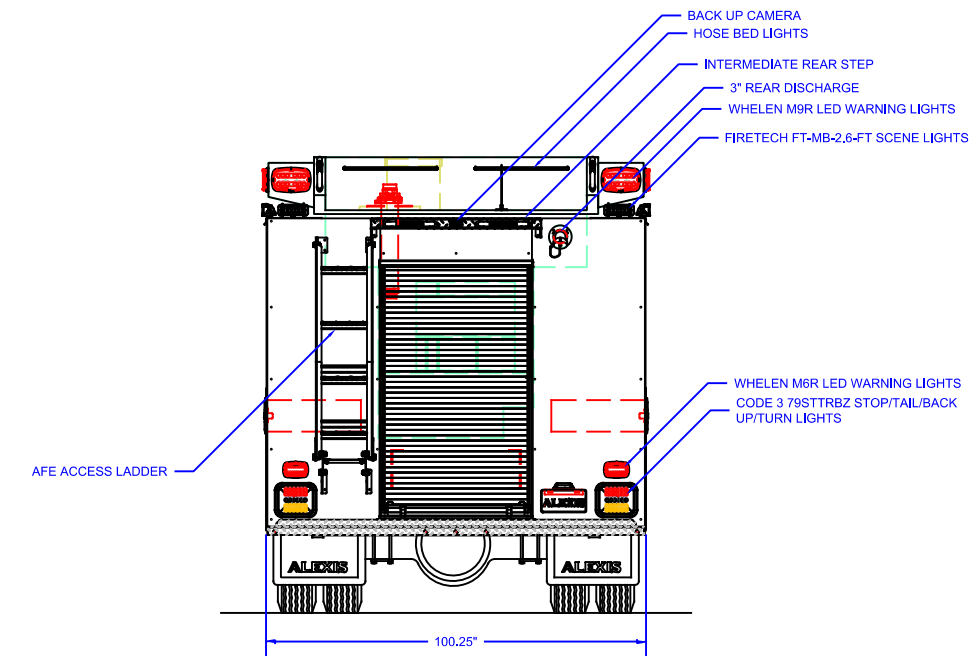
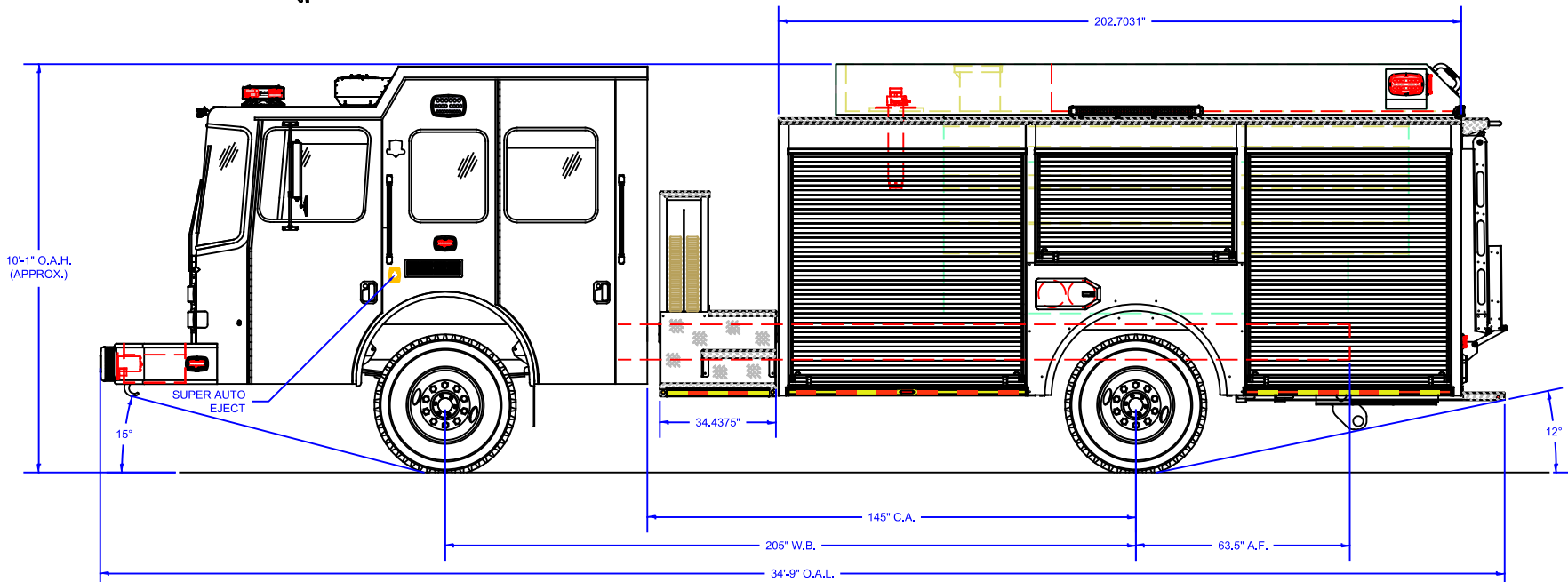
