowels shall be drilled and tapped (.50" diameter, 13.00" deep) to accommodate lifting eyes.

A sump shall be provided at the bottom of the water tank. The sump shall include a drain plug and the tank outlet.

Tank shall be installed in a fabricated "cradle" assembly constructed of structural steel.

A heavy-duty water tank restraint shall be provided.

Sufficient crossmembers are provided to properly support bottom of tank.

Crossmembers are constructed of steel bar channel or rectangular tubing.

Tank "floats" in cradle to avoid torsional stress caused by chassis frame flexing.

Rubber cushions, .50" thick x 3.00" wide, shall be placed on all horizontal surfaces that the tank rests on.

Stops are provided to prevent an empty tank from bouncing excessively while moving vehicle.

Tank mounting system is approved by the manufacturer.

Fill tower shall be constructed of 0.50" polypropylene and shall be a minimum of 8.00" wide x 14.00" long.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

Fill tower shall be furnished with a 0.25" thick polypropylene screen and a hinged cover.

An overflow pipe, constructed of 4.00" schedule 40 polypropylene, shall be installed approximately halfway down the fill tower and extend through the water tank and exit to the rear of the rear axle.

The water tank fill dome shall be as low as the water tank manufacturer will tolerate still functioning as it was meant.

**RUNNING BOARDS**

The running boards shall be fabricated of 0.125" bright aluminum treadplate and supported by structural steel angle assemblies bolted to the chassis frame rails.

Running boards shall be 13.00" deep and are spaced away from the body 0.50".

A splash guard shall be provided to keep road dirt or water from splashing up onto the pump panels.

The running boards shall have a riser on the body to protect the painted surface from damage by stepping on the running boards.

The entire surface of the running boards shall be covered with bright aluminum treadplate.

**TURNTABLE STEPS**

Steps to access the turntable from the left and right side shall be provided just behind the reservoir compartment. The bottom step shall have a step height not exceeding 24.00" from the ground to the top surface of the step at any time. All steps shall have a height no greater than 14.00" from top surface to top surface.

The steps shall be welded in place with the stepping area made of Morton Tread-Grip® channel.

The stepwell shall be lined with bright aluminum treadplate to act as scuffplates.

A knurled aluminum handrail handrail shall be provided on the forward side of the access steps.

**SMOOTH ALUMINUM REAR WALL**

The rear wall shall be smooth aluminum.

**TOW EYES**

Two (2) rear painted tow eyes shall be located at the rear of the apparatus and shall be mounted directly to the torque box. The inner and outer edges of the tow eyes shall be radiused. Each tow eye shall be rated for 9000lb and painted to match the lower job color.

**COMPARTMENTATION**

Body and compartments shall be fabricated of .125", 5052-H32 aluminum.

Side compartments shall be an integral assembly with the rear fenders.

Circular fender liners shall be provided for prevention of rust pockets and ease of maintenance.

Compartment flooring shall be of the sweep out design with the floor higher than the compartment door lip.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

The compartment door opening shall be framed by flanging the edges in 1.75" and bending out again .75" to form an angle.

Drip protection shall be provided above the doors by means of bright aluminum extrusion or formed bright aluminum treadplate.

The top of the compartment shall be covered with bright aluminum treadplate rolled over the edges on the front, rear and outward side. These covers shall have the corners welded.

Side compartment covers shall be separate from the compartment tops.

All screws and bolts which protrude into a compartment shall have acorn nuts on the ends to prevent injury.

A support system shall be used which shall incorporate a floating substructure by using Neoprene Elastomer isolators to allow the body to remain rigid while the chassis goes through its natural flex. The isolators shall have a broad range of proven viability in vehicular applications, be of a fail safe design, and allow for all necessary movement in three (3) transitional and rotational modes. This shall result in a 500 lb equipment rating for each lower compartment of the body.

The compartmentation shall include a 3.00" steel support assemblies which are bolted to the chassis frame rails. A steel framework shall be mounted to the body above these support assemblies connected to the support assemblies with isolators. There shall be one (1) support assembly mounted to each chassis frame rail.

**AGGRESSIVE WALKING SURFACE**

All exterior surfaces designated as stepping, standing, and walking areas shall comply with the required average slip resistance of the current NFPA standards.

**LOUVERS**

All body compartments shall have a minimum of one (1) set of louvers stamped into a wall to provide the proper airflow inside the compartment and to prevent water from dripping into the compartment. These louvers shall be formed into the metal and not added to the compartment as a separate plate.

**TRACTOR RESERVOIR COMPARTMENT**

A lap door compartment shall be provided ahead of the tractor fifth wheel.

The left side compartment shall be 17.88" wide x 37.88" high x 8.00" deep with a clear door opening of 12.00" wide x 29.75" high. The right side shall be 17.88" wide x 36.88" high x 8.00" deep with a clear door opening of 12.00" wide x 31.12" high.

**LEFT SIDE COMPARTMENTATION**

Left side compartmentation shall consist of the following:

Two (2) compartments shall be provided in the front body section on the left side. Each compartment shall be full-height.

The forward compartment shall be approximately 34.13" wide x 55.63" high x 24.50" deep with a minimum clear door opening of approximately 25.75" wide x 45.87" high.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

The rear compartment shall be approximately 44.50" wide x 55.63" high x 24.50" deep with a minimum clear door opening of approximately 38.75" wide x 45.87" high.

The upper 38.75" of each compartment shall be transverse to the right side front compartmentation.

Both compartments shall have roll-up doors.

Three (3) compartments shall be provided in the center body section on the left side.

The forward compartment shall be approximately 47.13" wide x 55.63" high x 24.50" deep with a clear door opening of approximately 38.75" wide x 45.87" high.

The upper 38.75" of the forward compartment shall be transverse to the right side front compartmentation.

The middle compartment shall be approximately 19.88" wide x 55.63" high x 24.50" deep with a clear door opening of approximately 14.13" wide x 45.87" high.

The rear, low compartment shall be approximately 24.38" wide x 26.63" high x 24.50" deep with a clear door opening of approximately 19.87" wide x 21.87" high.

Each compartment shall have roll-up doors.

There shall be a cutout in the vertical partition separating the middle and rear compartments that shall be as large as possible.

The side sheet at the rear shall be located 15.00" inboard from the outer edge of the body to accommodate side stacked ladder complement.

The side sheet at the rear shall be reduced in height inboard of the side stacked ladder so as to match the height of the rear body module.

Two (2) compartments shall be provided in the rear body section on the left side.

The forward compartment shall be approximately 69.00" wide x 24.13" high x 24.50" deep with a minimum clear door opening of approximately 63.25" wide x 16.87" high. This compartment shall be located ahead of the rear wheels and shall have a roll door.

The rearward compartment shall be approximately 42.00" wide x 26.63" high x 21.25" deep with a minimum clear door opening of approximately 36.25" wide x 16.87" high. There shall be a section of the forward area, approximately 15.00" from the front wall that shall only be 9.00" deep. This area shall be 6.00" wide. This compartment shall be located behind the rear wheels and in front of the tiller cab access steps and shall have a roll door.

The body sheets shall be moved inward 15.00" from the outer edge of the body.

The floor of the area rearward of the tiller cab access steps shall be raised 3.00" for increased angle of departure.

**RIGHT SIDE COMPARTMENTATION**

Right side compartmentation shall consist of the following:

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

Two (2) compartments shall be provided in the front body section on the right side. Each compartment shall be full-height.

The forward compartment shall be approximately 24.38" wide x 55.63" high x 24.50" deep with a minimum clear door opening of approximately 16.00" wide x 45.87" high.

The rear compartment shall be approximately 54.25" wide x 55.63" high x 24.50" deep with a minimum clear door opening of approximately 38.75" wide x 45.87" high.

The upper 38.75" of each compartment shall be transverse to the left side front compartmentation.

Both compartments shall have roll-up doors.

Three (3) compartments shall be provided in the center body section on the right side.

The forward compartment shall be approximately 47.13" wide x 55.63" high x 24.50" deep with a minimum clear door opening of approximately 38.75" wide x 45.87" high. This compartment shall have a roll door.

The upper 38.75" of the forward compartment shall be transverse to the left side front compartmentation.

The middle compartment shall be approximately 19.88" wide x 55.63" high x 24.50" deep with a minimum clear door opening of approximately 13.00" wide x 45.87" high. This compartment shall have a roll door.

The rear, low compartment shall be approximately 24.38" wide x 26.63" high x 24.50" deep with a minimum clear door opening of approximately 20.00" wide x 16.87" high. This compartment shall have a roll door.

There shall be a cutout in the vertical partition separating the middle and rear compartments that shall be as large as possible.

The side sheet at the rear shall be located 15.00" inboard from the outer edge of the body to accommodate side stacked ladder complement.

The side sheet at the rear shall be reduced in height inboard of the side stacked ladder so as to match the height of the rear body module.

Two (2) compartments shall be provided in the rear body section on the right side.

The forward compartment shall be approximately 69.00" wide x 24.13" high x 24.50" deep with a minimum clear door opening of approximately 63.25" wide x 16.87" high. This compartment shall be located ahead of the rear wheels and shall have a roll door.

The rearward compartment shall be approximately 42.00" wide x 26.63" high x 21.25" deep with a minimum clear door opening of approximately 36.25" wide x 16.87" high. There shall be a section of the forward area, approximately 15.00" from the front wall that shall only be 9.00" deep. This area shall be 6.00" wide. This compartment shall be located behind the rear wheels and in front of the tiller cab access steps and shall have a roll door.

The body sheets shall be moved inward 15.00" from the outer edge of the body.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

The floor of the area rearward of the tiller cab access steps shall be raised 3.00" for increased angle of departure.

**ROLLUP DOOR, SIDE COMPARTMENTS**

There shall be 14 compartment doors installed on the side compartments. The doors shall be double faced aluminum construction, painted one (1) color to match the lower portion of the body and manufactured by Gortite®.

Lath sections shall be an interlocking rib design and shall be individually replaceable without complete disassembly of door.

Between each slat at the pivoting joint shall be a PVC inner seal to prevent metal to metal contact and prevent dirt or moisture from entering the compartments. Seals shall allow door to operate in extreme temperatures ranging from 180 to -40 degrees Fahrenheit. Side, top and bottom seals shall be provided to resist ingress of dirt and weather and be made of Santoprene.

All hinges, barrel clips and end pieces shall be nylon 66. All nylon components shall withstand temperatures from 300 to -40 degrees Fahrenheit. Hardened plastic shall not be acceptable.

A polished stainless steel lift bar to be provided for each roll-up door. Lift bar shall be located at the bottom of door and have latches on the outer extrusion of the doors frame. A ledge shall be supplied over lift bar for additional area to aid in closing the door.

Doors shall be constructed from an aluminum box section. The exterior surface of each slat shall be flat. The interior surfaces shall be concave to provide strength and prevent loose equipment from jamming the door from inside.

To conserve space in the compartments, the spring roller assembly shall not exceed 3.00" in diameter. A garage style roll door shall not be acceptable.

The header for the rollup door assembly shall not exceed 4.00".

A heavy-duty magnetic switch shall be used for control of open compartment door warning lights.

**REAR BUMPER**

A black 1.50" thick x 2.50" high UHMW plastic rub rail shall be provided that extended the entire rear of the body. There shall be 0.50" rubber spacers included between the rub rail and the body.

The rub rails shall be fastened to the rear of the body with 0.50" stainless bolts and washers on a minimum of 12.00" centers.

Rub rails shall be tapered on each end of the body.

The rub rails shall not be an integral part of the body construction, allowing replacement in the event of damage.

**SCUFFPLATE**

A quantity of Two (2) scuffplates protective scuffplate(s) shall be provided forward body post above LS2 and RS2 (match job 34434) on the exterior of the body. The bright aluminum treadplate scuffplate shall be approximately 2.75" x 22.50" in size.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**DOOR GUARD**
There shall be 14 compartment doors that shall include a guard/drip pan designed to protect the roll-up door from damage when in the retracted position and contain any water spray. The guard shall be fabricated from stainless steel and installed LS1, LS2, LS3,LS4,LS5, LS6,LS7, RS1, RS2, RS3,RS4,RS5,RS6,RS7.

**SCUFFPLATE, INTERIOR OF COMPARTMENT DOOR**
There shall be 12 compartment doors that have a brushed stainless steel scuffplate. The scuffplate shall cover the entire width and height on the inside panel of the door pan.

The compartment door(s) that shall receive the scuffplate shall be for the LS1, LS2, LS7, RS1, RS2, RS7, B1 compartment(s).

**COMPARTMENT LIGHTING**
There shall be fourteen (14) compartment(s) with two (2) white 12 volt DC LED compartment light strips. The dual light strips shall be centered vertically along each side of the door framing. There shall be two (2) light strips per compartment.The dual light strips shall be in compartment(s): LS1, LS2, LS3, LS4, LS5, LS6, RS1, RS2, RS3, RS4, RS5, RS6, LS7, RS7.

Any remaining compartments without light strips shall have a 6.00" diameter Truck-Lite, Model: 79384 light. Each light shall have a number 1076 one filament, two wire bulb.

Opening the compartment door shall automatically turn the compartment lighting on.

**MOUNTING TRACKS**
There shall be eight (8) sets of tracks for mounting shelf(s) in LS3, LS4, LS5, LS6, RS3, RS4, RS5 and RS6. These tracks shall be installed vertically to support the adjustable shelf(s). The tracks shall be unpainted with a natural finish.

**ADJUSTABLE SHELVES**
There shall be two (2) shelves with a capacity of 500 lb provided. The shelf construction shall consist of .188" D/A sanded aluminum with 2.00" sides. Each shelf shall be infinitely adjustable by means of a threaded fastener, which slides in a track.

The shelves shall be held in place by .12" thick stamped plated brackets and bolts.

The location shall be LS3 - (1) centered and (1) upper 3rd.

**SLIDE-OUT ADJUSTABLE HEIGHT TRAY**
There shall be four (4) slide-out trays provided.

Each tray shall have 2.00" high sides and shall be half (1/2) the depth of the transverse compartment. The capacity rating of the tray shall be 500 lb in the extended position.

Each tray shall be mounted on a pair of side mounted slides. The slide mechanisms shall have ball bearings for ease of operation and years of dependable service. The slides shall be mounted to shelf tracks to allow the tray to be adjustable up and down within the designated mounting location.

An automatic lock shall be provided for both the in and out tray positions. The lock trip mechanism shall be located at the front of the tray and shall be easily operated with a gloved hand.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

The tray(s) shall be located (1) in LS5, (1) LS4, (1) RS5, (1) RS4 as low as possible in transverse area.

**TWO (2) WAY SLIDE-OUT UTILITY TRAY**

There shall be one (1) slide-out tray provided.

Each tray shall be rated for up to 500 lb in the extended position. The tray(s) shall be constructed of .19" thick aluminum for the tray bottom and special aluminum extrusions for the tray sides, ends and tracks. The corners shall be welded.

The tray shall have 3.00" high sides and be as wide as possible for the location specified within the compartment.The depth of the tray shall be Three Quarters (3/4) the Depth of the Transverse Compartment (RS6) and to end flush with the frame rail on the LS6 Side.

The tray shall be supported with a minimum of six (6) ball bearing rollers. The tray shall slide out two thirds (2/3) of its length to either side of the apparatus.

Automatic locks shall be provided for both the in and out positions. The trip mechanism for the locks shall be located at the front of the tray for ease of use with a gloved hand.

The vertical location of the tray within the compartment shall be adjustable.

The tray(s) shall be located LS6/RS6.

**SLIDE-OUT ADJUSTABLE HEIGHT TRAY**

There shall be one (1) slide-out tray provided.

Each tray shall have 2.00" high sides and a minimum capacity rating of 250 lb in the extended position.

Each tray shall be mounted on a pair of side mounted slides. The slide mechanisms shall have ball bearings for ease of operation and years of dependable service. The slides shall be mounted to shelf tracks to allow the tray to be adjustable up and down within the designated mounting location.

An automatic lock shall be provided for both the in and out tray positions. The lock trip mechanism shall be located at the front of the tray and shall be easily operated with a gloved hand.

The tray(s) shall be located RS3 - centered.

**SLIDE-OUT/TILT-DOWN TRAY**

There shall be four (4) slide-out trays provided.

The bottom of each tray shall be constructed of 0.188" thick aluminum while special aluminum extrusions shall be utilized for the tray sides, ends, and tracks. The corners shall be welded to form a rigid unit.

The tray shall be half depth of the transverse compartment.

A spring-loaded lock shall be provided on each side at the front of the tray. Releasing the locks shall allow the tray to slide out approximately two-thirds (2/3) of its length from the stowed position and tip 30 degrees down from horizontal. The tray shall be equipped with ball bearing rollers for smooth operation.

Rubber padded stops shall be provided for the tray in the extended positions.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

The capacity rating of the tray shall be a minimum of 215 lb in the extended position.

The vertical position of the tray within the compartment shall be adjustable.

The tray(s) shall be located (1) in upper 3rd of LS5, (1) in upper 3rd of LS4, (1) in upper 3rd of RS5, (1) in upper 3rd of RS4.

**SLIDE OUT TRAY HAND PROTECTION BLOCK**

An aluminum 1.00" x 1.00" tube spaced 1.00" in from the front of the tray to prevent the possibility of stored equipment sliding forward into someone's fingers shall be provided.

This shall be provided on a total of five (5) slide-out trays located Tilt/Slide Out Trays in LS4, LS5, RS3, RS4, RS5.

**SLIDE-OUT/TILT-DOWN TRAY**

There shall be one (1) slide-out tray provided.

The bottom of each tray shall be constructed of 0.188" thick aluminum with a dual action finish while special aluminum extrusions shall be utilized for the tray sides, ends, and tracks. The corners shall be welded to form a rigid unit.

A spring loaded lock shall be provided on each side at the front of the tray. Releasing the locks shall allow the tray to slide out approximately two-thirds (2/3) of its length from the stowed position and tip 30 degrees down from horizontal. The tray shall be equipped with ball bearing rollers for smooth operation.

Rubber padded stops shall be provided for the tray in the extended position.

The capacity rating of the tray shall be a minimum of 215 lb in the extended position.

The vertical position of the tray within the compartment shall be adjustable.

The location(s) shall be in RS3 in the upper third.

**SLIDE-OUT FLOOR MOUNTED TRAY**

There shall be three (3) floor mounted slide-out tray(s) provided.

Each tray shall have 2.00" high sides and a minimum capacity rating of 500 lb in the extended position.

Each tray shall be constructed of aluminum with a dual action finish.

There shall be two undermount-roller bearing type slides rated at 250 lb each provided. The pair of slides shall have a safety factor rating of 2.

To ensure years of dependable service, the slides shall be coated with a finish that is tested to withstand a minimum of 1,000 hours of salt spray per ASTM B117.

To ensure years of easy operation, the slides shall require no more than a 50 lb force for push-in or pull-out movement when fully loaded after having been subjected to a 40 hour vibration (shaker) test under full load. The vibration drive file shall have been generated from accelerometer data collected from a heavy truck chassis driven over rough gravel roads in an unloaded condition. Proof of compliance shall be provided upon request.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

Automatic locks shall be provided for both the "in" and "out" positions. The trip mechanism for the locks shall be located at the front of the tray for ease of use with a gloved hand.

The location(s) shall be RS3, RS5 and LS3.

**DRAWER ASSEMBLY**

A slide-out drawer assembly shall be installed LS4 floor, as wide as possible to fill the clear opening.

The clear dimensions of the first drawer starting at the top shall be 3.00" with a face plate that is 4.00" high x 21.00" deep. The clear dimensions of the second drawer shall be 3.75" with a face plate that is 4.00" high x 21.00" deep. The clear dimensions of the third drawer shall be 3.75" with a face plate that is 4.00" high x 21.00" deep. Each drawer shall be the same width and not exceed 36.00".

The drawers shall have a capacity of 250 lb.

The drawers shall be mounted in a cabinet housing constructed of light gray powder coated aluminum with anodized aluminum frames. The housing shall be 24.00" deep, and completely enclose the drawer.

A full-length aluminum extruded rail shall be provided at the top edge of each drawer. This rail shall act as the latching mechanism as well as the handle for each drawer.

There shall be a total of one (1) provided.

**CABLE RELEASE**

A cable release shall be provided to allow one handed operation of the latches for slide out tilt trays. A cable shall connect the two pull knobs so when you pull the cable from the center, it will release the dual knobs and release the tray. Cable shall be plastic coated.

A total of five (5) shall be provided LS4, LS5, RS3, RS4, RS5.

**CABLE RELEASE**

A cable release shall be provided to allow one handed operation of the latch for slide out trays. The cable shall be plastic coated.

A total of seven (7) shall be provided LS4, LS5, RS3, RS4, RS5, (2) RS6.

**TILLER MIRRORS**

There shall be a total of two (2) 10.00" x 6.50" mirror with adjustable arm and reinforced bracing installed on the tiller body to be determined.

**COMPARTMENT BETWEEN TOW EYES**

A compartment shall be supplied at the rear of the unit, above the rear bumper. It shall be 8.50" high x 25.75" wide x 27.00" deep. The compartment shall have a single-pan smooth aluminum drop-down door with a D-ring latch.