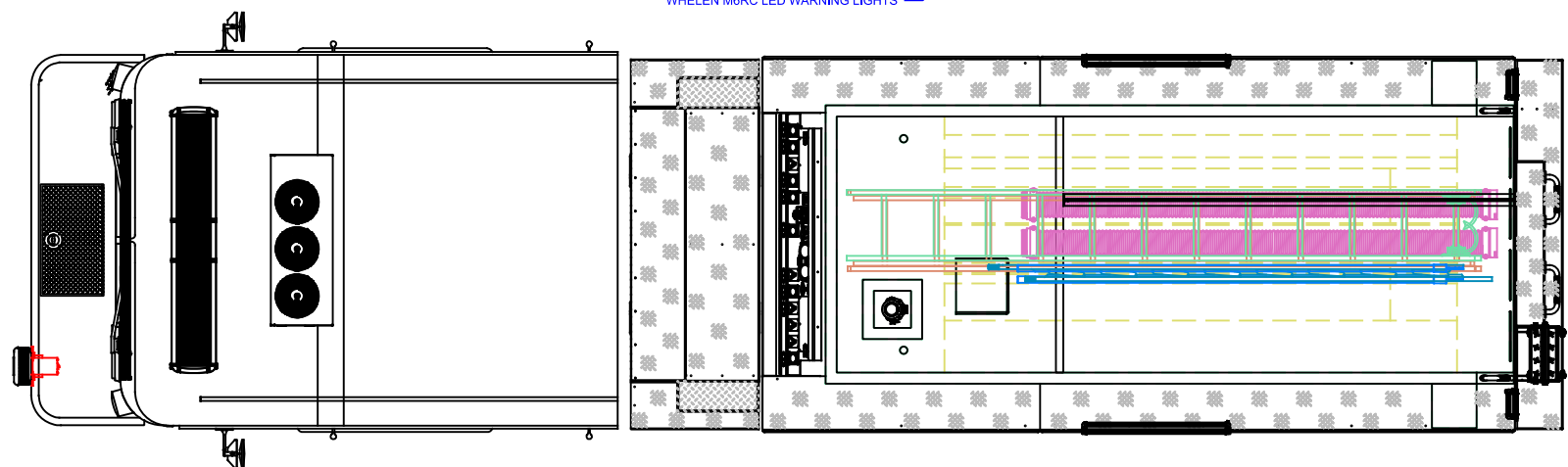
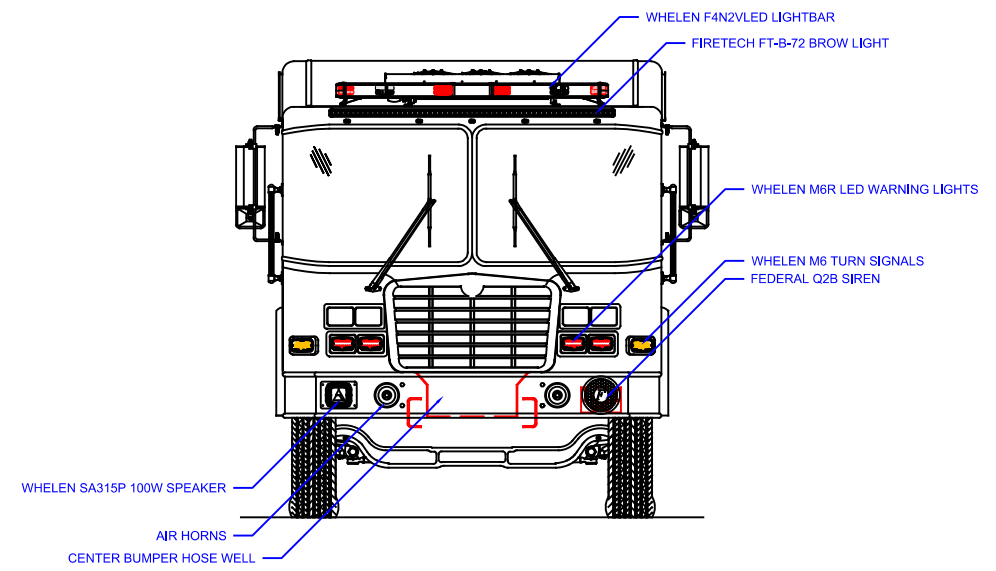
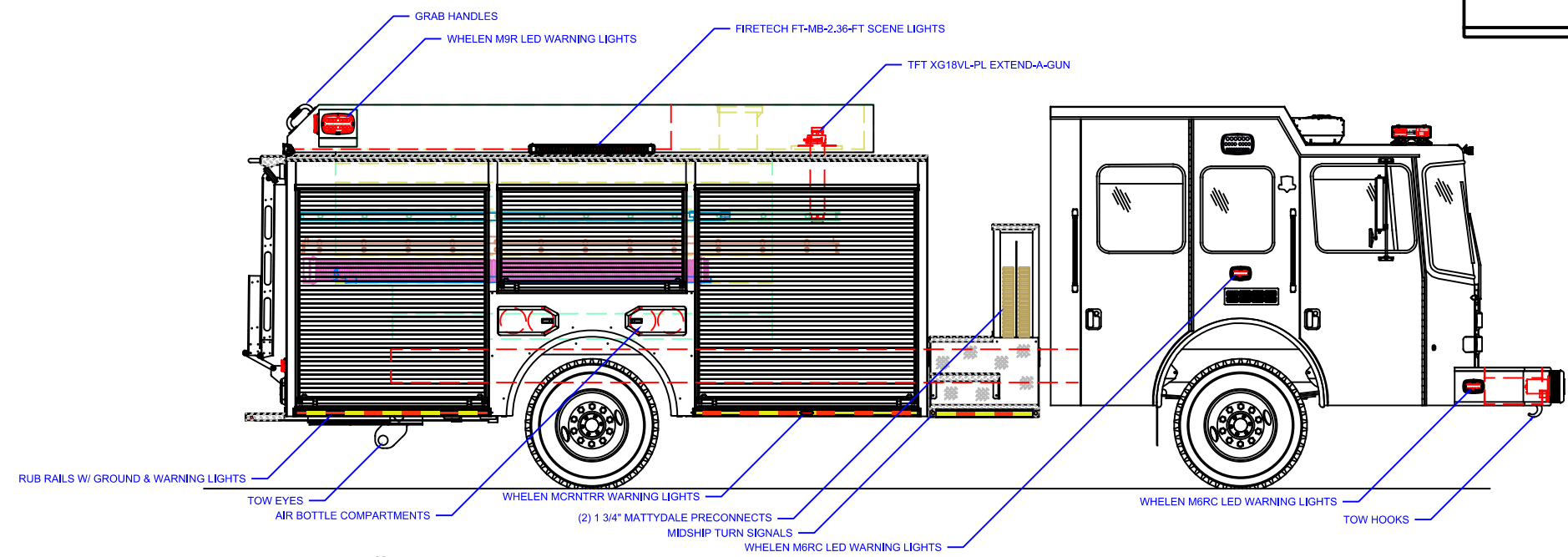