**TILLER CONVEX BODY MOUNTED MIRRORS**

A Grote, model 12010, 10.00" diameter round, convex mirror with adjustable arm and reinforced brace shall be provided on each side of the tiller body Mount at Mid Inspection, do not predrill any holes. The mirror shall be stainless steel. The mirror shall include one brace only so that the mirror support arm can be mounted vertically.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**DRAINS**
Four (4) drain holes shall be provided, one (1) in each corner of all shelves and trays that can hold water/moisture. These holes shall be installed prior to the shelf/tray lining if applicable.

**COMPARTMENT DRAINS**
A drain hole shall be provided in the floor of LS3 floor - rear corners. A splash guard shall be provided below each drain hole. There shall be a total of two (2) compartments requiring drains.

**COMPARTMENT LOUVER, NON-STANDARD LOCATION**
The louver(s) located in the RS3 compartments shall be provided high on rearward and forward wall. The quantity of louvers with non-standard locations is two (2).

**RECESS, BLISTER, COMPARTMENT WALL**
A quantity of one (1) blister(s) shall be provided LS1 on the right side of the compartment.

**ADDITIONAL COMPARTMENT VENT**
There shall be one (1) additional compartment vent(s) provided. These shall be in addition to any standard vent typically provided within the compartment. Each additional vent shall be added by cutting a hole in the compartment wall and installing a louvered plate over the hole. The plate shall match the compartment interior finish. The vent(s) shall vent to the atmosphere and not into another compartment.

The compartment(s) with an added vent shall be upper right/rear wall of LS3.

**RUB RAILS**
The bottom edge of the side body compartments shall be trimmed with a black 1.00" thick x 2.63" high UHMW plastic rail. There shall be 0.50" rubber spacers included between the rub rail and the body.

The rub rails shall not be an integral part of the body construction, which allows replacement in the event of damage.

Cut outs shall be provided in the rub rail for lighting.

**BODY FENDER CROWNS**
Rubber fender crowns shall be provided around the rear wheel openings.

Crowns shall be black.

**HANDRAILS**
The handrails shall be 1.25" diameter knurled aluminum to provide a positive gripping surface.

Chrome plated end stanchions shall support the handrail. Plastic gaskets shall be used between end stanchions and any painted surfaces.

Drain holes shall be provided in the bottom of all vertically mounted handrails.

Handrails shall be provided to meet current edition of applicable NFPA standards. The handrails shall be installed as noted on the sales drawing.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**AIR BOTTLE STORAGE (SINGLE)**
A quantity of two (2) air bottle compartments, 7.75" in diameter x 26.00" deep, shall be provided on the left side rearward of the rear wheels and on the right side rearward of the rear wheels. A painted stainless steel door with a chrome plated flush lift & turn latch shall be provided to contain the air bottle. A dielectric barrier shall be provided between the door hinge, hinge fasteners and the body sheet metal.

Inside the compartment, black rubber matting shall be provided.

**EXTENSION LADDER**
There shall be a 35' three (3) section aluminum Duo-Safety Series 1225-A extension ladder provided.

**ADDED EXTENSION LADDER**
There shall be two (2) 24', two (2) section, aluminum, Duo-Safety Series 900A extension ladder provided.

**ADDED EXTENSION LADDER**
There shall be two (2) 28', two (2) section, aluminum, Duo-Safety Series 1200A extension ladder provided.

**ADDED EXTENSION LADDER**
There shall be one (1) 35', three (3) section, aluminum, Duo-Safety Series 1225-A extension ladder provided.

**ROOF LADDER**
There shall be two (2) 16' aluminum, Duo-Safety, Series 875-DR roof ladder(s) provided. The ladder(s) shall have hooks on both ends.

**ADDED ROOF LADDER**
There shall be one (1) 10' roof, aluminum, Series 775-A provided.

**ADDED ROOF LADDER**
There shall be two (2) 14' roof, aluminum, Series 775-A provided.

**ADDED ROOF LADDER**
There shall be two (2) 16' roof, aluminum, Series 875-DR provided.

**ADDED ROOF LADDER**
There shall be one (1) Duo-Safety 6' aluminum wall ladder Series 750-A, 19.00" wide, with prong feet on both ends provided and located storage rack ontop of the goose neck.

**AERIAL ATTIC EXTENSION LADDER**
There shall be one (1) 10' Fresno, aluminum, Duo-Safety, Series 701 extension ladder(s) provided.

**AERIAL FOLDING LADDER**
There shall be one (1) 10' aluminum Duo-Safety Series 585-A folding ladder(s) provided and located in the ladder storage compartment.

**GROUND LADDER STORAGE**
The ground ladders shall be removable from the center rear of the apparatus.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

The ladders shall be individually stored in stainless steel slides and shall be arranged in such a manner that any one (1) ladder can be removed without having to move or remove any other ladder. Black Dura-Surf friction reducing material shall be added to the stainless steel slides, on the bottom horizontal surfaces, of the ladder storage rack.

Vertically hinged double lap doors shall be provided at the rear to close the ladder compartment.

Doors shall be of double pan aluminum construction. Single sheet aluminum doors shall not be considered. (no exception).

The lock door shall be latched with Eberhard latches with "D" ring handles. There shall be a Cast Products grabber door stay bracket provided on the outside of each door to hold it in the open position.

**LADDER BRACKETS**

There shall be two (2) side stacked ladder(s) provided on the left side of the rear body in lined brackets and held in place by chrome plated, quarter turn spring loaded clamps.If there is more than one (1) ladder stored here, the clamps shall be such that when a ladder is removed, the clamps can be moved a half-turn to hold the remaining ladder in place. The ladder brackets shall be adjustable up and down.

The brackets shall be designed to allow the ladders to be stored as close to the body as possible.

There shall be a 28' Duo-Safety 1200-A, two (2)-section extension and a 16' Duo-Safety 875-A roof ladder(s) located in the bracket.

**LADDER BRACKETS**

There shall be two (2) side stacked ladder(s) provided on the right side of the rear body in lined brackets and held in place by chrome plated, quarter turn spring loaded clamps.If there is more than one (1) ladder stored here, the clamps shall be such that when a ladder is removed, the clamps can be moved a half-turn to hold the remaining ladder in place. The ladder brackets shall be adjustable up and down.

The brackets shall be designed to allow the ladders to be stored as close to the body as possible.

There shall be a 28' Duo-Safety 1200-A, two (2)-section extension and a 16' Duo-Safety 875-A roof ladder(s) located in the bracket.

**LADDER STORAGE**

A trough shall be provided for storing a Duo-Safety 6' 750A 16.00" wall ladder with prong feet on both ends located on top of the goose neck to the rear of the turn table.

The trough shall be fabricated from smooth aluminum. The trough shall be provided with Velcro® straps to secure the ladder in place.

**LADDER STORAGE LIGHTING**

There shall be two (2) Truck Lite Model 44308C, 4.00" round LED lights with Model 40700, grommets used to illuminate the torque box ladder storage compartment. One (1) each side shall be located on the side wall of the torque box near the ladder storage entry area.

The lights shall be activated when the ladder storage compartment door is opened.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**ADDITIONAL FOLDING LADDER**
One (1) Revolution 2.0 Model 13117 Little Giant folding ladder shall be provided. The stored dimensions shall be 55.50" high x 23.75" wide x 9.25" deep. The weight shall be 32 lbs.

The ladder shall be located in the tray located on top of the DS body - rearward of compartment LS3.

**VELCRO RETENTION STRAPS**
There shall be a total of two (2) Velcro® retention strap(s) threaded through footman loops and installed outboard ladders (one strap each side) to prevent items from sliding rearward into the door.

**LADDER STORAGE AREA LIGHT**
There shall be two (2) Truck-Lite, Model 44308C, 4.00" round white LED light(s) with Model 40700, rubber grommets provided in the ladder rack storage area.

**LADDER PLATE**
A quantity of one (1) stainless plate(s) with a two bend flange and a stainless steel hinge shall be provided to secure the ladder complement located middle section of ladder storage area. The plate assembly shall be mounted to the bottom of the entrance of the ladder storage area.

When the plate is vertical, it shall secure the ladders and prevent them from migrating to the rear of the apparatus.

**NESTED LADDER STORAGE**
There shall be nested ladders on the left side of the ladder storage compartment. The ladders shall be nested so that one ladder can be removed without removing the adjoining ladder.

**NESTED LADDER STORAGE**
There shall be nested ladders on the right side of the ladder storage compartment.

**ADDITIONAL STORAGE TROUGHS**
There shall be a total of four (4) trough(s) provided in the torque box/ladder storage area. The size of the trough(s) shall be (3) 10' long troughs stacked vertically on left side of equipment rack. (1) 12' long horizontal trough in the space above the rack for the 28', 20', & 35' ladders. Reference equipment/ladder rack layout for sizes.. Each trough shall be constructed of stainless steel and shall be located in the ladder storage area

**STOKES BASKET STORAGE**
A bolt-in storage rack shall be located in the LS4 transverse compartment, mounted horizontally. This storage rack shall accommodate a stokes basket 84.50" long x 24.00" wide x 7.50" high, and shall be installed rearward in LS5/RS5, mounted to compartment ceiling. Access shall be provided from either side. A strap shall be provided to prevent side to side movement of the stokes basket. The storage rack shall match the compartment interior.

**LITTLE GIANT LADDER STORAGE**
A storage trough constructed of aluminum treadplate shall be provided on the top of the body on the left side of the truck, directly rearward of the LS3 compartment - located on the top of the body - can extend under the ladder (match job 37437). The trough shall be sized for a Little Giant Revolution 2.0 Model 17 - 13117. The ladder shall be held in place by Velcro® straps.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**12' PIKE POLES**
There shall be one (1) Fire Hooks Unlimited Model RH-12' New York Roof Hook with a fiberglass shaft and pry end provided. The pike pole(s) shall be stored in tubular holders located in the ground ladder storage compartment.

- two (2) Fire Hooks Unlimited, New York Roof Hook , 10' long roof hook with steel shaft and pry end shall be provided.

**6' PIKE POLE**
There shall be one (1) Fire Hooks Unlimited NY roof hook RH-6, 6' pike pole(s) with steel handles and pry end provided ladder compartment.

**PIKE POLE STORAGE IN TORQUE BOX/LADDER STORAGE**
There shall be aluminum tubing provided in the torque box/ladder storage area for a total of six (6) pike poles. The pike pole tube(s) shall be notched to allow a New York style pike pole to fit in the tube.

If the head of a pike pole can come into contact with a painted surface, a stainless steel scuffplate shall be provided.

**PUMP COMPARTMENT**
The pump compartment shall be separate from the hose body and compartments so that each may flex independently of the other. It shall be a fabricated assembly of steel tubing, angles and channels which supports both the fire pump and the side running boards.

The pump compartment shall be mounted on the chassis frame rails with rubber biscuits in a four point pattern to allow for chassis frame twist.

Pump compartment, pump, plumbing and gauge panels shall be removable from the chassis in a single assembly.

On both sides, the pump compartment shall extend outward to the outside edge of the body. The area where the outlets and inlets are located shall be recessed. The area above the pump inlets and outlets shall be full width to support the water tank.

The reservoir compartment shall be attached to the pumphouse.

**PUMP MOUNTING**
Pump shall be mounted to a substructure which shall be mounted to the chassis frame rail using rubber isolators. The mounting shall allow chassis frame rails to flex independently without damage to the fire pump.

**PUMP CONTROL PANELS (SIDE CONTROL)**
All pump controls and gauges shall be located at the left (driver's) side of the apparatus and properly marked.

The pump panel on the right (passenger's) side shall be removable with lift and turn type fasteners. The left (driver's) side shall be fastened with screws.

The gauge and control panels shall be two (2) separate panels for ease of maintenance.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

The side gauge panel shall be hinged at the bottom with a full length stainless steel hinge. The fasteners used to hold the panel in the upright position shall be quarter-turn type. Vinyl covered cable or chains shall be used to hold the gauge panel in the dropped position.

Polished stainless steel trim collars shall be installed around all inlets and outlets.

All push/pull valve controls shall have 1/4 turn locking control rods with polished chrome plated zinc tee handles. Guides for the push/pull control rods shall be chrome plated zinc castings securely mounted to the pump panel. Push/pull valve controls shall be capable of locking in any position. The control rods shall pull straight out of the panel and shall be equipped with universal joints to eliminate binding.

The identification tag for each valve control shall be recessed in the face of the tee handle.

All discharge outlets shall have color coded identification tags, with each discharge having its own unique color. Color coding shall include the labeling of the outlet and the drain for each corresponding discharge.

All line pressure gauges shall be mounted in individual chrome plated castings with the identification tag recessed in the casting below the gauge. All remaining identification tags shall be mounted on the pump panel in chrome plated bezels. Mounting of the castings and identification bezels shall be done with a threaded peg cast on the back side of the bezel or screws.

**TILLER PUMP HOUSE AREA FINISH**

The tiller pump house area components shall be finished as follows:

- The floor of the area under the pump panel shall be aluminum treadplate. The remaining interior surfaces, sides and top shall be painted lower cab color .
- The exterior surfaces of the pump house shall be painted to match lower cab .
- The water tank/cargo side sheets and area above the pump house shall be smooth aluminum and painted to match the lower cab color with a treadplate top .
- The water tank top cover shall be aluminum treadplate .
- The exterior of the crosslays shall be match the lower cab color .

**PUMP**

Pump shall be a Waterous S100C, 1500 gpm single (1) stage midship mounted centrifugal type. The pump shall be end suction, single inlet type.

Pump shall be the class "A" type.

Pump shall deliver the percentage of rated discharge at pressure indicated below:

- 100% of rated capacity at 150 psi net pump pressure.

-70% of rated capacity at 200 psi net pump pressure.

-50% of rated capacity at 250 psi net pump pressure.

Pump body shall be close-grained gray iron, bronze fitted and vertically split.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

Impeller shaft shall be stainless steel, accurately ground to size. It shall be supported by oil or grease lubricated, anti-friction ball bearings for rigid precise support. Impeller shall have flame-plated hubs assuring maximum pump life and efficiency despite any presence of abrasive matter in the water supply.

Bearings shall be protected from water and sediment by suitable stuffing boxes, slinger rings, and oil seals. No special or sleeve type bearings shall be used.

**MECHANICAL SEAL ON PUMP**

Pump shall be equipped with a self-adjusting, maintenance-free, mechanical shaft seal.

The mechanical seal shall consist of a flat, highly polished, spring fed carbon ring that rotates with the impeller shaft. The carbon ring shall press against a highly polished stainless steel stationary ring that is sealed within the pump body.

In addition, a throttling ring shall be pressed into the steel chamber cover, providing a very small clearance around the rotating shaft in the event of a mechanical seal failure. The pump performance shall not deteriorate, nor shall the pump lose prime, while drafting if the seal fails during pump operation.

Wear rings shall be bronze and easily replaceable to restore original pump efficiency and eliminate the need to replace the entire pump casing due to wear.

**PUMP TRANSMISSION**

The pump transmission shall be made of a three (3) piece, aluminum, horizontally split casing. Power transfer to pump shall be through a high strength Morse HY-VO silent drive chain. By using a chain rather than gears, 50 percent of the sprocket shall be accepting or transmitting torque, compared to two (2) or three (3) teeth doing all the work.

Drive shafts shall be 2.35" diameter hardened and ground alloy steel and supported by ball bearings. The case shall be designed to eliminate the need for water cooling.

**PUMPING MODE**

An interlock system shall be provided to ensure that the pump drive system components are properly engaged so that the apparatus can be safely operated. The interlock system shall be designed to allow stationary pumping only.

**AIR PUMP SHIFT**

Pump shift engagement shall be made by a two (2) position sliding collar, actuated pneumatically (by air pressure), with a three (3) position air control switch located in the cab. A manual back-up shift control shall also be located on the left side pump panel.

Two (2) indicator lights shall be provided adjacent to the pump shift inside the cab. One (1) green light shall indicate the pump shift has been completed and be labeled "pump engaged". The second green light shall indicate when the pump has been engaged, and that the chassis transmission is in pump gear. This indicator light shall be labeled "OK to pump".

The pump shift shall be interlocked to prevent the pump from being shifted out of gear when the chassis transmission is in gear to meet NFPA requirements.

The pump shift control in the cab shall be illuminated to meet NFPA requirements.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**TRANSMISSION LOCK-UP**
The direct gear transmission lock-up for the fire pump operation shall engage automatically when the pump shift control in the cab is activated.

**AUXILIARY COOLING SYSTEM**
A supplementary heat exchange cooling system shall be provided to allow the use of water from the discharge side of the pump for cooling the engine water. The heat exchanger shall be a separate unit. It shall be installed in the pump or engine compartment with the control located on the pump operator's control panel. The exchanger shall be plumbed to the master drain valve.

**PUMP INTAKE RELIEF VALVE**
An Akron Style 53 relief valve shall be installed on the suction side of the pump preset at 125 psig.

The relief valve shall have a working range of 50 psi to 250 psi.

The outlet shall terminate below the frame rails with a 2.50" National Standard hose thread adapter and shall have a "do not cap" warning tag.

The relief valve pressure control shall be located behind the right side pump panel with a stainless steel access door.

**PRESSURE CONTROLLER**
A FRC Pump Boss 500 electronic pressure controller with one (1) 600 PSI transducer on the pump discharge shall be provided. All readouts shall be standard PSI.

When a single 300 psi or single 600 psi pressure transducer is selected the transducer is installed in the discharge side of the water pump. The transducer continuously monitors pump pressure sending a signal to the electronic pressure controller.

When a dual 600 psi pressure transducer is selected the transducer are installed in the discharge side and intake side of the water pump. The discharge transducer continuously monitors pump pressure sending a signal to the electronic pressure controller. The intake transducer continuously monitors the pump intake sending a signal to the electronic pressure controller.

The pressure controller can be used in two (2) modes of operation, RPM mode and pressure modes. The controller shall be programmed to turn on/default to Pressure Setting mode.

In RPM mode, the controller can be activated after vehicle parking brake has been set. When in this mode, the controller shall maintain the set engine speed, regardless of engine load (within engine operation capabilities).

In pressure mode, the controller can be activated after vehicle parking brake has been set. When in this mode, the controller shall automatically maintain the discharge pressure set by the operator (within the discharge capabilities of the pump and water supply) regardless of flow.

A 2.00" diameter throttle control knob with no mechanical stops, a serrated grip, and a red idle push button in the center shall be a integrated/part of the pressure controller. The throttle control knob shall be programmed for Clockwise rotation to increase engine speed.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

Individual LED indicators for ok to pump, throttle ready, pressure mode and rpm mode shall be located on the pressure controller for easy viewing.

Safety features include recognition of low water and no water conditions with an automatic programmed response and a push button to return the engine to idle.

An additional audible alarm shall NOT BE provided.

The pressure controller screen shall be LCD. The LCD screen and LED intensity shall be automatically adjust for day and nighttime operation. The LCD screen intensity can also be manually adjusted if needed.

The following information shall be provided/displayed on the LCD screen:

- Engine RPM
- Check engine and stop engine warning indicators
- Engine oil pressure
- Engine coolant temperature
- Transmission Temp
- Battery voltage
- Operating mode (RPM or pressure)
- Pressure or RPM setting

On screen messaging show diagnostic and warning messages as they occur. It shall show apparatus information, stored data, and program options when selected by the operator. It shall monitor inputs outputs and support audible and visual warning alarms for the following conditions:

- High battery voltage
- Low battery voltage/engine off
- Low battery voltage/engine running
- High water pump temperature
- Low engine oil pressure
- High engine coolant temperature
- No engine response (visual alarm only)

The pressure controller shall store the accumulated operating hours for the pump and engine. These items are to be displayed within the pressure controller menu.

The pressure controller shall include a USB port on the back of the controller for easy software upgrades if needed.

**PRIMING PUMP**

The priming pump shall be a Trident Emergency Products compressed air powered, high efficiency, multistage venturi based AirPrime System, conforming to standards outlined in the current edition of applicable NFPA standards.

All wetted metallic parts of the priming system are to be of brass and stainless steel construction.

One (1) priming control shall open the priming valve and start the pump primer.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**PLUMBING INSTRUCTIONS**
move DS and PS main inlets as far rearward as possible

**PUMP MANUALS**
There shall be a total of two (2) pump manuals provided by the pump manufacturer and furnished with the apparatus. The manuals shall be provided by the pump manufacturer in the form of two (2) electronic copies. Each manual shall cover pump operation, maintenance, and parts.

**PLUMBING, STAINLESS STEEL AND HOSE**
All inlet and outlet lines shall be plumbed with either stainless steel pipe, flexible polypropylene tubing or synthetic rubber hose reinforced with hi-tensile polyester braid. All hose's shall be equipped with brass or stainless steel couplings. All stainless steel hard plumbing shall be a minimum of a schedule 10 wall thickness.

Where vibration or chassis flexing may damage or loosen piping or where a coupling is required for servicing, the piping shall be equipped with victaulic or rubber couplings.

Plumbing manifold bodies shall be ductile cast iron or stainless steel.

All piping lines are to be drained through a master drain valve or shall be equipped with individual drain valves. All drain lines shall be extended with a hose to drain below the chassis frame.

All water carrying gauge lines shall be of flexible polypropylene tubing.