CUSTOMER APPROVAL SIGNATURE:

DATE:

AFE-2565

IN THE EVENT THERE ARE DISCREPANCIES BETWEEN THE DRAWING AND THE SPECIFICATIONS, THE SPECIFICATIONS SHALL PREVAIL.



REVISION HISTORY				
REV	DESCRIPTION	DATE	DWN	
01	CHASSIS CHANGE	11/17/23	CMS	

<b>Pump Info:</b>		Apparatus Type: <b>Pumper</b>
Control Location: <b>Top</b>	Pump Drive: <b>Split Shaft</b>	Chassis: <b>HME 1871-W MFD</b>
Pump Make: <b>Hale</b>	Pump Model: <b>DSD</b>	Tank Capacity: <b>1000</b>
Pump RPM: <b>1500</b>		Material: <b>Aluminum</b>

COMPARTMENT DIMENSIONS	
COMP #	DOOR OPENING SIZES
L1 & R1	68" WIDE X 63" HIGH X 25" DEEP
L2 & R2	57" WIDE X 27" HIGH X 25" DEEP
L3 & R3	58" WIDE X 63" HIGH X 25" DEEP
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 DECIMAL ±0.062 ANGULAR ±0.5°  
 FRACTIONAL ±1/16 METRIC ±1.6 mm

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DRAWN: M. TINKHAM  
 DATE: 11/2/23  
 MATERIAL: 2

**ALEXIS** FIRE EQUIPMENT CO.  
 P.O. BOX 549, ALEXIS, ILLINOIS 61412

**EQUALIZER**  
 ALEXIS FIRE EQUIPMENT  
 ALEXIS, IL

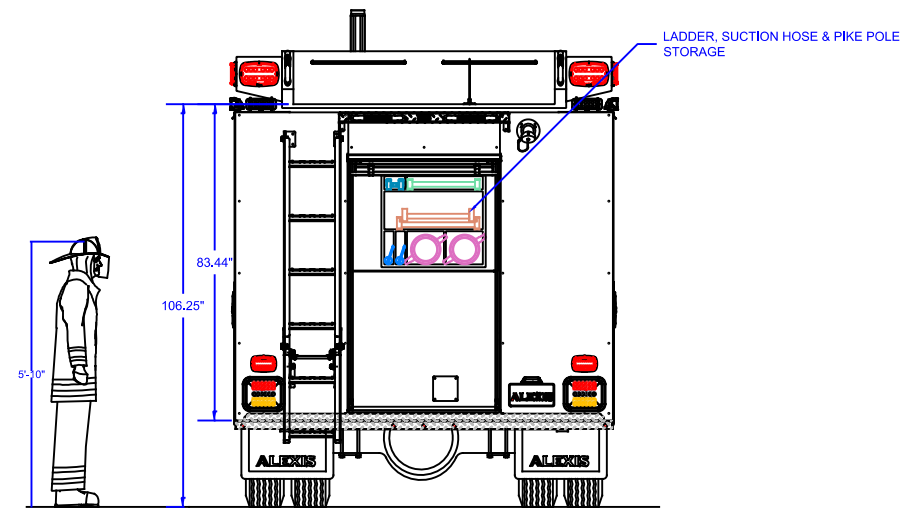