All piping, hose and fittings shall have a minimum of a 500 PSI hydrodynamic pressure rating.

**MAIN PUMP INLETS**
A 6.00" pump manifold inlet shall be provided on each side of the vehicle. The suction inlets shall include removable die cast zinc screens that are designed to provide cathodic protection for the pump, thus reducing corrosion in the pump.

**SHORT SUCTION TUBE(S)**
The suction tube(s) on the water pump shall have short suction tube(s) installed to allow for installation of adapters, elbows or intake valves without excessive overhang.

**INLET VALVES WITH INTAKE RELIEF VALVE**
A customer/dealer supplied and installed make and model Akron Revolution 7983 intake valve shall be installed Both sides .

**MAIN PUMP INLET CAP**
The main pump inlets shall have National Standard Threads with a long handle chrome cap.

The cap shall incorporate a thread design to automatically relieve stored pressure in the line when disconnected (no exception).

**VALVES**
All ball valves shall be Akron® Brass in-line valves. The Akron valves shall be the 8000 series heavy-duty style with a stainless steel ball and a simple two-seat design. No lubrication or regular maintenance is required on the valve.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

Valves shall have a **ten (10) year** warranty.

The location of the valve for the two (2) inlets shall be behind the pump panel.

**INLET CONTROL**
The side auxiliary inlet(s) shall incorporate a quarter-turn ball valve with the control located at the inlet valve. The valve operating mechanism shall indicate the position of the valve.

**LEFT SIDE INLET**
There shall be one (1) auxiliary inlet with a 2.50" valve at the left side pump panel, terminating with a 2.50" (F) National Standard hose thread adapter.

The auxiliary inlet shall be provided with a strainer, chrome swivel and plug.

**RIGHT SIDE INLET**
There shall be one (1) auxiliary inlet with a 2.50" valve at the right side pump panel, terminating with a 2.50" (F) National Standard hose thread adapter.

The auxiliary inlet shall be provided with a strainer, chrome swivel and plug.

**INLET BLEEDER VALVE**
A 0.75" bleeder valve shall be provided for each side gated inlet.

The valves shall be located behind the panel with a "T" swing style handle control extended to the outside of the panel.

The handles shall be chrome plated and provide a visual indication of valve position. The swing handle shall provide an ergonomic position for operating the valve without twisting the wrist and provides excellent leverage.

The water discharged by the bleeders shall be routed below the chassis frame rails.

**TANK TO PUMP**
The booster tank shall be connected to the intake side of the pump with stainless steel piping and a quarter turn 3.00" full flow line valve with the control remotely located at the operator's panel. Tank to pump line shall run straight (no elbows) from the pump into the front face of the water tank and angle down into the tank sump. A rubber coupling shall be included in this line to prevent damage from vibration or chassis flexing.

A check valve shall be provided in the tank to pump supply line to prevent the possibility of "back filling" the water tank.

**TANK REFILL**
A 1.50" combination tank refill and pump re-circulation line shall be provided, using a quarter-turn full flow ball valve controlled from the pump operator's panel.

**DISCHARGE OUTLET CONTROLS**
The discharge outlets shall incorporate a quarter-turn ball valve with the control located at the pump operator's panel. The valve operating mechanism shall indicate the position of the valve.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

If a handwheel control valve is used, the control shall be a minimum of a 3.9" diameter stainless steel handwheel with a dial position indicator built in to the center of the handwheel.

Any 3.00 inch or larger discharge valve shall be a slow-operating valve in accordance with NFPA 16.7.5.3.

**LEFT SIDE DISCHARGE OUTLETS**
There shall be Two (2) discharge outlets with a 2.50" valve on the left side of the apparatus, terminating with a 2.50" (M) National Standard hose thread adapter.

**LEFT SIDE OUTLET ELBOWS**
The 2.50" discharge outlets located on the left side pump panel shall be furnished with a 2.50" (F) National Standard hose thread x 2.50" (M) National Standard hose thread, chrome plated, 45 degree elbow.

The elbow shall incorporate a thread design to automatically relieve stored pressure in the line when disconnected (no exception).

**RIGHT SIDE DISCHARGE OUTLETS**
There shall be Two (2) discharge outlets with a 2.50" valve on the right side of the apparatus, terminating with a 2.50" (M) National Standard hose thread adapter.

**RIGHT SIDE OUTLET ELBOWS**
The 2.50" discharge outlets located on the right side pump panel shall be furnished with a 2.50" (F) National Standard hose thread x 2.50" (M) National Standard hose thread, chrome plated, 45 degree elbow.

The elbow shall incorporate a thread design to automatically relieve stored pressure in the line when disconnected (no exception).

**LARGE DIAMETER DISCHARGE OUTLET**
There shall be an Akron 8800 4.00" flat ball valve with 4.00" plumbing terminating with a 4.00" MNST chrome adapter on the right side pump panel.

The valve shall be controlled with a(n) Pierce small handwheel with indicator located at the pump operator's panel.

**LARGE DIAMETER OUTLET ELBOWS**
The 4.00" outlet(s) shall be furnished with one (1) 4.00" (F) National Standard hose thread x 5.00" Storz elbow adapter with Storz cap.

**DISCHARGE CAPS/ INLET PLUGS**
Chrome plated, rocker lug, caps with chain shall be furnished for all discharge outlets 1.00" thru 3.00" in size, besides the pre-connected hose outlets.

Chrome plated, rocker lug, plugs with chain shall be furnished for all auxiliary inlets 1.00" thru 3.00" in size.

The caps and plugs shall incorporate a thread design to automatically relieve stored pressure in the line when disconnected (no exception).

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**OUTLET BLEEDER VALVE**

A 0.75" bleeder valve shall be provided for each outlet 1.50" or larger. Automatic drain valves are acceptable with some outlets if deemed appropriate with the application.

The valves shall be located behind the panel with a T swing style handle control extended to the outside of the side pump panel.

The handles shall be chrome plated and provide a visual indication of valve position.

The T swing handle shall provide an ergonomic position for operating the valve without twisting the wrist and provides excellent leverage.

Bleeders shall be located at the bottom of the pump panel. They shall be properly labeled identifying the discharge they are plumbed in to.

The water discharged by the bleeders shall be routed below the chassis frame rails.

**CROSSLAY HOSE BEDS**

Two (2) crosslays with 1.50" outlets shall be provided. Each bed to be capable of carrying 200 feet of 1.75" double jacketed hose and shall be plumbed with 2.00" i.d. pipe and gated with a 2.00" quarter turn ball valve.

Outlets to be equipped with a 1.50" National Standard hose thread 90 degree swivel located in the hose bed so that hose may be removed from either side of apparatus.

The crosslay controls shall be at the pump operator's panel.

The center crosslay dividers shall be fabricated of .25" aluminum and shall provide adjustment from side to side. The divider shall be unpainted with a DA finish. The remainder of the crosslay bed shall be painted job color.

Scuffplates shall be provided on both sides, at the sides and bottom of each opening to protect the paint.

**CROSSLAY HOSE RESTRAINT**

A 2.00" black nylon webbing design restraint shall be provided at each of the ends of two (2) crosslay(s) to secure the hose during travel. The webbing assembly is to be attached at the bottom of the crosslays, with footman loops and a permanent attachment, and is to attach at the top with a top bar and a pair seat belt buckles. The female end of the seat buckle shall be permanently attached at the top. A orange nylon strap shall be attached to the seat belt buckle for releasing the buckle on the webbing.

**CROSSLAY COVER**

A hinged .19" aluminum treadplate cover shall be installed over the crosslay hose beds. It shall include a latch at each end of the cover to hold it securely in place, a chrome grab handle at each end for opening and closing the cover and a foam rubber gasket where the cover comes into contact to a painted surface.

The cover shall be provided with rubber latch hold open device.

The hinge shall be to the front of the hose beds.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**FOAM SYSTEM**
A foam system shall not be required on this apparatus.

The following drawing(s) shall be provided for approval by the customer. The drawing(s) shall be made to match No Similar Pierce Truck similar Pierce job number.

**PUMP OPERATOR'S PANEL DRAWING**
A detailed drawing to scale of the pump operator's panel shall be provided for the customer to review. The drawing shall include all of the gauges, controls, switching, etc.., located on the pump operator's panel. The customer will be allowed to make changes and/or mark-ups to this approval drawing. The fire apparatus manufacturer shall make revisions (If needed) to the drawing per the customer changes and/or mark-ups as long as the changes are physically possible within a specific product line.

The finalized and signed customer approved pump operator's panel drawing shall become part of the contract documents.

Due to the way drain(s), bleeder(s), operational/maintenance tag(s) and NFPA required warning tag(s) are placed on pump panel(s), these items will NOT be shown on any pump panel approval drawing(s). These item(s) will be placed on pump panel(s) at the fire apparatus manufacturer discretion.

**REMAINING PUMP PANEL(S)**
Detailed drawing(s) to scale of the remaining pump panel(s) shall be provided for the customer to review. The drawing(s) shall include all of the gauges, controls, switching, etc.., located on the pump panel(s). The customer will be allowed to make changes and/or mark-ups to these approval drawing(s). The fire apparatus manufacturer shall make revisions (If needed) to the drawing(s) per the customer changes and/or mark-ups as long as the changes are physically possible within a specific product line.

The finalized and signed customer approved pump panel drawing(s) shall become part of the contract documents.

Due to the way drain(s), bleeder(s), operational/maintenance tag(s) and NFPA required warning tag(s) are placed on pump panel(s), these items will NOT be shown on any pump panel approval drawing(s). These item(s) will be placed on pump panel(s) at the fire apparatus manufacturer discretion.

**COLOR CODED TAGS**
A detailed drawing/chart of the colors used on all of the inlet(s) and outlet(s) shall be provided for the customer to review. The customer will be allowed to make changes and/or mark-ups to this approval drawing/chart. The fire apparatus manufacturer shall make revisions (If needed) to the drawing per the customer changes and/or mark-ups as long as the changes are physically possible within a specific product line.

The finalized and signed customer approved drawing/chart of the colors shall become part of the contract documents.

**SPECIAL TEXT/VERBIAGE TAGS**
A detailed drawing/chart of the text/verbiage used on all of the inlet(s) and outlet(s) shall be provided for the customer to review. The customer will be allowed to make changes and/or mark-ups to this approval drawing/chart. The fire apparatus manufacturer shall make revisions (If needed) to the drawing per the

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

customer changes and/or mark-ups as long as the changes are physically possible within a specific product line.

The finalized and signed customer approved drawing/chart of the text/verbiage shall become part of the contract documents.

**PUMP PANEL CONFIGURATION**
The pump panel configuration shall be neat and orderly.

**PUMP OPERATOR'S PLATFORM**
A pull out, flip down platform shall be provided at the pump operator's control panel.

The front edge and the top surface of the platform shall be made of DA finished aluminum with a Morton Cass insert.

The platform shall be approximately 13.75" deep when in the stowed position and approximately 22.00" deep when extended. The platform stepping surface shall be 35.00" wide. The platform shall lock in the retracted and the extended position.

The sides, bottom and rear portions of the support assembly shall be painted to match lower job color.

The platform shall be wired to the "step not stowed" indicator in the cab.

**PUMP OPERATOR'S PLATFORM PERIMETER LIGHT**
There shall be an On Scene Solutions, Model Night Stick Access, 20.00" white 12 volt DC LED strip light provided to illuminate the ground area.

**PUMP AND GAUGE PANEL**
The pump and gauge panels shall be constructed of stainless steel with a brushed finish. A polished aluminum trim molding shall be provided on both sides of the pump panel.

**PUMP ACCESS**

**Right Side Panel**
The right side upper pump panel shall be removable.

**Panel Fastener**
The removable panels shall be secured with black swell latch.

The left side pump panels shall be attached with screws.

The right side lower pump panel (drain bank) shall be attached with screws.

**PUMP COMPARTMENT LIGHT**
There shall be one (1) Whelen®, Model 3SC0CDCR, 3.00" white 12 volt DC LED light(s) with Whelen, Model 3FLANGEC, flange(s) installed in the pump compartment.

Engine monitoring graduated LED indicators shall be incorporated with the pressure controller.

Also provided at the pump panel shall be the following:

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

- Master Pump Drain Control

**THROTTLE READY GREEN INDICATOR LIGHT**
There shall be a green indicator light integrated with the pressure governor and/or engine throttle installed on the pump operators panel that is activated when the pump is in throttle ready mode.

**OK TO PUMP INDICATOR LIGHT**
There shall be a green indicator light installed on the pump operators panel that is activated when the pump is in Ok To Pump mode.

**AIR HORN SWITCH**
An air horn control switch shall be provided at the pump operator's control panel. This switch shall be momentary red and properly labeled. The switch shall be located within easy reach of the operator in the electrical switch panel.

**VACUUM AND PRESSURE GAUGES**
The pump vacuum and pressure gauges shall be liquid filled and manufactured by Class 1 Incorporated.

The gauges shall be a minimum of 4.00" in diameter and shall have white faces with black lettering, with a pressure range of 30.00"-0-600#.

Gauge construction shall include a Zytel nylon case with adhesive mounting gasket and threaded retaining nut.

The pump pressure and vacuum gauges shall be installed adjacent to each other at the pump operator's control panel.

Test port connections shall be provided at the pump operator's panel. One (1) shall be connected to the intake side of the pump, and the other to the discharge manifold of the pump. They shall have 0.25 in. standard pipe thread connections and non-corrosive polished stainless steel or brass plugs. They shall be marked with a label.

This gauge shall include a 10 year warranty against leakage, pointer defect, and defective bourdon tube.

**PRESSURE GAUGES**
The individual "line" pressure gauges for the discharges shall be interlube filled and manufactured by Class 1©.

They shall be a minimum of 2.50" in diameter and shall have white faces with black lettering.

Gauges shall be compound type with a vacuum/pressure range of 30.00"-0-400#.

The individual pressure gauge shall be installed as close to the outlet control as practical.

**WATER LEVEL GAUGE**
There shall be a Class 1, Model ITL-40M multi colored LED electronic master water level gauge provided on the left side pump panel and a slave on the right side pump panel. The indicators shall include blue water level labels.

The water level indicators shall be as follows:

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

- 100% - Two (2) Green
- 75% - Two (2) Blue
- 50% - Two (2) Yellow
- 25% - Two (2) Red steady burn
- Refill - The entire light scrolls through all the lights.

**LIGHT SHIELD**

There shall be a polished, 16 gauge stainless steel light shield installed over the pump operator's panel.

- There shall be 12 volt DC white LED lights installed under the stainless steel light shield to illuminate the controls, switches, essential instructions, gauges, and instruments necessary for the operation of the apparatus. These lights shall be activated by the pump panel light switch. Additional lights shall be included every 18.00" depending on the size of the pump house.
- One (1) pump panel light shall come on when the pump is in ok to pump mode.

There shall be a light activated above the pump panel light switch when the parking brake is set. This is to afford the operator some illumination when first approaching the control panel.

**AIR HORN SYSTEM**

Two (2) Hadley®, eTone, chrome air horns shall be recessed in the front bumper. The air horn system shall be piped to the air brake system wet tank utilizing 0.38" tubing. A pressure protection valve shall be installed to prevent the loss of air in the brake system.

**Air Horn Location**

The air horns shall be located on each side of the bumper, just outside of the frame rails.

**Air Horn Control**

The air horn(s) shall be activated by the following:

- Right side lanyard. The lanyard to be a link chain inside vinyl tubing.
- Left side foot switch

**ELECTRONIC SIREN**

A Whelen®, Model 295SLSA1, electronic siren with noise canceling microphone shall be provided.

This siren to be active when the battery switch is on and that emergency master switch is on.

Electronic siren head shall be recessed in the passenger side inside switch panel.

The electronic siren shall be controlled on the siren head only. No horn button or foot switches shall be required.

**SPEAKERS**

There shall be two (2) Whelen®, Model SA315P, black nylon composite, 100-watt, speakers with through bumper mounting brackets and polished stainless steel grille provided. Each speaker shall be connected to the siren amplifier.

There shall be one (1) speaker recessed in the passenger side and one (1) speaker recessed in the driver side of the front bumper. The speakers shall be located in the angled corner area of the bumper.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**AUXILIARY MECHANICAL SIREN**

There shall be a Federal Signal Model Q2B mechanical siren furnished and installed in the front of the apparatus.

The Q2B shall be chrome finish.

The siren shall have a 2-gauge cable connected to a power solenoid that is connected by a 2-gauge cable ran battery direct to the primary chassis batteries and shall be labeled Q2B+ at the battery. The power solenoid shall only be enabled when the emergency master switch is on.

The siren shall have a 2-gauge ground wire connected to the chassis battery stud. The cable shall be labeled Q2B- at the battery.

The mechanical siren shall be recessed in the front bumper on the left side. The siren shall be supported by the bumper framework.

**MECHANICAL SIREN CONTROL**

The mechanical siren shall be activated by the following:

- Left side foot switch outboard of the air horn footswitch. The control to be available when the parking brake is released and control to be available when the emergency master switch is on.
- Right side foot switch on engine tunnel within reach of officer. The control to be available when the parking brake is released and control to be available when the emergency master switch is on.

A momentary chrome push button switch shall be included in the right side dash panel to activate the siren brake.

A momentary red switch shall be included in switch panel #9 to activate the siren brake.

**SIREN PROGRAMMING**

The electronic siren shall be programmed to include the warble and whoop tones.

T1 - Warble

T2 - Whoop

**FRONT ZONE UPPER WARNING LIGHTS**

There shall be three (3) Whelen® Freedom IV 21.50" lightbars mounted on the cab roof.

The driver's side lightbar shall be installed at a 30 degree angle from the front of the cab. This lightbar shall include the following:

- One (1) red flashing LED module in the outside end position.
- One (1) red flashing LED module in the outside front corner position.
- One (1) red flashing LED module in the outside front position.
- One (1) white flashing LED module in the inside front position.
- One (1) red flashing LED module in the inside front corner position.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

The center lightbar shall be installed parallel to the front of the cab. This lightbar shall include the following:

- One (1) red flashing LED module in the driver's side front corner position.
- One (1) red flashing LED module in the driver's side front position.
- One (1) red flashing LED module in the passenger's side front position.
- One (1) red flashing LED module in the passenger's side front corner position.

The passenger's side lightbar shall be installed at a 30 degree angle from the front of the cab. This lightbar shall include the following:

- One (1) red flashing LED module in the inside front corner position.
- One (1) white flashing LED module in the inside front position.
- One (1) red flashing LED module in the outside front position.
- One (1) red flashing LED module in the outside front corner position.
- One (1) red flashing LED module in the outside end position.

There shall be clear lenses included on the lightbar.

There shall be a switch in the cab on the switch panel to control the lightbars.

The white flashing LEDs shall be disabled when the parking brake is applied.

The red flashing LED modules in the center lightbar and the red flashing LED module in front inside corners in the side lightbars may be load managed when the parking brake is applied.

**LIGHTS, FRONT ZONE LOWER**

There shall be four (4) Whelen®, Model M6**S, 4.31" high x 6.75" wide x 1.37" deep steady burn LED warning lights installed on the cab face, above the headlights, mounted in two dual bezels.

- The left side outside warning light to include white LEDs
- The left side inside warning light to include red LEDs
- The right side inside warning light to include red LEDs
- The right side outside warning light to include white LEDs
- The warning light lens colors to be the same as the LEDs
- The housing to be polished and the trim shall be chrome

The lights shall be controlled utilizing the Whelen® CenCom CORE™, supplier microprocessor system.

There shall be a switch in the cab on the switch panel to control the lights.

Any white lights shall be de-activated when the park brake is set.

**ROTO RAY LIGHT**

There shall be one (1) Roto Ray, Model 4000W rotating warning light provided on the front of the cab mounted through the top section of the front grille.

This warning light shall include the following:

| Bidder Complies | |
|---|---|
| Yes | No |

- Two (2) PAR46 lights with red LEDs and clear lenses
- One (1) PAR46 light with white LEDs and a clear lens

There shall be a switch in the cab on the switch panel to control this light.

The rotation motor and the warning lights shall be deactivated when the parking brake is applied.

**HEADLIGHT FLASHER**

The high beam headlights shall flash alternately between the left and right side.

There shall be a switch installed in the cab on the switch panel to control the high beam flash. This switch shall be live when the battery switch and the emergency master switches are on.

The flashing shall automatically cancel when the hi-beam headlight switch is activated or when the parking brake is set.

**SIDE ZONE LOWER LIGHTING**

There shall be six (6) Whelen®, Model M6*C, flashing LED warning lights with chrome trim installed per the following:

- Two (2) lights, one (1) each side on the front custom cab corner. The side front lights to be red.
- Two (2) lights, one (1) each side of cab rearward of crew cab doors. The side middle lights to be red.
- Two (2) lights, one (1) each side above rear wheels. The side rear lights to be red.
- The lights shall include clear lenses.

There shall be a switch in the cab on the switch panel to control the lights.

**INTERIOR CAB DOOR WARNING LIGHTS**

There shall be four (4) Weldon, Model 8401-0000-20, 16" long x 3/4" High x 5/8" deep amber 12 volt DC LED flashing strip lights provided.

- One (1) light on the left side cab door.
- One (1) light on the right side cab door.
- One (1) light on the right side crew cab door.
- One (1) light on the left side crew cab door.

Each light shall be located over the door window..

Each light shall be activated when the battery switch is on, respective door is opened and the park brake is on.

Each light shall be installed so the flash pattern directs traffic away from the doors.

**ELECTRICAL CONNECTORS FOR WARNING LIGHTS**

The lights shall be installed with a weatherproof insulated crimped connectors in order to provide ease of connection/disconnection of the circuit applied to.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**SIDE WARNING LIGHTS**
There shall be two (2) Whelen®, Model M6**S, 4.31" high x 6.75" wide x 1.37" deep steady burning warning light(s) with chrome trim provided, centered over front wheel on both sides of the cab.

The light(s) to include red flashing LEDs.

The warning light lens colors to be the same as the LEDs.

There shall be a switch in the cab on the switch panel to control the lights.

The flash pattern of the lights shall be controlled through the supplier based electrical control system.

White LEDs shall be deactivated when the parking brake is applied.

Amber, blue, green and red LEDs may be load managed when the parking brake is applied.

**SIDE WARNING LIGHTS**
There shall be eight (8) Whelen®, Model WIONSM**, steady burning LED light(s) with chrome trim and clear lens(es) surface mounted in the body rub rails centered under compartments: LS1, LS2, LS3/LS4, LS5/LS6, RS1, RS2, RS3/RS4, RS5/RS6. The lights shall only be mounted with the rubber gasket if clearance allows it.

The light(s) to include red LEDs.

The lights shall be set to steady burn prior to mounting.

The light(s) shall be activated with the side warning switch.

The flash pattern of the lights shall be controlled through the supplier based electrical control system.

White LEDs shall be deactivated when the parking brake is applied.

**REAR ZONE LOWER LIGHTING**
There shall be two (2) Whelen®, Model M6*C, LED flashing warning lights with chrome trim located at the rear of the apparatus.

- The driver's side rear light to be red
- The passenger's side rear light to be red

The lenses shall be clear.

There shall be a switch located in the cab on the switch panel to control the lights.

**REAR WARNING LIGHTS**
There shall be two (2) Whelen®, Model M6**, 4.31" high x 6.75" wide x 1.37" deep flashing LED warning light(s) with chrome trim provided at the rear of the apparatus, on the back of the tiller cab, low outside corners.

The light(s) to include red flashing LEDs. The warning light lens color(s) to be clear.

These light(s) shall be controlled with the rear lower warning switch.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

The light(s) may be load managed when the parking brake is applied.

**REAR OF HOSE BED WARNING LIGHTS**

There shall be two (2) Whelen Rota-Beam, Model R316RF, 4.00" high x 7.19" wide beacons with red LED's and clear domes provided.

- One (1) shall be installed on the driver's side rear of the apparatus.
- One (1) shall be installed on the passenger's side rear of the apparatus.

There shall be a switch located in the cab on the switch panel to control the beacons.

**ELECTRICAL SYSTEM GENERAL DESIGN FOR ALTERNATING CURRENT**

The following guidelines shall apply to the 120/240 VAC system installation:

**General**

Any fixed line voltage power source producing alternating current (ac) line voltage shall produce electric power at 60 cycles plus or minus 3 cycles.

Except where superseded by the requirements of the current edition of applicable NFPA standards, all components, equipment and installation procedures shall conform to NFPA 70, National Electrical Code (herein referred to as the NEC).

Line voltage electrical system equipment and materials included on the apparatus shall be listed and installed in accordance with the manufacturer's instructions. All products shall be used only in the manner for which they have been listed.

**Grounding**

Grounding shall be in accordance with Section 250-6 "Portable and Vehicle Mounted Generators" of the NEC. Ungrounded systems shall not be used. Only stranded or braided copper conductors shall be used for grounding and bonding.

An equipment grounding means shall be provided in accordance with Section 250-91 (Grounding Conductor Material) of the NEC.

The grounded current carrying conductor (neutral) shall be insulated from the equipment grounding conductors and from the equipment enclosures and other grounded parts. The neutral conductor shall be colored white or gray in accordance with Section 200-6 (Means of Identifying Grounding Conductors) of the NEC.

In addition to the bonding required for the low voltage return current, each body and driving or crew compartment enclosure shall be bonded to the vehicle frame by a copper conductor. This conductor shall have a minimum amperage rating of 115 percent of the nameplate current rating of the power source specification label as defined in Section 310-15 (amp capacities) of the NEC. A single conductor properly sized to meet the low voltage and line voltage requirements shall be permitted to be used.

All power source system mechanical and electrical components shall be sized to support the continuous duty nameplate rating of the power source.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**Operation**
Instructions that provide the operator with the essential power source operating instructions, including the power-up and power-down sequence, shall be permanently attached to the apparatus at any point where such operations can take place.

Provisions shall be made for quickly and easily placing the power source into operation. The control shall be marked to indicate when it is correctly positioned for power source operation. Any control device used in the drive train shall be equipped with a means to prevent the unintentional movement of the control device from its set position.

A power source specification label shall be permanently attached to the apparatus near the operator's control station. The label shall provide the operator with the following information:

- Rated voltage(s) and type (ac or dc)
- Phase
- Rated frequency
- Rated amperage
- Continuous rated watts
- Power source engine speed

Direct drive (PTO) and portable generator installations shall comply with Article 445 (Generators) of the NEC.

**Overcurrent protection**
The conductors used in the power supply assembly between the output terminals of the power source and the main over current protection device shall not exceed 144.00" (3658 mm) in length.

For fixed power supplies, all conductors in the power supply assembly shall be type THHW, THW, or use stranded conductors enclosed in nonmetallic liquid tight flexible conduit rated for a minimum of 194 degree Fahrenheit (90 degrees Celsius).

For portable power supplies, conductors located between the power source and the line side of the main overcurrent protection device shall be type SO or type SEO with suffix WA flexible cord rated for 600-volts at 194 degrees Fahrenheit (90 degrees Celsius).

**Wiring Methods**
Fixed wiring systems shall be limited to the following:

- Metallic or nonmetallic liquid tight flexible conduit rated at not less than 194 degrees Fahrenheit (90 degrees Celsius)
- or
- Type SO or Type SEO cord with a WA suffix, rated at 600 volts at not less than 194 degrees Fahrenheit (90 degrees Celsius)

Electrical cord or conduit shall not be attached to chassis suspension components, water or fuel lines, air or air brake lines, fire pump piping, hydraulic lines, exhaust system components, or low voltage wiring. In addition the wiring shall be run as follows.

- Separated by a minimum of 12.00" (305 mm), or properly shielded, from exhaust piping

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

- Separated from fuel lines by a minimum of 6.00" (152 mm) distance

Electrical cord or conduit shall be supported within 6.00" (152 mm) of any junction box and at a minimum of every 24.00" (610 mm) of continuous run. Supports shall be made of nonmetallic materials or corrosion protected metal. All supports shall be of a design that does not cut or abrade the conduit or cable and shall be mechanically fastened to the vehicle.

**Wiring Identification**

All line voltage conductors located in the main panel board shall be individually and permanently identified. The identification shall reference the wiring schematic or indicate the final termination point. When prewiring for future power sources or devices, the unterminated ends shall be labeled showing function and wire size.

**Wet Locations**

All wet location receptacle outlets and inlet devices, including those on hardwired remote power distribution boxes, shall be of the grounding type provided with a wet location cover and installed in accordance with Section 210-7 "Receptacles and Cord Connections" of the NEC.

All receptacles located in a wet location shall be not less than 24.00" (610 mm) from the ground. Receptacles on off-road vehicles shall be a minimum of 30.00" (762 mm) from the ground.

The face of any wet location receptacle shall be installed in a plane from vertical to not more than 45 degrees off vertical. No receptacle shall be installed in a face up position.

**Dry Locations**

All receptacles located in a dry location shall be of the grounding type. Receptacles shall be not less than 30.00" (762 mm) above the interior floor height.

All receptacles shall be marked with the type of line voltage (120-volts or 240-volts) and the current rating in amps. If the receptacles are direct current, or other than single phase, they shall be so marked.

**Listing**

All receptacles and electrical inlet devices shall be listed to UL 498, Standard for Safety Attachment Plugs and Receptacles, or other appropriate performance standards. Receptacles used for direct current voltages shall be rated for the appropriate service.

**Electrical System Testing**

The wiring and associated equipment shall be tested by the apparatus manufacturer or the installer of the line voltage system.

The wiring and permanently connected devices and equipment shall be subjected to a dielectric voltage withstand test of 900-volts for one (1) minute. The test shall be conducted between live parts and the neutral conductor, and between live parts and the vehicle frame with any switches in the circuit(s) closed. This test shall be conducted after all body work has been completed.

Electrical polarity verification shall be made of all permanently wired equipment and receptacles to determine that connections have been properly made.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**Operational Test per Current Edition NFPA Standard**

The apparatus manufacturer shall perform the following operation test and ensure that the power source and any devices that are attached to the line voltage electrical system are properly connected and in working order. The test shall be witnessed and the results certified by an independent third-party certification organization.

The prime mover shall be started from a cold start condition and the line voltage electrical system loaded to 100 percent of the nameplate rating.

The power source shall be operated at 100 percent of its nameplate voltage for a minimum of two (2) hours unless the system meets category certification as defined in the current edition of applicable NFPA standards.

Where the line voltage power is derived from the vehicle's low voltage system, the minimum continuous electrical load as defined in the current edition of applicable NFPA standards shall be applied to the low voltage electrical system during the operational test.

**GENERATOR**

The apparatus shall be equipped with a complete electrical power system. The generator shall be a Harrison Model MCR Stealth 10.0 kW Hydraulic unit. The wiring and generator installation shall conform to the present National Electrical Codes Standards of the National Fire Protection Association. The installation shall be designed for continuous operation without overheating and undue stress on components.

Generator Performance

- Continuous Duty Rating: 10,000 watts

- Nominal Volts: 120/240

- Amperage: 80 @ 120 volts, 40 @ 240 volts

- Phase: Single

- Cycles: 60 hertz

- Engine Speed at Engagement: Idle

- RPM range: 900 to 3,000 (hydraulic pump)

The output of the generator shall be controlled by an internal hydraulic system. An electrical instrument gauge panel shall be provided for the operator to monitor and control all electrical operations and output.

The generator shall be driven by a transmission power take off unit, through a hydraulic pump and motor.

The generator shall include an electrical control inside the cab. The hydraulic engagement supply shall be operational at any time (no interlocks).

An electric/hydraulic valve shall supply hydraulic fluid to the clutch engagement unit provided on the chassis PTO drive.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

Generator Instruments and Controls

To properly monitor the generator performance a digital meter panel shall be furnished and mounted next to the circuit breaker panel. The meter shall indicate the following items:

- Voltage

- Amperage for both lines

- Frequency

- Generator run hours

- Over current indication

- Over temperature indication

- "Power On" indication

- Two (2) fuse holders with two (2) amp fuses (for indicator light protection)

The meter and indicators shall be installed near eye level in the compartment. Instruments shall be flush mounted in an appropriate sized weatherproof electrical enclosure. All instruments used shall be accurate within +/- two (2) percent.

Generator Wiring:

The system shall be installed by highly qualified electrical technicians to assure the required level of safety and protection to the fire apparatus operators. The wiring, electrical fixtures and components shall be to the highest industry quality standards available on the domestic market. The equipment shall be the type as designed for mobile type installations subject to vibration, moisture and severe continuous usage. The following electrical components shall be the minimum acceptable quality standards for this apparatus:

Wiring:

All electrical wiring shall be fine stranded copper type. The wire shall be sized to the load and circuit breaker rating; ten (10) gauge on 30 amp circuits, 12 gauge on 20 amp circuits and 14 gauge on 15 amp circuits. The cable shall be run in corner areas and extruded aluminum pathways built into the body for easy access.

Load Center:

The main load center shall be a Cutler Hammer with circuit breakers rated to load demand.

Circuit Breakers:

Individual breakers shall be provided for all on-line equipment to isolate a tripped breaker from affecting any other on-line equipment.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**GENERATOR LOCATION**
The generator shall be mounted in the area above the goose neck of the tiller trailer. The flooring in this area shall be either reinforced or constructed, in such a manner, that it shall handle the additional weight of the generator.

**GENERATOR START**
There shall be a switch located on the cab instrument panel to engage the generator.

There shall be another switch located in the tiller cab on the instrument panel to engage the same generator.

**CIRCUIT BREAKER PANEL**
The circuit breaker panel shall be located high on the left wall of compartment LS6.

**120 VOLT LIGHTING**
There shall be three (3) HiViz Model FT-MB-2.36-*-*, 2.75" high x 39.80" long x 3.31" deep, 26,611.2 effective lumens, 24 volt DC light(s) with flood optics and adjustable mounting brackets installed on the passenger side trailer above RS7, RS4 and the rear steer axle.

The painted parts of the light housing and brackets to be white.

The lights shall be activated by a switch at the driver's side switch panel and by a switch at the passenger's side switch panel.

**SWITCH (QUARTZ LIGHT)**
The 120/240 volt AC light(s) located driver side trailer lights shall be activated by the same means as the 12 volt DC lights located drivers switch panel.

**120 VOLT LIGHTING**
There shall be three (3) HiViz Model FT-MB-2.36-*-*, 2.75" high x 39.80" long x 3.31" deep, 26,611.2 effective lumens, 24 volt DC light(s) with flood optics and adjustable mounting brackets installed on the driver side trailer above LS7, LS4 and rear steer axle.

The painted parts of the light housing and brackets to be white.

The lights shall be activated by a switch at the driver's side switch panel and by a switch at the passenger's side switch panel.

**SWITCH (QUARTZ LIGHT)**
The 120/240 volt AC light(s) located passenger side trailer lights shall be activated by the same means as the 12 volt DC lights located officer switch panel.

**120 VOLT RECEPTACLE**
There shall be one (1), 15/20 amp 120 volt AC three (3) wire straight blade duplex receptacle(s) with interior stainless steel wall plate(s), installed behind driver's seat. The NEMA configuration for the receptacle(s) shall be 5-20R.

The receptacle(s) shall be powered from the shoreline inlet.

There shall be a label installed near the receptacle(s) that state the following:

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

- Line Voltage
- Current Ratting (amps)
- Phase
- Frequency

**120 VOLT RECEPTACLE**

There shall be six (6), 15/20 amp 120 volt AC three (3) wire straight blade duplex receptacle(s) with interior stainless steel wall plate(s), installed upper corners of forward wall in LS4, LS5, LS6, RS4, RS5, RS6. The NEMA configuration for the receptacle(s) shall be 5-20R.

The receptacle(s) shall be powered from the onboard generator to shoreline power transfer switch.

There shall be a label installed near the receptacle(s) that state the following:

- Line Voltage
- Current Ratting (amps)
- Phase
- Frequency

**FOUR (4)-SECTION 107 FOOT TRACTOR-DRAWN AERIAL LADDER**

**CONSTRUCTION STANDARDS**

The ladder shall be constructed to meet all of the requirements as described in the current edition of applicable NFPA standards.

The aerial device shall be a true ladder type device; therefore ladders attached to booms shall not be considered.

These capabilities shall be established in an unsupported configuration.

All structural load supporting elements of the aerial device that are made of a ductile material shall have a design stress of not more than 50% of the minimum yield strength of the material based on the combination of the live load and the dead load. This 2:1 structural safety factor meets the current NFPA standard.

All structural load supporting elements of the aerial device that are made of non-ductile material shall have a design stress of not more than 20% of the minimum ultimate strength of the material, based on the combination of the rated capacity and the dead load. This 5:1 safety factor meets the current NFPA standard.

Wire ropes and attaching systems used to extend and retract the fly sections shall have a 5:1 safety factor based on the ultimate strength under all operating conditions. The factor of safety for the wire rope shall remain above 2:1 during any extension or retraction stall. The minimum ratio of the diameter of wire rope used to the diameter of the sheave used shall be 1:12. Wire ropes shall be constructed of seven (7) strands over an inner wire core for increased flexibility. The wire rope shall be galvanized to reduce corrosion.

The aerial base pivot bearings shall be maintenance free type bearings and require no external lubrication.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

The aerial device shall be capable of sustaining a static load one and one-half times its rated tip load capacity (live load) in every position in which the aerial device can be placed when the vehicle is on a firm level surface.

The aerial device shall be capable of sustaining a static load one and one-third times its rated tip load capacity (live load) in every position the aerial device can be placed when the vehicle is on a slope of five degrees downward in the direction most likely to cause overturning.

With the aerial device out of the cradle and in the fully extended position at zero degrees elevation, a test load shall be applied in a horizontal direction normal to the centerline of the ladder. The turntable shall not rotate and the ladder shall not deflect beyond what the product specification allows.

All welding of aerial components, including the aerial ladder sections, turntable, pedestal, and outriggers, shall be in compliance with the American Welding Society standards. All welding personnel shall be certified, as qualified under AWS welding codes.

The aerial device shall be capable of operating in conditions of wind up to 50 mph and icing conditions of up to a .25" coating over the aerial structure.

All of the design criteria must be supported by the following test data (no exception):

- Strain gage testing of the complete aerial device

- Analysis of deflection data taken while the aerial device was under test load

The following standards for materials are to be used in the design of the aerial device:

- Materials are to be certified by the mill that manufactured the material

- Materials that are certified or recertified by vendors other than the mill shall not be acceptable

- Material testing that is performed after the mill test shall be for verification only and not with the intent of changing the classification

- All welded structural components for the ladder shall be traceable to their mill lots.

**LADDER CONSTRUCTION**

The ladder is comprised of four (4) sections.

The ladder shall have the capability to support a minimum of 750 pounds at the tip in the unsupported configuration, based upon 360 degree rotation, up to full extension and from -10 degrees to +77 degrees.

The ladder (handrails, baserails, trusses, K-braces and rungs) shall be constructed of high strength low alloy steel, minimum 100,000 pounds per square inch yield, with full traceability on all structural members (no exception).

Each section shall be trussed diagonally, vertically and horizontally using welded steel tubing.

All ladder rungs are round and welded to each section utilizing "K" bracing for lateral and torsional rigidity.

The inside width dimensions of the ladder shall be:

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

- Base Section41.87"

- Lower Mid Section34.88"

- Upper Mid Section27.87"

- Fly Section21.63"

The height of the handrails above the centerline of the rungs shall be:

- Base Section26.28"

- Lower Mid Section22.68"

- Upper Mid Section20.06"

- Fly Section17.32"

The ladder shall be designed to provide continuous egress for firefighters and civilians from an elevated position to the ground.

The egress section shall be designed to maintain the rated load of the aerial device. It shall be bolted on for easy replacement. There shall be a lift eye welded on to each side of the egress.

**VERTICAL HEIGHT**
The ladder shall extend to a minimum height of 107' above the ground at full extension and elevation. The measurement of height shall be consistent with NFPA standards.

**HORIZONTAL REACH**
The rated horizontal reach shall be 100' (no exception). The measurement of horizontal reach shall be consistent with NFPA standards.

**TURNTABLE**
The upper turntable assembly shall connect the aerial ladder to the turntable bearing. The steel structure shall have a mounting position for the aerial elevation cylinders, ladder connecting pins, and upper turntable operator's position.

The turntable shall be coated with an non-skid, chemical resistant material in the walking areas. The stepping surfaces shall meet the skid-resistance requirements of the current NFPA standard.

The turntable handrails shall be a minimum 42.00" high and shall not increase the overall travel height of the vehicle. The handrails shall be constructed from aluminum and have a slip resistant knurled surface. The turntable vertical handrail spacing shall be designed with a 44.00" wide x 27.00" high opening to allow for equipment to pass through from the ground to the aerial ladder. The opening shall be located at the center, rear of the turntable. A chain shall be provided across this opening.

**ELEVATION SYSTEM**
Dual 5.50" diameter elevating cylinders shall be mounted on the underside of the base section of the ladder, one (1) on each side. One (1) 2.25" diameter stainless steel pin shall fasten each cylinder to the ladder and one (1) 2.50" diameter stainless steel pin shall fasten each cylinder to the turntable. The pins

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

shall have 125,000 psi minimum yield strength and shall be secured with 0.50" Grade 8 bolts with castle nut and cotter pin. The bolts are to ensure that the pins do not walk out of the mounting brackets on the turntable and base section.

The elevating cylinders shall be mounted utilizing maintenance-free spherical bearings on both ends of the cylinders (no exception). The aerial base pivot bearings shall be maintenance-free type bearings with no external lubrication required (no exception). The cylinders shall function only to elevate the ladder and not as a structural member to stabilize the ladder side movement. The elevating cylinders shall be provided with pilot-operated check valves on the barrel and rod side of the piston to prevent movement of the ladder in case of a loss of hydraulic pressure.

The operation envelope shall be 10 degrees below horizontal to 77 degrees above horizontal.

The elevation system shall be designed following NFPA standards. The elevation hydraulic cylinders shall incorporate cushions on the upper limit of travel.

The lift cylinders shall be equipped with integral holding valves located in the cylinder to prevent the unit from descending should the charged lines be severed, at any point within the hydraulic system and to maintain the ladder in the bedded position during road travel. The integral holding valves shall NOT be located in the transfer tubes.