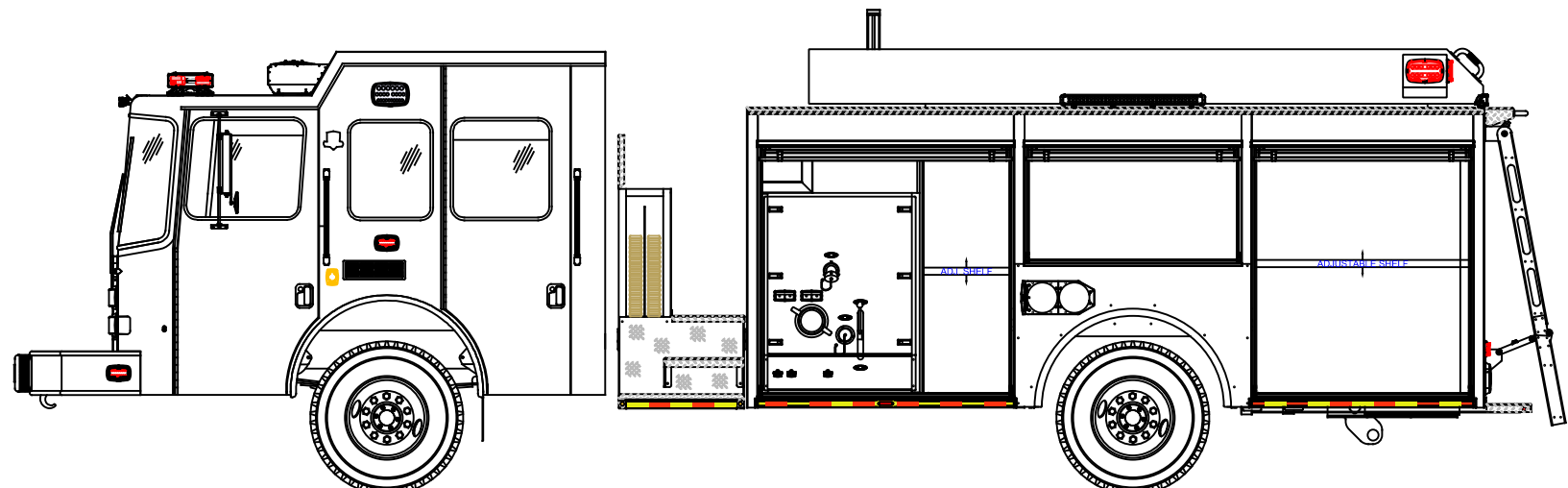
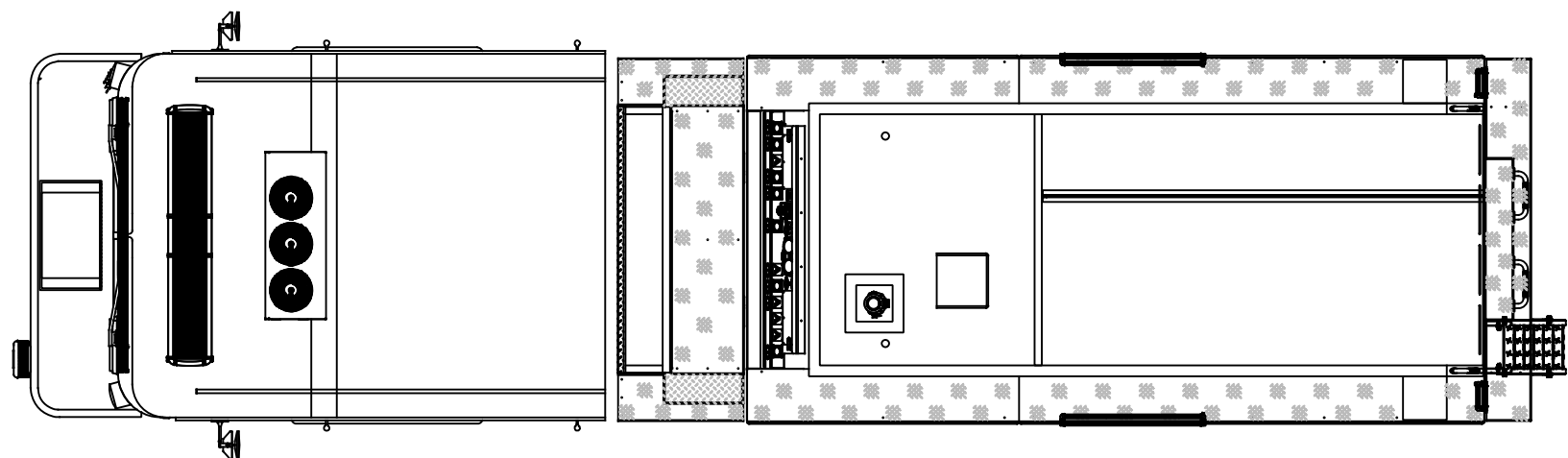
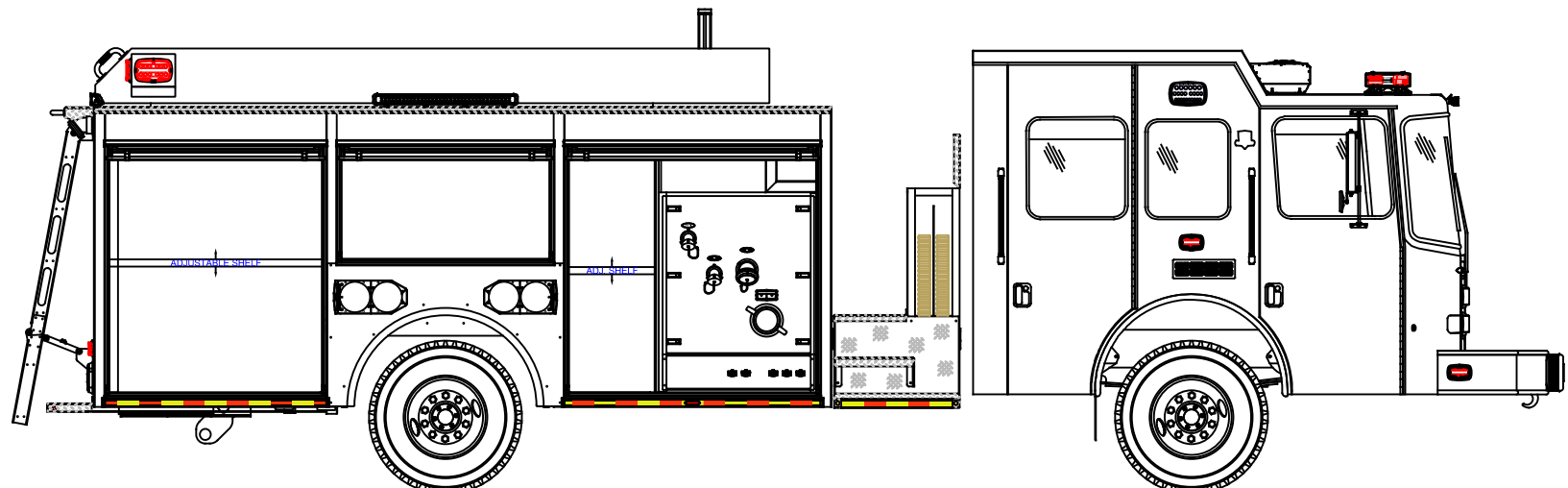
SIZE: D SCALE: 1/2" = 1'  
 DWG NO: EQ-B89  
 CONTRACT #: 2565 SHEET 1 OF 2