The elevation system shall be controlled by the microprocessor. Linear transducers shall measure the extension of the elevation cylinder. The microprocessor shall provide the following features:

- Collision avoidance of the elevation system to prevent accidental body damage

- Automatic deceleration when the aerial device is lowered into the cradle

- Automatic deceleration at the end of stroke, in maximum raise and lower positions

- Deceleration of the aerial device at the limits of travel.

**EXTENSION/RETRACTION SYSTEM**

A hydraulically powered, extension and retraction system shall be provided through dual hydraulic cylinders and wire ropes. Each set shall be capable of operating the ladder in the event of a failure, of the other. For safety, systems that use only a single extension/retraction system shall not be acceptable. The extension cylinder rod shall be chrome plated to provide smooth operation of the aerial device and reduce seal wear. The extension/retraction cylinders shall be equipped, with integral holding valves, to prevent the unit from retracting should the charged line be severed, at any point within the hydraulic system. The integral holding valves shall NOT be located in the transfer tubes.

Wire ropes and attaching systems used to extend and retract the fly sections shall have a 5:1 safety factor based on the ultimate strength under all operating conditions. The factor of safety for the wire rope shall remain above 2:1 during any extension or retraction stall. The minimum ratio of the diameter of wire rope used to the diameter of the sheave used shall be 1:12. Wire ropes shall be constructed of seven (7) strands over an inner wire for increased flexibility. The wire rope shall be galvanized to reduce corrosion.

The extension/retraction system shall be controlled by the microprocessor. Linear transducers shall measure the ladder extension. The microprocessor shall provide the following features:

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

- Automatic deceleration at the end of stroke, in maximum extend and retract positions

All sheaves shall require lubrication. They shall have bronze bushings and grease zerks.

**MANUAL OVERRIDE CONTROLS**
Manual override controls shall be provided for all aerial and stabilizer functions.

**LADDER SLIDE MECHANISM**
UHMW polyethylene wear pads shall be used between the telescoping ladder sections, to provide greater bearing surface area for load transfer. Adjustable slide pads shall be used to control side play between the ladder sections.

**ROTATION SYSTEM**
The aerial shall be supplied with a powered rotation system as outlined in NFPA standards. The hydraulic rotation motor shall provide continuous rotation under all rated conditions and be supplied with a brake to prevent unintentional rotation. One (1) hydraulically driven, planetary gear box with drive speed reducers shall be used to provide infinite and minute rotation control throughout the entire rotational travel. One (1) spring applied, hydraulically released disc type swing brake shall be furnished to provide positive braking of the turntable assembly. Provisions shall be made for emergency operation of the rotation system should complete loss of normal hydraulic power occur. The hydraulic system shall be equipped with pressure relief valves which shall limit the rotational torque to a nondestructive power. The gearbox shall have a minimum continuous torque rating of 80,000 in. lbs. and a minimum intermittent rating of 160,000 in. lbs. The turntable bearing, ring gear teeth, pinion gear, planetary gearbox, and output shaft shall be certified by the manufacturer of the components for the application.

The rotation system shall be controlled by the microprocessor. The microprocessor shall provide the following features:

- Collision avoidance to prevent accidental body damage

- Prevent the aerial from being rotated into an unstable condition.

**ROTATION INTERLOCK**
The microprocessor shall be used to prevent the rotation of the aerial device to the side in which the stabilizers have not been fully deployed (short-jacked). The microprocessor shall allow full and unrestricted use of the aerial, in the 180 degree area, on the side(s) where the stabilizers have been fully deployed. The system shall also have a manual override to comply with the current edition of applicable NFPA standards. SYSTEMS THAT PERMIT THE AERIAL TO ROTATE TO THE "SHORT JACK" SIDE, WITHOUT AUTOMATICALLY STOPPING THE ROTATION AND/OR WITHOUT ACTUATION OF THE "MANUAL OVERRIDE", SHALL NOT BE ACCEPTED. SYSTEMS THAT ONLY INCLUDE AN ALARM ARE NOT CONSIDERED AN INTERLOCK AND SHALL NOT BE ACCEPTED.

**LADDER CRADLE INTERLOCK SYSTEM**
A ladder cradle interlock system shall be provided through the microprocessor to prevent the lifting of the aerial device from the nested position until the operator places all the stabilizers in a load supporting configuration. A switch shall be installed at the boom support to prevent operation of the stabilizers once the aerial has been elevated from the nested position..

| Bidder Complies | |
|---|---|
| Yes | No |

**AERIAL TORQUE BOX/PEDESTAL**

The pedestal assembly shall be a welded assembly made of high strength 0.25" plate. The vertical member shall be a 0.375" reinforced wall cylinder with a 28.00" outside diameter and shall connect the rotation bearing mounting plate to the lower substructure.

The pedestal assembly shall be bolted to the chassis frame with 0.88" diameter Grade 8 bolts, and shall be utilized to mount the outrigger jacks and reservoir for the aerial hydraulic system.

**LOAD CAPACITIES**

The following load capacities shall be established with the stabilizers at full horizontal extension and placed in the down position to level the truck and to relieve the weight from the tires and axles. Capacities shall be based upon full extension and 360 degree rotation.

A load chart, visible at the operator's station, shall be provided. The load chart shall show the recommended safe load at any condition of the aerial device's elevation and extension (no exception).

**50 MPH WIND CONDITIONS/WATERWAY DRY**

| Degrees of Elevation | -10 to 9 | 10 to 19 | 20 to 29 | 30 to 39 | 40 to 49 | 50 to 59 | 60 to 69 | 70 to 77 |
|---|---|---|---|---|---|---|---|---|
| Egress | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 |
| Fly | - | - | - | - | - | 250 | 500 | 750 |
| Upper Mid | - | - | - | - | 250 | 500 | 1000 | 1000 |
| Lower Mid | - | - | - | - | 500 | 750 | 1000 | 1000 |
| Base | - | - | - | 500 | 500 | 1000 | 1000 | 1000 |

**50 MPH WIND CONDITIONS/WATERWAY CHARGED**

| Degrees of Elevation | -10 to 9 | 10 to 19 | 20 to 29 | 30 to 39 | 40 to 49 | 50 to 59 | 60 to 69 | 70 to 77 |
|---|---|---|---|---|---|---|---|---|
| Egress | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| Fly | - | - | - | - | - | 250 | 500 | 500 |
| Upper Mid | - | - | - | - | 250 | 500 | 750 | 1000 |
| Lower Mid | - | - | - | 250 | 500 | 750 | 1000 | 1000 |
| Base | - | - | 250 | 500 | 750 | 1000 | 1000 | 1000 |

**Reduced loads at the tip can be redistributed in 250 lb. increments to the fly, mid, or base sections as needed.**

**The tip capacity shall be reduced to zero when flowing water with the nozzle above the waterway centerline.**

**BOOM SUPPORT**

A heavy-duty boom support shall be provided for support of the ladder in the travel position. On the base section of the ladder, a stainless steel scuffplate shall be provided where the ladder comes into contact with the boom support.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**AERIAL BOOM SUPPORT LIGHT**
There shall be one (1) Whelen, Model 50C03ZCR, white LED light mounted on the boom support cradle. This light shall be activated when the aerial master switch is activated.

**SKID PLATE AT REAR OF TRAILER BODY**
There shall be a full width stainless steel skid plate bolted under the very rear of the tiller trailer.

**ROPE TIE DOWN AT GOOSENECK**
There shall be two (2) pairs of rope tie downs provided each side of the tiller gooseneck in the forward and rearward locations. Equal quantities shall be provided on each side. The tie downs shall be rated for a straight line pull of 9000 lb and shall be nickel plated.

**AERIAL BOOM PANEL**
There shall be one boom panel provided on each side of the aerial ladder base section. The boom panel shall be painted #948 White.

The boom panels shall be designed so no mounting bolts are in the face of the panel. This shall keep the lettering surface free of holes.

**EXTENSION INDICATOR**
Extension markings and corresponding numerical markings shall be provided along each inside top rail of the base section of the aerial every five (5) feet. These markings shall indicate various positions of extension up to full. Markings and indicators shall be clearly visible to the console operator. To aid in visibility during hours of darkness, the markings and numerical indicators shall be of a black reflective material.

**FOLDING STEPS**
One (1) set of folding steps shall be provided at the tip of the ladder. An additional set of folding steps shall be provided at the base of the fly section. The steps shall be bright finished with a black tread coating on the stepping surface. Each step shall have no integrated light.

**AERIAL DEVICE RUNG COVERS**
Each rung shall be covered with a secure, heavy-duty, fiberglass pultrusion that incorporates an aggressive, no-slip coating.

The rung covers shall be glued to each rung and shall be easily replaceable should the rung cover become damaged.

The center portion of each rung cover shall be black and the outside 2.00" edge at each side shall be safety yellow.

Under no circumstances shall the rung covers be fastened to the rungs using screws or rivets (no exception).

The rung covers shall have a 10-year, limited warranty.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**LADDER STORAGE MOUNTING BRACKETS**
Mounting shall be provided on each side of the aerial device for storage of two (2) roof ladder(s). The bracket(s) shall be located inboard of the boom panel at the base section. The bracket(s) shall hold the boom panel as close to the base section as possible and include straps to secure the ladder.

The mounting brackets shall accommodate a 10' Duo-Safety 775-DR and 16' Duo-Safety 875-DR roof ladder as determined by the type of aerial device and the available space.

**STABILITY TEST**
An aerial stability test shall be run on the apparatus using the maximum weight allowance for tip options.

**TEMPORARY SCABBARD AT END OF AERIAL**
There shall be a total of one (1) vent saw scabbard(s) provided. The scabbard(s) shall be mounted on the right side of the aerial tip. The scabbard(s) shall be DA finished.

**RUBBISH HOOK MOUNTING BRACKET**
Mounting shall be provided near the end of the fly section of the aerial ladder for a rubbish hook.

The bracket shall be sized to hold a Fire Hooks Unlimited 8' Colorado hook

**SPECIAL LENGTH EGRESS**
A special egress section shall be provided on the aerial ladder. The egress shall be shortened by one (1) rung.

**PLATE FOR DEPARTMENT NUMBERS**
There shall be two (2) painted aluminum plate(s) provided for department numbers. They shall be located Each side of Aerial ladder near tip/egress (Reference Graphics LP) and be DS-10.5" High X 15" Wide, PS-11.5" High X 15" Wide .

**LIGHTS FOR TURNTABLE WALKWAY**
There shall be white LED lights provided at the aerial turntable. The lights shall be located to illuminate the entire walking surface of the turntable including the area around the turntable console. These lights shall be activated by the aerial master switch.

**TURNTABLE CONSOLE LIGHTING**
There shall be one (1) TecNiq, Model T10, white LED light strip mounted in the turntable console cover to illuminate the controls located on both the upper and lower portion of the turntable control station. These lights shall be activated by the aerial master switch.

**ROTATION BEARING COVER**
A cover shall be fitted over the aerial rotation bearing and drive pinion gear(s). The cover shall be aluminum treadplate and attached to the underside of the turntable deck.

**INFORMATION CENTER**
There shall be an information center provided at the aerial turntable control station. The information center shall operate in temperatures from -40 to 158 degrees Fahrenheit. The information center shall employ a Linux operating system and a 7.00" (diagonal measurement) LCD display. The LCD shall have a 1000 nits rated, color display. The LCD shall be sunlight readable. The LCD display shall be encased

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

in an ABS, grey plastic housing with a Pierce decal. There shall be five (5), weather-resistant user interface switches provided. The LCD display can be changed to an available foreign language.

**OPERATION**

The information center shall be designed for easy operation in everyday use. There shall be a page button to cycle from one screen to the next screen in a rotating fashion. A video button shall allow an NTSC signal into the information center to be displayed on the LCD. If any button is pressed while viewing a video feed, the information center shall return to the vehicle information screens. There shall be a menu button to provide access to maintenance, setup, and diagnostic screens. All other button labels shall be specific to the information being viewed.

**GENERAL SCREEN DESIGN**

Where possible, background colors shall be used to provide vehicle information *At A Glance*. If the information provided on a screen is within acceptable limits, a green background color shall be used. If the information provided on a screen is not within acceptable limits, an amber background color shall indicate a caution condition and a red background color shall indicate a warning condition.

Every screen in the information center shall include the aerial tip temperature, the time (12- or 24-hour mode) and a text Alert Center. The time shall be synchronized between all Command Zone color displays located on the vehicle. The Alert Center shall display text messages for audible alarms. The text messages shall identify any items causing the audible alarm to sound. If more than one (1) audible alarm is activated, the text message for each alarm shall cycle every second until the problems have been resolved. The background for the Alert Center shall change to indicate the severity of the warning message. Amber shall indicate a caution condition and red shall indicate a warning condition. If a warning and a caution condition occur simultaneously, the red background color shall be shown for all Alert Center messages.

A label shall be provided for each button. The label shall indicate the function for each active button for each screen. If the button is not utilized on specific screens, it shall have a button label with no text.

Symbols shall accurately depict the aerial device type the information pertains to such as rear mount ladder, rear mount platform, mid-mount ladder or mid-mount platform.

**PAGE SCREENS**

The Information center shall include the following pages:

The Aerial Main and Load Chart page shall indicate the following information:

Rungs Aligned and Rungs Not Aligned shall be indicated with text and respective green or red colored ladder symbols.

Ladder Elevation shall be indicated via a fire apparatus vehicle with ladder symbol with the degree of elevation indicated between the vehicle and ladder.

Water Flow (if applicable) shall be indicated via a water nozzle symbol and text indicating flow / time.

Breathing Air Levels shall be indicated via an air bottle symbol and text indicating the percent (%) of air remaining. A green bar graphs shown inside the bottle shall indicate oxygen levels above 20%. A red

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

bar graph shall indicate oxygen levels at or below 20%. When oxygen levels are at or below 10% the red bar graph shall flash.

The Aerial Load Chart shall indicate the load limit on each section of the ladder based on actual ladder position and water flow (if applicable).

*At A Glance* color features shall be utilized on this screen. Caution type conditions shall be indicated via a yellow background. Warning type conditions shall be indicated via a red background. Conditions operating within acceptable limits shall be indicated via a green background.

The Aerial Reach and Hydraulic Systems page shall indicate the following information:

Aerial Hydraulic Oil Temperature shall be indicated with symbol and text. At a glance features shall be utilized.

Aerial Hydraulic Oil Pressure shall be indicated with a symbol and text. At a glance features shall be utilized.

The following calculations shall be indicated on a representative vehicle symbol:

Aerial Device Extension length.

Aerial Device Height indicating the height of the aerial device tip from the ground.

Aerial Device Reach indicating the horizontal distance the aerial reaches from the turntable.

Aerial Device Angle indicating the angle from the vehicle which the device is at.

*At A Glance* color features shall be utilized on this screen. Caution type conditions shall be indicated via a yellow background. Warning type conditions shall be indicated via a red background. Conditions operating within acceptable limits shall be indicated via a green background.

The Level Vehicle page shall indicate the following information:

The grade of the vehicle shall be indicated via a fire apparatus vehicle symbol with the degree of grade shown in text format. The symbol shall tilt dependent on the vehicle grade.

The slope of the vehicle shall be indicated via a fire apparatus vehicle symbol with the degree of slope shown in text format. The symbol shall tilt dependent on the vehicle slope.

Outriggers status shall be indicated via a colored symbol for each outrigger present. Each outrigger status shall be defined as one of the following:

Outrigger stowed indicated with a silver pan located close to the vehicle

Outrigger fully extended indicated with a fully deployed green outrigger

Outrigger short-jacked indicated by a yellow outrigger partially deployed

Outrigger not set indicated by a red outrigger that is not set on the ground

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

A text box located on the vehicle symbol shall be utilized to identify the overall status of the outrigger leveling system. The following status shall be indicated in the text box:

Deployed status shall indicate all outriggers are properly set on the ground at full extension

Shortjacked status shall indicate one or more outriggers are set on the ground but not fully extended.

Not Set status shall indicate one or more outriggers is not properly set on the ground.

Stowed status shall indicate all outriggers are stowed for vehicle travel.

A bedding assist alert shall indicate that the aerial device is being aligned by the Command Zone system as the operator lowers the aerial device into the cradle with the joystick.

*At A Glance* color features shall be utilized on this screen. Caution type conditions shall be indicated via a yellow background. Warning type conditions shall be indicated via a red background. Conditions operating within acceptable limits shall be indicated via a green background.

**MENU SCREENS**

The following screens shall be available through the Menu button:

The View System Information screen shall display aerial device hours, aerial PTO hours, ladder aligned for stowing, aerial rotation angle, total water flow (if applicable), and aerial waterway valve status (if applicable).

The Set Display Brightness screen shall allow brightness increase and decrease and include a default setting button.

The Configure Video Mode screen shall allow setting of video contrast, video color and video tint.

The Set Startup screen allows setting of the screen that shall be active at vehicle power-up.

The Set Date and Time screen has a 12- or 24-hour format, and allows setting of the time and date.

The View Active Alarms screen shows a list of all active alarms including the date and time of each alarm occurrence and shows all alarms that are silenced.

The System Diagnostics screen allows the user to view system status for each module and it's respective inputs and outputs. Viewable data shall include the module type and ID number; the module version; and module diagnostics information including input or output number, the circuit number connected to that input or output, the circuit name (item connected to the circuit), status of the input or output, and other module diagnostic information.

Aerial calibrations screen indicates items that may be calibrated by the user and instructions to follow for proper calibration of the aerial device.

Button functions and button labels may change with each screen.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**STABILIZER CONTROL STATION**

There shall be an easily accessible control station located on the trailer gooseneck, one (1) each side of the apparatus. The following controls and indicator lights shall be clearly identified and conveniently located for ease of operation and viewing at each control station.

- Driver Side/Passenger Side In/Out control switches
- Driver Side/Passenger Side Up/Down control switches
- Driver Side/Passenger Side Fully Extended indicator lights
- Driver Side/Passenger Side Firm On Ground indicator lights
- Stabilizer Emergency Power control switch
- Trailer Level Assist control toggle switch
- Global Safety Interlock Override red guarded switch
- Aerial system Emergency Stop switch
- Aerial system Emergency Stop Activated indicator light

**TURNTABLE CONTROL STATION**

There shall be one (1) device control station located on the right side of the turntable so the operator may easily observe the ladder tip while operating the controls. All elevation, extension and rotation controls shall operate from this location. The controls shall permit the operator to regulate the speed of the aerial functions, within the safe limits, as determined by the manufacturer and NFPA standards. Each control shall be equipped, with a positive lock to hold the control in a neutral position, preventing accidental activation. In addition to the neutral lock, a console cover shall be provided at the turntable control station.

The following items shall also be provided at the turntable control station, clearly identified and lighted for nighttime operation and conveniently located for ease of operation and viewing:

- Intercom controls
- Tip tracking light switch
- Emergency stop switch
- Emergency power unit switch
- Operator's load chart
- Two (2) position switch for selecting aerial operational speed

**HIGH IDLE**

The high idle shall be controlled by the microprocessor. The microprocessor shall automatically adjust the engine rpm to compensate for the amount of load placed upon the system. The system shall include a safety device that allows activation of the high idle, only when the parking brake is set and the transmission is placed in neutral.

**STABILIZERS**

The vehicle shall come equipped with a stabilization system consisting of two (2) hydraulically operated out and down style stabilizers. This system shall meet or exceed all requirements of the NFPA specifications related to stabilization and setup on sloped surfaces.

The stabilizer/leveling jacks shall have a maximum spread of 17' measured from the centerline of the jack footpads when the beams are fully extended. The beams shall be 6.81" wide x 8.88" high with 0.75" thick top and bottom plates and 0.50" thick sides of 100,000-PSI minimum yield strength steel. The cylinders

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

shall have pilot-operated check valves with thermal relief designed to ensure that the beams shall not drift out of the stowed position during travel. Wear pads shall guide the stabilizers.

The horizontal extension cylinders shall be totally enclosed within the beams and shall incorporate telescoping hydraulic tubing to supply the jack cylinder hydraulic power. Stabilizer hydraulic hoses shall remain stationary during operation of the stabilizers to prevent hose wear and potential failure. The cylinders shall be equipped with decelerators to reduce the speed of extension and retraction when the beams are near the fully retracted and extended positions. The stabilizer extension hydraulic cylinders shall have the following dimensions: 2.25" bore, 1.38" rod, and 57.25" stroke.

The vertical jack cylinders shall be capable of 12.00" ground penetration. The cylinders shall be supplied with pilot operated check valves on each jack cylinder to hold the cylinder in the stowed or working position, should a charged line be severed at any point in the hydraulic system. For safety, the integral holding valves shall be located in the cylinder base end, NOT in the transfer tube. Vertical jack cylinder rods shall be fully enclosed by a telescoping inner box to protect the cylinder rods from damage. The stabilizer jack hydraulic cylinders shall have the following dimensions: 4.25" bore, 3.00" rod, and 28.88" stroke.

Each stabilizer jack shall have a pan that shall be of the split-pan design and shall be a maximum 12.50" wide so as to allow the extension of the stabilizer between parked cars or other obstacles. This pan shall serve as a protective guard and a mounting surface for warning lights. The top, forward, and rear edges shall be flanged back 90 degrees for added strength.

**STABILIZER PADS**

The stabilizer footpad shall be 12.00" in diameter. The footpad shall be attached to the jack cylinder rod by means of a machined ball at the end of the jack cylinder rod which mates to a socket machined into the footpad. The footpad shall have the ability to pivot 20 degrees from horizontal in any direction to allow setup on uneven terrain.

**AUXILIARY STABILIZER PADS**

An auxiliary ground pad shall be supplied for each stabilizer to provide additional load distribution on soft surfaces. The pads shall be 24.00" square and made from lightweight composite material. The ground pressure shall not exceed 75 lb per square inch when the ground pads are used and the apparatus is fully loaded and the aerial device is carrying its rated capacity in any position. There shall be one (1) pad located on each side of the apparatus, behind the stabilizers.

**STABILIZER CONTROLS**

An electrically controlled hydraulic valve shall power stabilizer movement. The valve can also be manually controlled in the event of electrical malfunction. Hydraulic power override controls shall be incorporated into the valve. The manual override mechanism shall be completely sealed within the valve assembly to prevent any possibility of corrosion.

The stabilizer controls shall be located on the trailer gooseneck, one (1) each side of the apparatus, to provide the operator with a full view of each stabilizer being positioned. Each stabilizer control panel shall include the following:

- Driver Side/Passenger Side In/Out control toggle switches
- Driver Side/Passenger Side Up/Down control toggle switches

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

- Driver Side/Passenger Side Fully Extended indicator lights
- Driver Side/Passenger Side Firm On Ground indicator lights
- Stabilizer Emergency Power control toggle switch
- Trailer Level Assist control toggle switch
- Global Safety Interlock Override red guarded toggle switch
- Aerial system Emergency Stop mushroom switch
- Aerial system Emergency Stop Activated indicator light

As a safety device, an electrically actuated diverter valve shall be provided. The hydraulic power shall be diverted to the aerial ladder controls automatically the instant all stabilizer jacks are firmly planted on the ground. Once the aerial ladder is raised from the bedded position, the stabilizer hydraulic power is cut off so the stabilizers shall not accidentally be moved while the aerial is being operated.

To aid in leveling the unit, two (2) bubble type angle indicators shall be located near the stabilizer controls. One (1) indicator shall show the angle of the truck from the front to rear and the other shall show the side to side angle of the truck. The indicators shall be color coded green to show when the truck has been properly leveled allowing the aerial device to be operated at full capacity.

A stabilizer deployment audible warning alarm shall be provided at each side of the body, activated by the stabilizer movement.

A "Stabilizers Not Stowed" indicator light shall be provided in the cab within view of the driver. It shall illuminate automatically whenever the stabilizers are not fully stowed to prevent damage to the vehicle if it is moved. The stabilizer system shall also be wired to the "Do Not Move Truck" indicator light. This light shall flash whenever the apparatus parking brake is not engaged and the stabilizers are not fully stowed.

**STABILIZER PAN MATERIAL**
The aerial stabilizer pans shall be polished stainless steel.

**STABILIZER PINS**
The stabilizer jacks shall not have holes for the stabilizer pins.

**STABILIZER CONTROL BOX DOORS**
There shall be aluminum treadplate doors hinged on the bottom with a flush lift and turn latch provided over each stabilizer control box.

**VALVE/POWER DISTRIBUTION BOX ACCESS DOOR**
There shall be aluminum treadplate doors with a flush lift and turn latch provided over the valve and power distribution box doors. These doors shall be bottom hinged.

**STABILIZER PLACEMENT**
There shall be two (2) cameras provided and installed on the body, one (1) directly above each stabilizer. The cameras shall be activated with a switch in the cab and shall provide a picture to specify the fully extended stabilizer position allowing the driver the ability to position the vehicle with the proper clearance for stabilizer deployment.

**HYDRAULIC SYSTEM**
All hose assemblies shall be assembled and crimped by the hose manufacturers certified technician.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

All manufacturing employees responsible for the installation of hydraulic components shall be properly trained. Training shall include: proper handling, installation, torque requirements, cleanliness and quality control procedures for hydraulic components.

Hoses used in the aerial hydraulic system shall be of a premium quality hose with a high abrasion resistant cover. All pressure hoses shall have a working pressure of 4000 psi and a burst pressure rating of 16,000 psi.

All hydraulic fittings and tubing shall be plated to minimize corrosion.

The fitting shall use an O-ring seal where possible to minimize hydraulic leaks.

An interlock shall be provided that prevents activation of the hydraulic pump until the transmission is placed in neutral and the parking brake is set as outlined in the current NFPA standard.

The system shall meet the performance requirement of the current NFPA standard, which requires adequate cooling less than 2.5 hours of operations.

All hydraulic components that are non-sealing whose failure could result in the movement of the aerial shall comply with current NFPA standards and have burst strength of 4:1.

Dynamic sealing components whose failure could cause aerial movement shall have a margin of 2:1 on maximum operating pressure per the current NFPA standard.

All hydraulic hoses, tubes, and connections shall have a minimum burst strength of 4:1 per the current NFPA standard.

A chassis mounted positive displacement piston pump for consistent pressure and rapid responses shall supply hydraulic power for all aerial operations. The positive displacement pump shall provide 3,150psi. The hydraulic pump shall be solely dedicated to aerial operations (no exception).

The hydraulic oil shall be a premium Multi-Vis product having a leading edge additive package, provide oxidation stability, be extremely shear stable and maximum anti-wear properties. All oil delivered to the manufacturing site shall have a minimum ISO cleanliness level of 18/15/13.

Each aerial shall be evaluated as to the region and climate where it shall be used to determine the optimum viscosity and proper oil grade. Oil viscosity shall be based on an optimum range of 80 to 1000 SUS during normal aerial use. Before shipment of the unit, an oil sample shall be taken and analyzed to confirm the oil is within the allowable ISO grade tolerance.

The aerial hydraulic system shall have a minimum oil cleanliness level of ISO 18/15/13 based on the ISO 4406:1999 cleanliness standard. Each customer shall receive a certificate of actual cleanliness test results and an explanation of the rating system.

Each aerial shall include an oil sample port, identified with a yellow dust cap and a label, for subsequent customer testing.

Ball valves shall be provided in the hydraulic suction lines to permit component servicing without draining the oil reservoir.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

The aerial shall incorporate the use of trombone steel tubes inside the stabilizer beams to eliminate hydraulic hose wear and leaks.

Hydraulic power to the ladder shall be transferred from the pedestal by a hydraulic swivel.

The system hydraulic pressure shall be displayed on the turntable display.

The hydraulic system shall be additionally protected from excessive pressure by a secondary pressure relief valve set at 3,150 psi. In the event the main hydraulic pump compensator malfunctions, the secondary relief shall prevent system damage.

**HYDRAULIC CYLINDERS**

All cylinders used on the aerial device shall be produced by a manufacturer that specializes in the manufacture of hydraulic cylinders.

Each cylinder shall include integral safety holding cartridges. No manifold or transfer tube mounted cartridge shall be acceptable.

Each cylinder shall be designed to a minimum safety factor of 4:1 to failure.

All safety holding cartridges shall be installed at the cylinder manufacturer, in a controlled clean environment to avoid possible contamination and or failure.

**POWER TAKEOFF/HYDRAULIC PUMP**

The apparatus shall be equipped with a power takeoff driven by the chassis transmission and actuated by an electric shift, located inside the cab. The power takeoff which drives the hydraulic pump shall meet all the requirements for the aerial unit operations.

Am amber indicator light shall be installed on the cab instrument panel to notify the operator that the power takeoff is engaged.

An interlock shall be provided that allows operation of aerial power only after the chassis spring brake has been set and the chassis transmission has either been placed in the neutral position or drive position after the driveline has been disengaged from the rear axle.

The hydraulic system shall be supplied by a variable displacement load and pressure compensating piston pump. The pump shall meet the demands of all three simultaneous aerial functions. The pump shall provide proper flow for single aerial function with the engine at idle speed. A switch shall be provided on the control console to increase the engine speed for multiple function operation.

**EMERGENCY PUMP**

The hydraulic system shall be designed with an auxiliary power unit meeting the guidelines of the current NFPA standard.

The aerial shall be equipped with an emergency hydraulic pump, electrically driven from the truck batteries. The pump shall be capable of running for 30 minutes for limited aerial functions to stow the unit in case of a main pump or truck system failure. A momentary switch shall be located at the stabilizer and aerial control locations to activate the emergency pump.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**AERIAL CONTROL VALVE**
The aerial hydraulic control valve shall be designed with special spool flows, limiting the oil flow for the designed function speed. The valve shall be electrically controlled and be located in the control console with the handles oriented downward for manual operation. The activation handles shall be spaced a minimum of 3.50" for ease of operation. The valve spools shall be designed to bleed off downstream pressure, in the neutral position and allow proper sealing of any cylinder holding cartridge.

**OIL RESERVOIR**
The oil reservoir shall have a minimum capacity of 40 gallons. The oil fill location shall be easily accessible and be labeled "Hydraulic Oil Only" and also indicate the grade of oil that is installed in the reservoir. The fill cap shall have a 40 micron filter to provide protection from contamination. A drain hose shall be included and shall terminate with a quarter turn ball valve.

Two suction ports shall be provided, one for the main hydraulic pump and one for the emergency pump. The main suction shall be slightly elevated off the bottom of the reservoir and include a 100 mesh suction strainer. The emergency suction port shall be closer to the bottom of the reservoir to provide some reserve oil for emergency operation.

A six (6) disc type magnetic drain shall also be provided to collect any ferrous contaminants.

A combination sight glass and thermometer shall be mounted to the reservoir in an easily viewable location.

The hydraulic oil reservoir shall be labeled per the current edition of NFPA standard.

**RETURN FILTER**
The low pressure oil return filter shall be remote mounted and designed to prevent oil loss during filter change. A 50 psi bypass shall be included to protect the element and hydraulic system during lower than normal operating temperatures. The system shall incorporate the following filter to provide dependable service:

- return filter: beta 200 at 6 micron

**HYDRAULIC SWIVEL**
The aerial ladder shall be equipped with a three (3) port, high pressure hydraulic swivel which shall connect the hydraulic lines from the hydraulic pump and reservoir through the rotation point to the aerial control bank. The hydraulic swivel shall allow for 360 degree continuous rotation of the aerial.

**ELECTRIC SWIVEL**
The ladder shall be equipped with an electric swivel to allow 360 degrees rotation of the aerial while connecting all electrical circuits through the rotation point. A minimum of 28 collector rings shall be provided that are capable of supplying 30 amp continuous service. All collector rings shall be enclosed and protected with desiccant plugs against condensation and corrosion. No oil or silicone shall be used.

**12-BIT ABSOLUTE ENCODER**
The aerial ladder shall be equipped with a 12-Bit Absolute Encoder which provides 4096 counts per shaft turn for position and direction reference.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

The 12-Bit Absolute Encoder shall provide a unique binary word to reference each position and direction for all 360 degrees of rotation.

If the power is interrupted for any reason, the 12-Bit Absolute Encoder shall allow power to be returned to the system without having to re-zero the settings.

The 12-Bit Absolute Encoder shall be an integral part of a micro-processor based control system.

**ELECTRICAL SYSTEM**

The aerial device shall utilize a microprocessor-based control system. The system shall consist of the following components:

Control System Modules

Each of the control system modules shall be configured as follows:

Sealed to a NEMA 4X rating

Operating range from -40 degrees F to 156 degrees F (-40 degrees C to 70 degrees C)

Communicate using J1939 data link

Two (2) diagnostic LED lights

One (1) green light that illuminates when module has power (B+) and ground

One (1) red light that flashes to indicate the module is capable of communicating via the data link

Up to 16 diagnostic LEDs on each module

Ground matrix identification system

The following control system modules shall be used:

Control Module

Main controller for the system

USB connection allows for computer diagnostics

Power Module

Built-in fault sensing

Eight (8) digital outputs

Pulse width modulating (PWM) capable

10A continuous per output

Circuit protection based on actual current draw (not affected by heat)

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

Current Control Module

Built-in fault sensing

Three (3) analog inputs

Eight (8) digital outputs

Pulse width modulating (PWM) capable

3A continuous per output

Closed Loop System

Circuit protection based on actual current draw (not affected by heat)

Input Module

16 software selectable (digital or analog) inputs

Output Module

16 digital outputs

Input/Output Module

Eight (8) software selectable (digital or analog) inputs

Eight (8) digital outputs

**TIP LIGHT**

There shall be four (4) HiViz Model FT-WL-X-9-*, 5,732 raw lumens 12 volt DC LED lights with adjustable bail mounts installed on the fly section of the aerial device below the handrail height.

- One (1) light on the left side high. The left side tip light to include flood optics.
- One (1) light on the left side low. The left side lower tip light to include spot optics.
- One (1) light on the right side low. The right side lower tip light to include spot optics.
- One (1) light on the right side high. The right side tip light to include flood optics.
- The painted parts to be white.

The lights shall be controlled with the tracking lights.

**TRACKING LIGHTS**

There shall be two (2) HiViz FT-WL-X-9-*, 5,734 effective lumens 12 volt DC lights with white LEDs and adjustable mounts installed on the base section of the aerial device below the hand rails per the following:

- One (1) located on the left side. The left side tracking light to include a combination of flood and spot optics.
- One (1) located on the right side. The right side tracking light to include a combination of flood and spot optics.
- The painted parts of the light housing and brackets to be white.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

The tracking lights shall be controlled by a switch located at the platform/tip and turntable.

**AERIAL LED LOCATOR LIGHT**
There shall be two (2) Hiviz®, Model FT-G25-**, 5.22" wide x 1.77" high x 0.39" deep, 12 volt flashing LED lights with chrome trim installed at the aerial tip facing out when the aerial boom is in the stowed position. There shall be one (1) light on the left side and one (1) light on the right side.

The color of the lights shall be, blue.

The lens shall be clear.

The light shall be activated when the aerial master switch is activated and a switch at the turntable operator's panel is activated through the aerial master.

**LIGHTING ON AERIAL EGRESS**
There shall be two (2) HiViz, Model FT-CU-HD-7.5, LED lights mounted on the bottom of the aerial egress. One light mounted on each side facing down.

The egress section of the ladder to be white.

The LED lighting shall be activated when the aerial master switch is activated.

The lights may be load managed when the parking brake is applied.

**LIGHTING ON AERIAL LADDER**
There shall be TecNiq, Model D02, LED rung lighting provided on both sides of the aerial ladder base, lower and upper mid, and fly sections. The lighting shall be located adjacent to the ladder rungs along the lower rail of the ladder sections and shall run the length of the ladder section.

The color of the sections shall be:

- The base section of the ladder to be blue.
- The lower mid section of the ladder to be blue.
- The upper mid section of the ladder to be blue.
- The fly section of the ladder to be blue.

The LED rung lighting shall be activated when the aerial master switch is activated and a switch at the turntable operator's panel is activated through the aerial master.

The lights may be load managed when the parking brake is applied.

**STABILIZER WARNING LIGHTS**
There shall be two (2) Whelen®, Model M9**S, steady burning LED warning lights with chrome trim provided, one (1) on each stabilizer cover panel per the following:

- The left side stabilizer pan warning light to include red flashing LEDs
- The right side stabilizer pan warning light to include red flashing LEDs
- The warning light lens colors to be the same as the LEDs

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

These lights shall be controlled utilizing the microprocessor based Whelen® CenCom CORE™ system.

These warning lights shall be activated by the same switch as the side warning lights.

**STABILIZER BEAM WARNING LIGHTS**
Two (2) 4.00" diameter red LED flashing lights shall be mounted on each stabilizer, one (1) facing forward and one (1) facing rearward.

The lights shall be Grote Supernova 40 series LED lights.

The lights shall be recessed in the horizontal beam of the stabilizer.

These warning lights shall be activated with the aerial master switch.

**STABILIZER SCENE LIGHTS**
There shall be one (1) Truck-Lite, Model 6060C, 2.32" high x 6.49" long x 1.02" deep oval LED light installed under each stabilizer beam to illuminate the surrounding area. A total of two (2) lights shall be installed. These lights shall be activated by the aerial master switch.

**DC POWER CABLE TO TIP**
There shall be a cable installed in the aerial device to provide 27.84 amps @ 12 volts DC to the tip of the aerial device.

**2-WAY AERIAL COMMUNICATION SYSTEM**
There shall be a Fire Research, Model ICA910, two-way intercom system provided. The control module with an LED volume display and push-button volume control shall be located on the turntable operator console.

A hands free module shall be located at the aerial tip or platform and constantly transmit to the other module unless the control module push-to-talk button is pressed.

Each intercom unit shall be weatherproof.

**ROPE TIE BAR AT BASE SECTION, RESCUE LIFTING SYSTEM**
A removable bracket shall be supplied at the rear of the base section, attached between the left hand and right hand rear hand rails. The bracket shall provide Lyfe Pulley rope tie off and/or guide points spaced 5.25" apart, centered between the rear hand rails. The bracket shall be designed to be easily removable and not interfere with a fully retracted ladder assembly when attached to the base section. A storage box for the bracket shall be provided on the outside rear of the base section. The storage box and bracket shall be painted to match the aerial device.

**LIFTING EYE ASSEMBLY - ROPE RESCUE ATTACHMENT**
A lifting eye assembly shall be provided that is designed to evenly distribute load at the tip of the aerial. The lift eye assembly is retained by two (2) locking pins, one (1) at each end outboard side of the egress. Leveling is maintained by the lifting eye assembly rotating within the egress mounting. The lifting eye assembly rating shall match the capacity rating of the aerial device.

**RESCUE LIFTING SYSTEM**
A rescue lifting attachment shall be provided. The lifting attachment shall mount to the aerial egress and shall consist of a pair of nylatron pulleys mounted to a stainless steel shaft. The pulleys shall be

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

adjustable from side to side and shall have a total lifting capacity of 750lb, regardless of whether one (1) or both pulleys are being utilized.

**AERIAL TURNTABLE CHAIN**

A chain shall be installed at the aerial turntable.

**WATER SYSTEM**

A waterway system shall be provided consisting of the following components and features:

A 5.00" pipe shall be connected to the water supply on one end and to a 5.00" internal diameter water swivel at the rotation point of the turntable. The water swivel shall permit 360 degree continuous rotation of the aerial device.

The 5.00" waterway swivel is to be routed through the rotation point up to the heel pin swivel. The heel pin swivel shall allow the water to flow to the ladder pipe while elevating the aerial ladder from -10 degrees to 77 degrees. The heel pivot pin is not integral with the waterway swivel at any point. The design of the waterway shall allow complete servicing of the waterway swivel without disturbing the heel pivot pin.

The integral telescopic water system shall consist of a 4.50" diameter tube in the base section, a 4.00" diameter tube in the inner mid-section, a 3.50" diameter tube in the outer mid-section, and a 3.00" diameter tube in the fly section. The telescopic waterway shall be constructed of anodized aluminum pipe.

The aerial shall be capable of discharging up to 1000 gpm at 100 psi parallel to the ladder and 90 degrees to each side of center while maintaining the rated tip load.

The aerial shall be capable of discharging between 1001 and up to 1500 gallons per minute at 100 psi parallel to the ladder and 40 degrees to each side of center while maintaining the rated tip load.

The master stream shall be capable of flow up to 30 degrees above horizontal. The monitor mounting bracket shall be modified to move the monitor 8.00" rearward to accommodate a shortened trailer and egress.

An adjustable pressure relief valve shall be furnished to protect the aerial waterway from a pressure surge.

Two (2) 1.50" drain valves shall be located at the lowest points of the waterway system and shall be routed to drain through the center of the 5th wheel.

**WATERWAY SEALS**

The waterway seals shall be of type-B PolyPak design, composed of nitroxile seal and a nitrile wiper, which together offer maximum stability and extrusion resistance on the waterway. The seal shall be capable of withstanding pressures up to 2000 psi, temperatures in excess of 250 degrees Fahrenheit and have resistance to all foam generating solutions. The seals shall be internally lubricated.

The waterway seals shall have automatic centering guides constructed of synthetic thermalpolymer. The guides shall provide positive centering of the extendible sections within each other and the base section to insure longer service life and smoother operation.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**AERIAL MONITOR**
An Akron Model 3486 monitor with stow and deploy shall be provided at the tip with a Akron 1500 gpm Model 5178. This monitor shall allow for an additional 30 degrees of travel above horizontal at the aerial tip.

The monitor's functions shall be controlled electrically from two (2) separate locations. One (1) control shall be located at the control console and the other at the ladder tip.

There shall be a courtesy light at the tip of the aerial to illuminate the controls.

If the aerial has a quick-lock waterway, a limit switch shall be provided to disable the extended vertical travel when the monitor is locked to the lower ladder section.

**AERIAL VALVE MANIFOLD UNDER MONITOR**
An Akron Aerial Valve Manifold (AVM) valve and manifold shall be provided at the aerial waterway monitor inlet. This configuration provides a valve to control flow through the monitor and an additional valve as a discharge connection for hose.

The AVM monitor flow control valve shall be manually operated at the tip of the ladder with a slow close gear valve. The valve shall have an integral automatic drain valve.

The Akron S2 left side discharge valve shall have a 90 degree, 1/4 turn ball valve with 2.50" NH outlet threads. A 2.50" NH cap with chain shall be provided.

A pressure relief valve shall be installed to prevent incidental damage to the waterway system when both valves are closed.

**AERIAL WATERWAY FLOW METER**
Waterway flow, including total water flowed, shall be monitored by the microprocessor. An LCD display shall be located at the turntable control station.

**AERIAL WATERWAY INLET**
The aerial waterway shall be plumbed from the fifth wheel area to the waterway swivel with 4.00" pipe.

A 5.00" inlet shall be located on each side of the apparatus complete with a chrome plated cap.

The individual "line" pressure gauges for the inlets shall be manufactured by Class 1.

They shall be a minimum of 3.50" in diameter and shall have white faces with black lettering.

Gauges shall be compound type with a vacuum/pressure range of 30.00"-0-600#.

The individual pressure gauge shall be installed as close to the inlet as practical.

**WATERWAY LOCKING SYSTEM**
The aerial ladder waterway monitor shall be capable of being positioned at either the fly section or at the next lower section of the ladder.

The monitor location shall be changeable by the use of a single handle, located at the side of the ladder.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

The handle, attached to a cam bracket, shall simply be moved forward to lock the monitor at the fly section and back to lock it to the previous section.

There shall be no pins to remove and reinstall.

The monitor shall be operational at all times, regardless of its position, without connecting or disconnecting electrical lines.

**QUICK-LOCK WATER WAY LOCK LABELING**

The Quick-Lock waterway locking mechanism shall be labeled "LOWER FLY" "RELEASE" "UPPER FLY". Three (3) labels shall be installed on the side of the pinnable waterway release lever mounting bracket.

**TOOLS**

The following tools shall be provided for retorquing of all specified bolts as recommended by the manufacturer:

- Torque Wrench
- All Required Extensions, Sockets and Adapters
- 4-to-1 Multiplier

**MANUALS**

Two (2) operator maintenance manuals and two (2) wiring diagrams pertaining to the aerial device shall be provided with the apparatus at time of pick-up.

**INITIAL INSTRUCTION**

On initial delivery of the fire apparatus, the contractor shall supply a qualified representative to demonstrate the apparatus and provide initial instruction to the fire department regarding the operation, care, and maintenance of the apparatus for a period of three (3) consecutive days.

**TILLER CAB**

A permanently mounted tiller cab shall be located on top of the tiller trailer, to the rear of the aerial ladder.

The maximum overall height of the tiller cab shall not exceed 134.00" (no exception).

The tiller cab shall be totally enclosed.

The cab windshield shall be automotive approved tinted safety glass and shall provide a minimum of 1,513 square inches of clear viewing area.

Each side window, directly rearward of the windshield, shall be more than 536 square inches. The side windows, combined with the windshield, shall provide a minimum of 2,585 square inches of unobstructed viewing area.

In order to provide maximum visibility for the tillerman, there shall be no corner posts at the forward corners of the windshield (no exception).

Two (2) slide back doors, one each side of cab shall be provided. Doors shall be mounted on top and bottom slides which shall be lockable in either open or closed position. A minimum door opening of

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

21.50" shall be provided when entering and exiting the tiller cab. The tiller cab doors shall be equipped with drop-down windows. The windows shall be 18.00" wide x 31.00" high.

The rear wall of the tiller cab shall have a vertically-split sliding window. The window shall be 33.50" wide x 27.75" high.

The tiller cab floor shall be constructed of aluminum treadplate.

A two (2) speed electric windshield wiper with washer shall be provided for the front windshield.

The windshield washer reservoir shall have a capacity of two (2) quarts and shall be located forward of the tiller cab.

An adjustable, telescopic steering column shall be provided.

The diagnostic plug for the trailer ABS system shall be provided in the driver side tiller access stepwell, behind the fuel fill door.

The following controls/alarms shall be provided inside the tiller cab:

- Buzzer signaling system with push button in tiller cab steering wheel as well as a labeled push button in the tractor cab, within reach of the driver.
- Jackknife alarm

The following shall be provided on the steering column support pedestal:

- Two (2) heater/defroster outlets
- Heater/defroster control switch

The following controls/gauges shall be located in the upper control panel:

- Tiller wheel position indicator gauge. (L-C-R)
- Two (2) 2.00" diameter amber turn signals
- Windshield wiper/washer control switch

A vinyl covered sun visor shall be provided in the tiller cab above the windshield. There shall be a black plastic thumb latch provided to help secure the sun visor in the stowed position.

**TILLER CAB DOME LIGHT**

There shall be one (1) dual LED dome light with black bezel installed in the tiller cab.

The color of the LED shall be red and white.

The white LED shall be controlled by the door switches and the lens switch.

The color LED shall be controlled by the lens switch.

In order to ensure exceptional illumination, the white LED dome light shall provide a minimum of 10.1 foot-candles (fc) covering an entire 20.00" x 20.00" square seating position when mounted 40.00" above the seat.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**TILLER CAB HEATER/DEFROSTER**
There shall be a DC Thermal, Model SA12-4000, combination heater/defroster provided in the tiller cab. The system shall be 12 volt and shall be powered through the tractor ignition circuit.

A thermostat integral to the unit shall be provided.

An on/off rocker switch shall be provided in the tiller cab overhead switch panel.

**TILLER CAB AIR CONDITIONING**
Air conditioning shall be provided for the tiller cab.

The unit shall be manufactured by Danhard Inc.

The air conditioner shall have cooling capacity of 13,500 BTU.

The in tiller cab venting shall route via louvers included on the B-pillar of the tiller cab.

The unit shall be 120 volt AC and shall be run off of the onboard generator. The full load amperage draw shall be 12.00 amps in the cooling mode.

The evaporator shall be located ahead of the tiller cab on the top deck of the tiller trailer. The air conditioning unit shall not increase the overall height of the tiller cab.

**TILLER CAB SEAT**
A Bostrom Sierra, FX model fixed companion high back style seat with forward and rearward adjustment shall be provided in the tiller cab for the tillerman. The seat shall be provided with a switch that is connected to a warning indicator in the tractor cab. The indicator shall indicate the tiller driver is not present in the tiller cab.

The seating position shall be furnished with a 3-point seat belt. The seat belt shall be furnished with an automatic retractor.

**TILLER CAB STEPS**
For access to the tiller cab, two (2) sets of steps shall be furnished at the rear of the apparatus, one set each side. The steps shall be moved rearward and be in alignment with the tiller cab door. The bottom three (3) access steps shall be full width, approximately 21.00" wide, and located just behind the tiller axle. The top step shall be full width, approximately 18.50" wide. The steps shall be securely reinforced and constructed of aluminum treadplate. Vertical handrails shall be provided on the forward portion of each step assembly and the rear handrail shall be a candy cane shaped handrail, extending upward from the existing handrail and form a u-shape approximately 10.00" high above the top of the body. A vertical handrail shall also be provided on the tiller cab. The steps shall be illuminated for nighttime operation.

**JACKKNIFE ALARM**
An audible and visual warning system shall be provided to warn both drivers when the jackknife position approaches the maximum allowable angle.

The light shall be a Whelen Model 0SB00SCR blue LED. The jackknife alarm in both the cab and tiller cab shall be provided with a special Warble tone tone to distinguish itself from the other truck alarms.

**TILLER WARNING INDICATOR**

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

A warning indicator in the tractor cab shall be activated if the parking brake is released and the tiller driver is not present in the tiller cab.

**TILLER CAB MIRRORS**
A 10.00" x 6.50" mirror with fixed arm shall be installed on each side of tiller cab.

**ANGLED BRACKET FOR CAB CONTROLS**
The heater and air conditioning controls shall be located on a specially designed 30 degree bracket that angles them upward toward the tillerman.

**ENGINE START IN TILLER CAB**
A push button switch shall be provided on the lower tiller cab dash area to allow the truck to be started. If the switch is not pressed the truck shall not start.

There shall be a master override switch located in the tractor cab which shall allow the truck to be started in the unlikely event that the switch at the tiller cab would fail or the tillerman isn't present.

The switch in the cab shall be a covered momentary switch.

The switches shall be located under switch panel #11 in cab.

**TRANSMISSION INTERLOCK IN TILLER CAB**
A foot switch shall be provided in the tiller cab the right front corner of the tiller cab floor, out of the way for entry/exit to the cab and convenient for the tillerman to allow the truck to be shifted into gear. If the switch is not pressed the truck shall not shift into gear.

There shall be a master override switch located in the cab which shall allow the truck to be shifted into gear without depressing the tiller cab foot switch. This shall be for maintenance work.

**WINDOW DEFROST FANS**
Two (2) window defrost fans shall be mounted match locations of 37754.

**GRAB HANDLE(S)**
There shall be two (2) black offset rubber covered grab handle(s) mounted high on door posts of tiller cab, each side, match 37754 to assist in exiting the tiller cab. The grab handle(s) shall be securely mounted.

There shall be an air brake system pressure gauge and alarm provided in tiller cab on the dash area.

**BUZZER AND WARNING LIGHT**
There shall be a Cole Hersee, Model 4112-RC000 combination buzzer with red pilot warning light provided near each buzzer warning button that shall activate when either buzzer warning button is activated in the tiller or tractor cab.

**TILLER TRAILER**
The gooseneck area of the tiller trailer shall be constructed of 100,000 psi minimum yield strength steel.

The gooseneck area shall have a section modulus of 289.00 cu. in. and a resistance to bending moment of 28,900,000 inch pounds.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

The gooseneck area shall be 46.00" wide x 13.50" deep.

The tiller trailer frame shall be box type construction to effectively resist trailer twist.

The side rails shall have a 13.38" tall web over the front and mid sections of the trailer, with a continuous smooth taper to a 10.75" over the tiller axle.

The frame rails shall be constructed of 80,000 psi minimum yield strength heat treated .38" thick steel, with 3.50" wide flanges and covered by top and bottom plates to form a ridged box structure. Cover plates shall be 50,000 psi minimum yield strength steel.

The tiller trailer frame shall have a section modulus of 257.70 cu. in., and a resisting bending moment (rbm) of 12,880,000 inch pounds over the critical regions of the frame assembly, with a section modulus of 18.96 cu. in. with an rbm of 2,085,803 inch pounds over the rear axle.

The overall length of the tiller trailer shall be 458.00". This shall be shorter than standard, but shall include a 3.00" extended gooseneck area of the trailer.

**WALKWAY, TURNTABLE TO BODY**
A walkway shall be provided from the aerial turntable to the tiller body.

**TILLER TRAILER NON DRIVE AXLE**
The tiller trailer axle shall be a reverse "I" beam type with inclined king pins. It shall be a Hendrickson® axle, Model AIRTEK NXT, with a ground rated capacity of 23,000 lb.

**TILLER TRAILER STEERING**
Dual ZF TAS85 and RCS 65 steering gears, with integral heavy-duty power steering, shall be provided.

The steering wheel shall be 18.00" in diameter, and capable of tilting and telescoping.

A lock-out pin shall be provided on the tiller cab steering column.

**BRAKES**
The tiller trailer brake calipers shall be Meritor® DiscPlus™ EX225 air disc type. The brake rotors shall be 17.00" ventilated.

**SUSPENSION**
Rear suspension shall be a Hendrickson Model AIRTEK NXT, air ride with a ground rating of 23,000 pounds. The suspension shall have the following features:

- Inboard vertical mounted heavy-duty shock absorbers

- Utilizes track bars to restrict lateral axle movement

- Low spring rate air springs for excellent ride quality

- Dual height control valves to maintain level vehicle from side to side

**TIRES**
Tiller trailer tires shall be Michelin 425/65R22.50 radials, load range L, ZY3 wide base tread, rated for 24,396 lb maximum axle load and 65 mph maximum speed.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

The tires shall be mounted on Alcoa® Dura-Bright, 22.50" x 12.25" polished aluminum disc type wheels with a ten (10)-stud 11.25" bolt circle.

**OIL SEALS**
Oil seals with viewing window shall be provided on the tiller axle.

**GUARD FOR REAR BODY**
There shall be a U-shaped guard provided and bolted to the underside of the rear wall substructure. The guard shall run the entire width of the rear of the body and be approximately 12.00" deep (towards the front of the apparatus). It shall be constructed of steel and painted job color. The guard shall angle up to the inside and outside. Drain holes shall be provided on the bottom of the guard.

**LOOSE EQUIPMENT**
The following equipment shall be furnished with the completed unit:

- One (1) bag of chrome, stainless steel, or cadmium plated screws, nuts, bolts and washers, as used in the construction of the unit

**NFPA LOOSE EQUIPMENT**

**NFPA Required Loose Equipment Provided by Fire Department**
The following loose equipment as outlined in NFPA 1900, 2024 edition, table 8.1 and CAN/ULC S515:2024 edition, section 5.2 ill be provided by the fire department:

- One (1) traffic vest for each seating position, each vest to comply with ANSI/ISEA 107, *American National Standard for High-Visibility Safety Apparel and Accessories*, and have a five-point breakaway feature that includes two (2) at the shoulders, two (2) at the sides, and one (1) at the front.
- Five (5) fluorescent orange traffic cones not less than 28.00" (711 mm) in height, each equipped with a 6.00" (152 mm) retro-reflective white band no more than 4.00" (152 mm) from the top of the cone, and an additional 4.00" (102 mm) retro-reflective white band 2.00" (51 mm) below the 6.00" (152 mm) band.
- Five (5) illuminated warning devices such as highway flares, unless the five (5) fluorescent orange traffic cones have illuminating capabilities.
- Four (4) ladder belts meeting the requirements of NFPA 2500.

**NFPA Loose Equipment That Should be Considered**
The following loose equipment as outlined in NFPA 1900, 2024 edition, appendix table A.8.4 (a) and CAN/ULC S515:2024 edition, section 5.2 should be considered:

- Two (2) 3 ft - 4 ft plaster hooks with D handles mounted in brackets fastened to the apparatus
- Two (2) crowbars
- Two (2) claw tools
- Two (2) 12 lb (5 kg) sledgehammers
- Four (4) SCBA apparatus
- Four (4) SCBA spare cylinders
- One (1) first aid kit
- Six (6) salvage covers, each a minimum size of 12 ft × 18 ft (3.6 m × 5.5 m)

| Bidder Complies | |
|---|---|
| Yes | No |

- Four (4) combination spanner wrenches
- Two (2) scoop shovels
- One (1) pair of bolt cutters, 24.00" (0.6 m) minimum
- One (1) 150 ft (45 m) light-use life safety rope meeting the requirements of NFPA 2500
- One (1) 150 ft (45 m) general-use life safety rope meeting the requirements of NFPA 2500
- One (1) 150 ft (45 m) utility ropes having a breaking strength of at least 5000 lb (2300 kg)
- One (1) box of tools to include the following:
  - one (1) hacksaw with three (3) blades
  - one (1) keyhole saw
  - one (1) 12" (.3 m) pipe wrench
  - one (1) 24" (.6 m) pipe wrench
  - one (1) ballpeen hammer
  - one (1) pair of tin snips
  - one (1) pair of pliers
  - one (1) pair of lineman's pliers
  - assorted types and sizes of screwdrivers
  - assorted adjustable wrenches
  - assorted combination wrenches
- One (1) automatic external defibrillator (AED)

**SOFT SUCTION HOSE**

There shall be no soft suction hose provided.

**DRY CHEMICAL EXTINGUISHER PROVIDED BY FIRE DEPARTMENT**

The extinguisher is not on the apparatus as manufactured. The fire department shall provide and mount the extinguisher.

**WATER EXTINGUISHER PROVIDED BY FIRE DEPARTMENT**

The extinguisher is not on the apparatus as manufactured. The fire department shall provide and mount the extinguisher.

**FLATHEAD AXE PROVIDED BY FIRE DEPARTMENT**

The axe is not on the apparatus as manufactured. The fire department shall provide and mount the axe.

**PICKHEAD AXE PROVIDED BY FIRE DEPARTMENT**

The axe is not on the apparatus as manufactured. The fire department shall provide and mount the axe.

**PAINT PROCESS**

The exterior custom cab and body painting procedure shall consist of a seven (7) step finishing process as follows:

1. Manual Surface Preparation - All exposed metal surfaces on the custom cab and body shall be thoroughly cleaned and prepared for painting. Imperfections on the exterior surfaces shall be removed and sanded to a smooth finish. Exterior seams shall be sealed before painting. Exterior surfaces that shall not be painted include; chrome plating, polished stainless steel, anodized aluminum and bright aluminum treadplate.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

2. Chemical Cleaning and Pretreatment - All surfaces shall be chemically cleaned to remove dirt, oil, grease, and metal oxides to ensure the subsequent coatings bond well. The aluminum surfaces shall be properly cleaned and treated using a high pressure, high temperature 4 step Acid Etch process. The steel and stainless surfaces shall be properly cleaned and treated using a high temperature 3 step process specifically designed for steel or stainless. The chemical treatment converts the metal surface to a passive condition to help prevent corrosion.
3. Surfacer Primer - The Surfacer Primer shall be applied to a chemically treated metal surface to provide a strong corrosion protective basecoat. A minimum thickness of 2 mils of Surfacer Primer is applied to surfaces that require a Critical aesthetic finish. The Surfacer Primer is a two-component high solids urethane that has excellent sanding properties and an extra smooth finish when sanded.
4. Finish Sanding - The Surfacer Primer shall be sanded with a fine grit abrasive to achieve an ultra-smooth finish. This sanding process is critical to produce the smooth mirror like finish in the topcoat.
5. Sealer Primer - The Sealer Primer is applied prior to the Basecoat in all areas that have not been previously primed with the Surfacer Primer. The Sealer Primer is a two-component high solids urethane that goes on smooth and provides excellent gloss hold out when topcoated.
6. Basecoat Paint - Two coats of a high performance, two component high solids polyurethane basecoat shall be applied. The Basecoat shall be applied to a thickness that shall achieve the proper color match. The Basecoat shall be used in conjunction with a urethane clear coat to provide protection from the environment.
7. Clear Coat - Two (2) coats of Clear Coat shall be applied over the Basecoat color. The Clear Coat is a two-component high solids urethane that provides superior gloss and durability to the exterior surfaces. Lap style and roll-up doors shall be Clear Coated to match the body. Paint warranty for the roll-up doors shall be provided by the roll-up door manufacturer.

After the cab and body are painted, the color shall be verified to make sure that it matches the color standard. Electronic color measuring equipment shall be used to compare the color sample to the color standard entered into the computer. Color specifications shall be used to determine the color match. A Delta E reading shall be used to determine a good color match within each family color.

All removable items such as brackets, compartment doors, door hinges, and trim shall be removed and painted separately if required, to ensure paint behind all mounted items. Body assemblies that cannot be finish painted after assembly shall be finish painted before assembly.

The paint finish quality levels for critical areas of the apparatus (cab front and sides, body sides and doors, and boom lettering panels) are to meet or exceed Cadillac/General Motors GMW15777 global paint requirements. Orange peel levels are to meet or exceed the #6 A.C.T. standard in critical areas. These requirements must be met in order for the exterior paint finish to be considered acceptable. The manufacture's written paint standards shall be available upon request.

**Environmental Impact**

Contractor shall meet or exceed all current state regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water and soil. Controls shall include the following conditions:

- Topcoats and primers shall be chrome and lead free.

| Bidder Complies | |
|---|---|
| Yes | No |

- Metal treatment chemicals shall be chrome free. The wastewater generated in the metal treatment process shall be treated on-site to remove any other heavy metals.
- Particulate emission collection from sanding operations shall have a 99.99 percent efficiency factor.
- Particulate emissions from painting operations shall be collected by a dry filter or water wash process. If the dry filter is used, it shall have an efficiency rating of 98 percent. Water wash systems shall be 99.97 percent efficient.
- Water from water wash booths shall be reused. Solids shall be removed on a continual basis to keep the water clean.
- Paint wastes are disposed of in an environmentally safe manner.
- Empty metal paint containers shall be recycled to recover the metal.
- Solvents used in clean-up operations shall be recycled on-site or sent off-site for distillation and returned for reuse.

Additionally, the finished apparatus shall not be manufactured with or contain products that have ozone depleting substances. Contractor shall, upon demand, present evidence that the manufacturing facility meets the above conditions and that it is in compliance with his state EPA rules and regulations.

**TWO-TONE CAB PAINT**

The cab shall be painted two-tone with the upper section painted #948 White and the lower section painted #999 RED. There shall be a standard two-tone cab paint break provided.

There shall be a standard cab shield provided.

**BODY PAINT**

The body shall be painted to match the lower section of the cab.

**PAINT**

The tiller cab shall be painted #999 Red.

**PAINT CHASSIS FRAME ASSEMBLY**

The chassis frame assembly shall be finished with primer and gloss paint to match the lower job color before the installation of the cab and body, and before installation of the engine and transmission assembly, air brake lines, electrical wire harnesses, etc.

Components that are included with the chassis frame assembly that shall be painted (unless otherwise stated in a secondary option) are:

- Frame rails
- Frame liners
- Cross members
- Axles
- Suspensions
- Steering gear
- Battery boxes
- Bumper extension weldment
- Frame extensions
- Body mounting angles

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

- Rear Body support substructure (front and rear)
- Pump house substructure
- Steel fuel tank
- Castings
- Individual piece parts used in chassis and body assembly

Components treated with epoxy E-coat protection prior to paint:

- Two (2) C-channel frame rails
- Two (2) frame liners

The E-coat process shall meet the technical properties shown.

**AXLE HUB PAINT**
All axle hubs shall be painted to match lower job color.

**TRAILER HORIZONTAL COATING**
Portions of the trailer shall be coated with black Safe-Stride® anti-slip coating to help reduce glare for the tillerman.

Surfaces to be coated include:

- Top, horizontal surfaces of the front, center and rear body module
- Horizontal and vertical treadplate surfaces of low side catwalks
- All drip rails
- Tiller cab air conditioning condenser and hose lines shall also be covered (if applicable)

**LADDER STORAGE TROUGH PAINT**
A quantity of one (1) catwalk/top of body mounted ladder storage trough(s) located directly rearward of the LS3 compartment - located on the top of the body shall be painted black FormCoat. The exterior and interior surfaces shall be painted.

**COMPARTMENT INTERIOR FINISH**
The interior of the compartments shall be dual action finished and not painted.

**AERIAL DEVICE PAINT COLOR**
The aerial device paint procedure shall consist of a seven (7) step finishing process as follows:

1. Manual Surface Preparation - All exposed metal surfaces on the aerial device structural components above the rotation point shall be thoroughly cleaned and mechanically shot-blasted to remove metal impurities and prepare the aerial for painting.

2. Zinc Rich Primer - Zinc rich primer shall be applied to the trailer including the gooseneck and stabilizer housings, stabilizer beams and jacks, and upper 5th wheel components.

3. Primer/Surfacer Coats - A two (2) component epoxy primer/surfacer shall be applied to the mechanically shot-blasted metal surfaces to provide a strong corrosion protective base coat and to smooth out the surface. All seams shall be caulked with a two (2) component epoxy caulk before painting.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

4. Hand Sanding - The primer/surfacer coat of the outer surfaces of the hand rails and base rails shall be lightly sanded to a smooth finish.

5. Primer Coat - A two (2) component epoxy primer coat shall be applied over the sanded primer.

6. Topcoat Paint - Urethane base coat shall be applied to opacity for correct color matching.

7. Clear Coat - Two (2) coats of an automotive grade two (2) component urethane shall be applied.

Surfaces that shall not be painted include all chrome plated, polished stainless steel, anodized aluminum and bright aluminum treadplate.

All buy out components, such as monitor, nozzle, gauges, etc. shall be supplied as received from the vendor.

Removable items such as brackets shall be removed and painted separately to ensure paint coverage behind all mounted items.

The aerial device components shall be painted as follows using the aforementioned seven (7) step finishing process:

- Aerial device ladder sections and extension cylinders: white 948
- Aerial turntable: white 948
- Aerial control console: white 948
- Aerial lift cylinders: white 948
- Aerial rotation motor (if applicable): red 999
- Aerial trailer including the gooseneck and stabilizer housings, 5th wheel components below the rotation point, body support structure, tiller axle and suspension: red 999
- Aerial stabilizers: red 999
- Aerial egress: 999 red (shall be contrasting color to the aerial device ladder sections)
- Aerial boom support: red 999

**REFLECTIVE BAND**

A 6.00" white reflective band shall be provided across the front of the vehicle and along the sides of the body.

The reflective band provided on the cab face shall be at the headlight level.

**REFLECTIVE STRIPE ON STABILIZERS**

There shall be 6.00" wide alternating red diamond grade and yellow diamond grade reflective chevron stripes provided on the forward and rear facing sides of both aerial stabilizers. The stripes shall be angled at a 45 degree angle.

**STOP SIGN, REFLECTIVE, CAB DOORS**

A 12.00" x 12.00" reflective stop sign shall be provided on the interior of each cab door. The stop sign shall be located on the stainless steel door panel.

This sign shall meet the current edition of applicable NFPA standards.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**REFLECTIVE STRIPE, TILLERMAN DOORS**
A 6.00" x 16.00" white reflective stripe shall be provided across the interior of each tillerman's entry door. The stripe shall be located approximately 1.00" up from the bottom, on the door panel.

This stripe shall meet the NFPA 1901 requirement.

**CAB FACE STRIPE**
There shall be a genuine gold leaf stripe across the face of the cab.

**CAB STRIPE**
There shall be a genuine gold leaf stripe provided on both sides of the cab in place of the chrome molding.

**LETTERING**
The lettering shall be totally encapsulated between two (2) layers of clear vinyl.

**LETTERING**
Forty-one (41) to sixty (60) genuine gold leaf lettering, 3.00" high, with outline and shade shall be provided.

**LETTERING**
There shall be reflective lettering, 16.00" high, with outline and shade provided. There shall be one (1) letter provided.

**LETTERING**
There shall be genuine gold leaf lettering, 4.00" high, with outline and shade provided. There shall be nine (9) letters provided.

**LETTERING**
There shall be reflective lettering, 7.00" high, with outline and shade provided. There shall be six (6) letters provided.

**LETTERING**
There shall be reflective lettering, 9.00" high, with outline and shade provided. There shall be 16 letters provided.

**LETTERING**
There shall be reflective lettering, 8.00" high, with outline and shade provided. There shall be five (5) letters provided.

**LETTERING**
There shall be reflective lettering, 5.00" high, with outline and shade provided. There shall be six (6) letters provided.

**LETTERING**
Forty-one (41) to sixty (60) reflective lettering, 3.00" high, with outline and shade shall be provided.

**EMBLEM - RIBBON STYLE**
There shall be one (1) pair of "ISO CLASS 1" gold leaf emblem(s) installed.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**EMBLEMS**
A pair of 13.50" maltese cross emblems shall be provided and installed on each side of the boom panel as shown on graphics LP. The emblems shall be airbrushed and match a supplied photo. They shall be encapsulated in vinyl for protection.

**FIRE APPARATUS PARTS MANUAL**
There shall be one (1) custom parts manual(s) in USB flash drive format for the complete fire apparatus provided.

The manual(s) shall contain the following:

- Job number
- Part numbers with full descriptions
- Table of contents
- Parts section sorted in functional groups reflecting a major system, component, or assembly
- Parts section sorted in alphabetical order
- Instructions on how to locate parts

Each manual shall be specifically written for the chassis and body model being purchased. It shall not be a generic manual for a multitude of different chassis and bodies.

**Service Parts Internet Site**
The service parts information included in these manuals are also available on the factory website. The website offers additional functions and features not contained in this manual, such as digital photographs and line drawings of select items. The website also features electronic search tools to assist in locating parts quickly.

**CHASSIS SERVICE MANUALS**
There shall be one (1) chassis service manuals on USB flash drives containing parts and service information on major components provided with the completed unit.

The manual shall contain the following sections:

- Job number
- Table of contents
- Troubleshooting
- Front Axle/Suspension
- Brakes
- Engine
- Tires
- Wheels
- Cab
- Electrical, DC
- Air Systems
- Plumbing
- Appendix

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

The manual shall be specifically written for the chassis model being purchased. It shall not be a generic manual for a multitude of different chassis and bodies.

**CHASSIS OPERATION MANUAL**
The chassis operation manual shall be provided on one (1) USB flash drive.

**ONE (1) YEAR MATERIAL AND WORKMANSHIP**
Each new piece of apparatus shall be provided with a minimum **one (1) year** basic apparatus material and workmanship limited warranty. The warranty shall cover such portions of the apparatus built by the manufacturer as being free from defects in material and workmanship that would arise under normal use and service.

A copy of the warranty certificate shall be submitted with the bid package (no exception).

**ENGINE WARRANTY**
A Cummins **five (5) year** limited engine warranty shall be provided. A copy of the warranty certificate shall be submitted with the bid package.

**STEERING GEAR WARRANTY**
A Sheppard **three (3) year** limited steering gear warranty shall be provided. A copy of the warranty certificate shall be submitted with the bid package.

**FIFTY (50) YEAR STRUCTURAL INTEGRITY**
The chassis frame shall be provided with a **fifty (50) year** material and workmanship limited warranty. The warranty shall cover the chassis frame only (does not include crossmembers) as being free from defects in material and workmanship that would arise under normal use and service.

A copy of the warranty certificate shall be submitted with the bid package (no exception).

**FRONT AXLE THREE (3) YEAR MATERIAL AND WORKMANSHIP WARRANTY**
Independent front suspension shall be provided with a **three (3) year** material and workmanship limited warranty. The manufacturer's warranty shall provide that the independent front suspension and steering gears be free from any defect related to material and workmanship on the portion of the apparatus built by the manufacturer that would arise under normal use and service. A copy of the warranty certificate shall be submitted with the bid package (no exception).

**SINGLE REAR AXLE FIVE (5) YEAR MATERIAL AND WORKMANSHIP WARRANTY**
A Meritor™ Axle 5 year limited warranty shall be provided.

**ABS BRAKE SYSTEM THREE (3) YEAR MATERIAL AND WORKMANSHIP WARRANTY**
A Meritor Wabco™ ABS brake system **three (3) year** limited warranty shall be provided.

**TEN (10) YEAR STRUCTURAL INTEGRITY**
The new cab shall be provided with a **ten (10) year** material and workmanship limited warranty. The warranty shall cover such portions of the cab built by the manufacturer as being free from structural failures caused by defects in material and workmanship that would arise under normal use and service.

A copy of the warranty certificate shall be submitted with the bid package (no exception).

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**TEN (10) YEAR PRO-RATED PAINT AND CORROSION**
Each new piece of apparatus shall be provided with a **ten (10) year** pro-rated paint and corrosion limited warranty on the apparatus cab. The warranty shall cover painted exterior surfaces of the body to be free from blistering, peeling, corrosion, or any other adhesion defect caused by defective manufacturing methods or paint material selection that would arise under normal use and service.

A copy of the warranty certificate shall be submitted with the bid package (no exception).

**FIVE (5) YEAR MATERIAL AND WORKMANSHIP**
The electronic modules and display(s) shall be provided with a five (5) year material and workmanship limited warranty. The warranty shall cover electronic modules to be free from failures caused by defects in material and workmanship.

A copy of the warranty certificate shall be submitted with the bid package (no exception).

**CAMERA SYSTEM WARRANTY**
A fifty four (54) month warranty shall be provided for the camera system**.**

**COMPARTMENT LIGHT WARRANTY**
A ten (10) year material and workmanship limited warranty shall be provided for the Pierce 12 volt DC LED strip lights**.** The warranty shall cover the LED strip lights to be free from defects in material and workmanship that would arise under normal use.

A copy of the warranty certificate shall be submitted with the bid package (no exception).

**TRANSMISSION WARRANTY**
The transmission shall have a **five (5) year/unlimited mileage** warranty covering 100 percent parts and labor. The warranty is to be provided by Allison Transmission and not the apparatus builder.

**TRANSMISSION COOLER WARRANTY**
The transmission cooler shall carry a five (5) year parts and labor warranty (exclusive to the transmission cooler). In addition, a collateral damage warranty shall also be in effect for the first three (3) years of the warranty coverage and shall not exceed $10,000 per occurrence. A copy of the warranty certificate shall be submitted with the bid package.

**WATER TANK WARRANTY**
The UPF poly water tank shall be provided with a lifetime material and workmanship limited warranty.

A copy of the warranty certificate shall be submitted with the bid package (no exception).

**TEN (10) YEAR STRUCTURAL INTEGRITY**
Each new piece of apparatus shall be provided with a **ten (10) year** material and workmanship limited warranty on the apparatus body. The warranty shall cover such portions of the apparatus built by the manufacturer as being free from defects in material and workmanship that would arise under normal use and service.

A copy of the warranty certificate shall be submitted with the bid package (no exception).

**PUMP WARRANTY**
The Waterous pump shall be provided with a seven (7) year material and workmanship limited warranty.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

A copy of the warranty certificate shall be submitted with the bid package (no exception).

**TEN (10) YEAR PUMP PLUMBING WARRANTY**
The stainless steel plumbing components and ancillary brass fittings used in the construction of the water/foam plumbing system shall be warranted for a period of **ten (10) years or 100,000 miles**. This covers structural failures caused by defective design or workmanship, or perforation caused by corrosion, provided the apparatus is used in a normal and reasonable manner. This warranty is extended only to the original purchaser for a period of ten years from the date of delivery.

A copy of the warranty certificate shall be submitted with the bid package (no exception).

**TWENTY (20) YEAR AERIAL DEVICE STRUCTURAL INTEGRITY WARRANTY**
The aerial device shall be provided with a twenty (20) year material and workmanship limited warranty. The warranty shall cover such portions of the apparatus built by the manufacturer as being free from defects in material and workmanship that would arise under normal use and service. This warranty shall be limited to the torque box, turntable, aerial sections and other structural components.

A copy of the warranty certificate shall be submitted with the bid package (no exception).

**AERIAL SWIVEL WARRANTY**
An Amity five (5) year limited swivel warranty shall be provided. A copy of the warranty certificate shall be submitted with the bid package (no exception).

**HYDRAULIC SYSTEM COMPONENTS WARRANTY**
Aerial hydraulic system components shall be provided with a five (5) year material and workmanship limited warranty.

**HYDRAULIC SEAL WARRANTY**
Aerial hydraulic seals shall be provided with a three (3) year material and workmanship limited warranty.

A copy of the warranty certificates shall be submitted with the bid package (no exception).

**AERIAL WATERWAY WARRANTY**
An Amity ten (10) year limited waterway warranty shall be provided. A copy of the warranty certificate shall be submitted with the bid package (no exception).

**FOUR (4) YEAR PRO-RATED PAINT AND CORROSION**
The aerial device shall be provided with a four (4) year pro-rated paint and corrosion limited warranty. The warranty shall cover exterior painted surfaces of the aerial device to be free from blistering, peeling, corrosion, or any other adhesion defect caused by defective manufacturing methods or paint material selection that would arise under normal use and service.

A copy of the warranty certificate shall be submitted with the bid package (no exception).

**TWO (2) YEAR GENERATOR MATERIAL AND WORKMANSHIP WARRANTY**
A Harrison Hydra-Gen generator two (2) year limited warranty shall be provided.

**TEN (10) YEAR PRO-RATED PAINT AND CORROSION**
Each new piece of apparatus shall be provided with a **ten (10) year** pro-rated paint and corrosion limited warranty on the apparatus body. The warranty shall cover painted exterior surfaces of the body to be free

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

from blistering, peeling, corrosion, or any other adhesion defect caused by defective manufacturing methods or paint material selection that would arise under normal use and service.

A copy of the warranty certificate shall be submitted with the bid package (no exception).

**THREE (3) YEAR MATERIAL AND WORKMANSHIP**

The gold leaf lamination shall be provided with a **three (3) year** material and workmanship limited warranty. The warranty shall cover the gold leaf lamination as being free from defects in material and workmanship that would arise under normal use and service.

A copy of the warranty certificate shall be submitted with the bid package (no exception).

**VEHICLE STABILITY CERTIFICATION**

The fire apparatus manufacturer shall provide a certification stating the apparatus complies with NFPA 1900, current edition, section 7.14, Vehicle Stability. The certification shall be provided at the time of bid.

**ENGINE INSTALLATION CERTIFICATION**

The fire apparatus manufacturer shall provide a certification, along with a letter from the engine manufacturer stating they approve of the engine installation in the bidder's chassis. The certification shall be provided at the time of delivery.

**POWER STEERING CERTIFICATION**

The fire apparatus manufacturer shall provide a certification stating the power steering system as installed meets the requirements of the component supplier. The certification shall be provided at the time of bid.

**CAB INTEGRITY CERTIFICATION**

The fire apparatus manufacturer shall provide a cab crash test certification with this proposal. The certification shall state that a specimen representing the substantial structural configuration of the cab has been tested and certified by an independent third party test facility. Testing events shall be documented with photographs, real-time and high-speed video, vehicle accelerometers, cart accelerometers, and a laser speed trap. The fire apparatus manufacturer shall provide a state licensed professional engineer to witness and certify all testing events. Testing shall meet or exceed the requirements below:

- SAE J2422 Cab Roof Strength Evaluation - Quasi-Static Loading Heavy Trucks.
- European Occupant Protection Standard ECE Regulation No.29.
- SAE J2420 COE Frontal Strength Evaluation - Dynamic Loading Heavy Trucks.

**Side Impact**

The cab shall be subjected to dynamic preload where a 14,320-lb moving barrier is slammed into the side of the cab at 5.50 mph, striking with an impact of 13,000 ft-lb of force. This test is part of the SAE J2422 test procedure and more closely represents the forces a cab shall see in a rollover incident.

**Frontal Impact**

The same cab shall withstand a frontal impact of 32,600 ft-lb of force using a moving barrier in accordance with SAE J2420.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**Additional Frontal Impact**
The same cab shall withstand a frontal impact of 65,098 ft-lb of force using a moving barrier. (Twice the force required by SAE J2420)

**Roof Crush**
The cab shall be subjected to a roof crush force of 22,500 lb. This value meets the ECE 29 criteria, and is equivalent to the front axle rating up to a maximum of ten (10) metric tons.

**Additional Roof Crush**
The same cab shall be subjected to a roof crush force of 110,000 lbs. (Four and a half times the load criteria of ECE 29)

The same cab shall withstand all tests without any measurable intrusion into the survival space of the occupant area.

There shall be no exception to any portion of the cab integrity certification. Nonconformance shall lead to immediate rejection of bid.

**CAB DOOR DURABILITY CERTIFICATION**
Robust cab doors help protect occupants. Cab doors shall survive a 200,000 cycle door slam test where the slamming force exceeds 20 G's of deceleration. The bidder shall certify that the sample doors similar to those provided on the apparatus have been tested and have met these criteria without structural damage, latch malfunction, or significant component wear.

**WINDSHIELD WIPER DURABILITY CERTIFICATION**
Visibility during inclement weather is essential to safe apparatus performance. Windshield wipers shall survive a 3 million cycle durability test in accordance with section 6.2 of SAE J198 *Windshield Wiper Systems - Trucks, Buses and Multipurpose Vehicles.* The bidder shall certify that the wiper system design has been tested and that the wiper system has met these criteria.

**ELECTRIC WINDOW DURABILITY CERTIFICATION**
Cab window roll-up systems can cause maintenance problems if not designed for long service life. The window regulator design shall complete 30,000 complete up-down cycles and still function normally when finished. The bidder shall certify that sample doors and windows similar to those provided on the apparatus have been tested and have met these criteria without malfunction or significant component wear.

**SEAT BELT ANCHOR STRENGTH**
Seat belt attachment strength is regulated by Federal Motor Vehicle Safety Standards and should be validated through testing. Each seat belt anchor design shall withstand 3000 lb of pull on both the lap and shoulder belt in accordance with FMVSS 571.210 Seat Belt Assembly Anchorages. The bidder shall certify that each anchor design was pull tested to the required force and met the appropriate criteria.

**SEAT MOUNTING STRENGTH**
Seat attachment strength is regulated by Federal Motor Vehicle Safety Standards and should be validated through testing. Each seat mounting design shall be tested to withstand 20 G's of force in accordance with FMVSS 571.207 Seating Systems. The bidder shall certify, at time of delivery, that each seat mount and cab structure design was pull tested to the required force and met the appropriate criteria.

| | Bidder Complies | |
|---|---|---|
| | Yes | No |

**PERFORMANCE CERTIFICATIONS**

**Cab Air Conditioning**
Good cab air conditioning temperature and air flow performance keeps occupants comfortable, reduces humidity, and provides a climate for recuperation while at the scene. The cab air conditioning system shall cool the cab from a heat-soaked condition at 100 degrees Fahrenheit to an average of 78 degrees Fahrenheit in 30 minutes. The bidder shall certify that a substantially similar cab has been tested and has met these criteria.

**Cab Defroster**
Visibility during inclement weather is essential to safe apparatus performance. The defroster system shall clear the required windshield zones in accordance with SAE J381 Windshield Defrosting Systems Test Procedure And Performance Requirements - Trucks, Buses, And Multipurpose Vehicles. The bidder shall certify that the defrost system design has been tested in a cold chamber and passes the SAE J381 criteria.

**Cab Auxiliary Heater**
Good cab heat performance and regulation provides a more effective working environment for personnel, whether in-transit, or at a scene. An auxiliary cab heater shall warm the cab 77 degrees Fahrenheit from a cold-soak, within 30 minutes when tested using the coolant supply methods found in SAE J381. The bidder shall certify, at time of delivery, that a substantially similar cab has been tested and has met these criteria.

**AMP DRAW REPORT**
The bidder shall provide, at the time of bid and delivery, an itemized print out of the expected amp draw of the entire vehicle's electrical system.

The manufacturer of the apparatus shall provide the following:

- Documentation of the electrical system performance tests.
- A written load analysis, which shall include the following:
  - The nameplate rating of the alternator.
  - The alternator rating under the conditions specified per:
    - Current edition of applicable NFPA standards.
  - The minimum continuous load of each component that is specified per:
    - Current edition of applicable NFPA standards.
  - Additional loads that, when added to the minimum continuous load, determine the total connected load.
  - Each individual intermittent load.

All of the above listed items shall be provided by the bidder per the current edition of applicable NFPA standards.