CUSTOMER APPROVAL SIGNATURE:

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**ALEXIS** FIRE EQUIPMENT CO.  
P.O. BOX 549, ALEXIS, ILLINOIS 61412

**EQUALIZER**  
ALEXIS FIRE EQUIPMENT  
ALEXIS, IL

SIZE: D SCALE: 1/2" = 1' DWG NO: EQ-B89

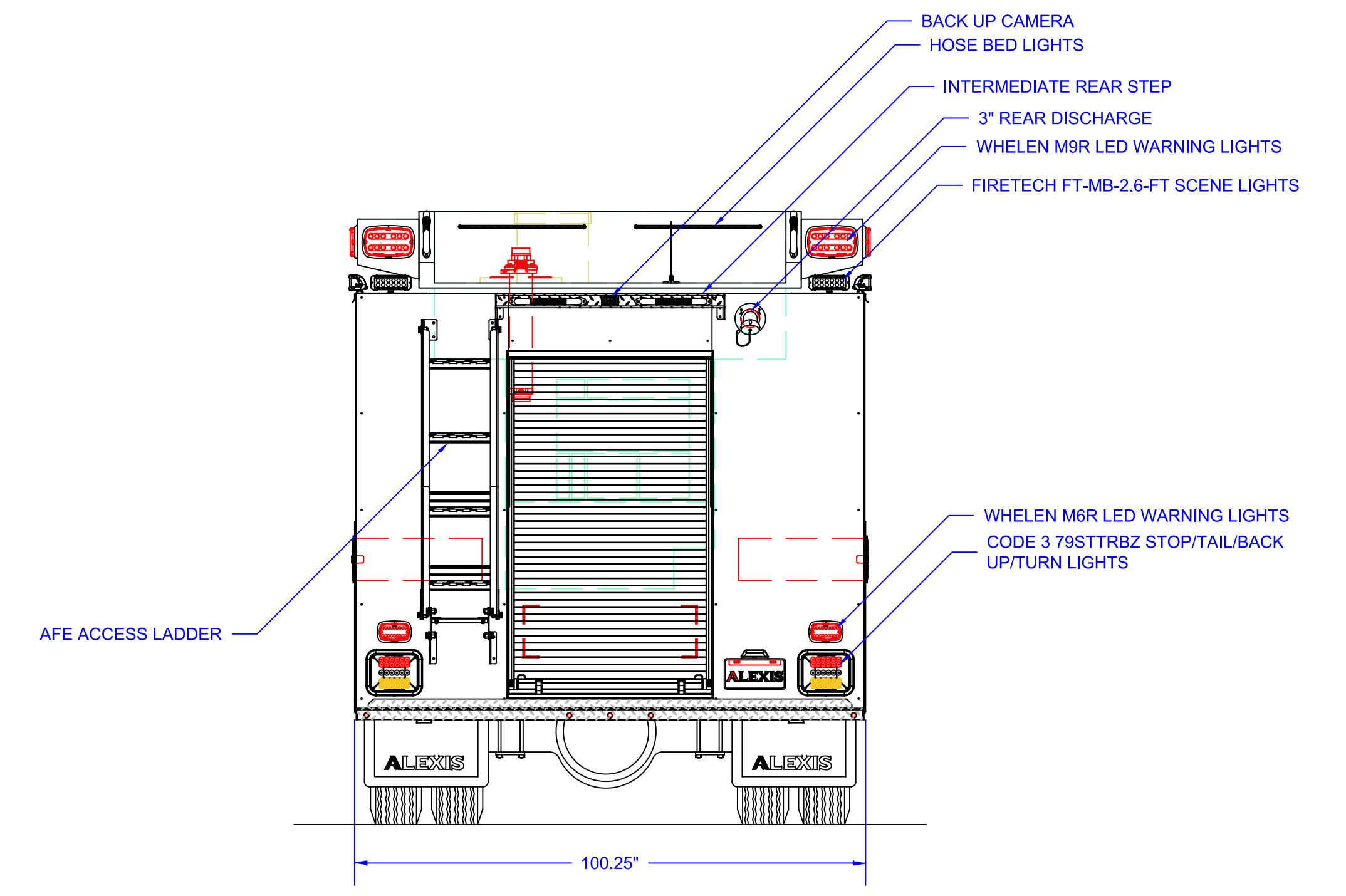
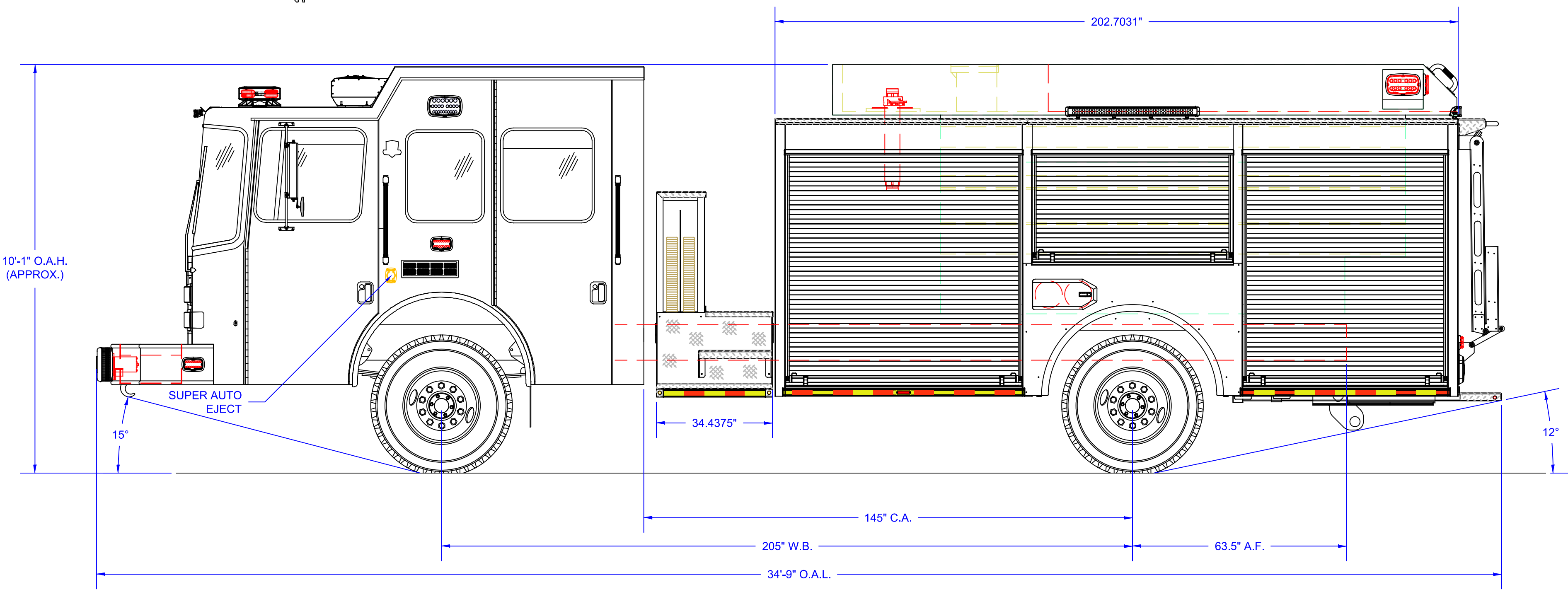
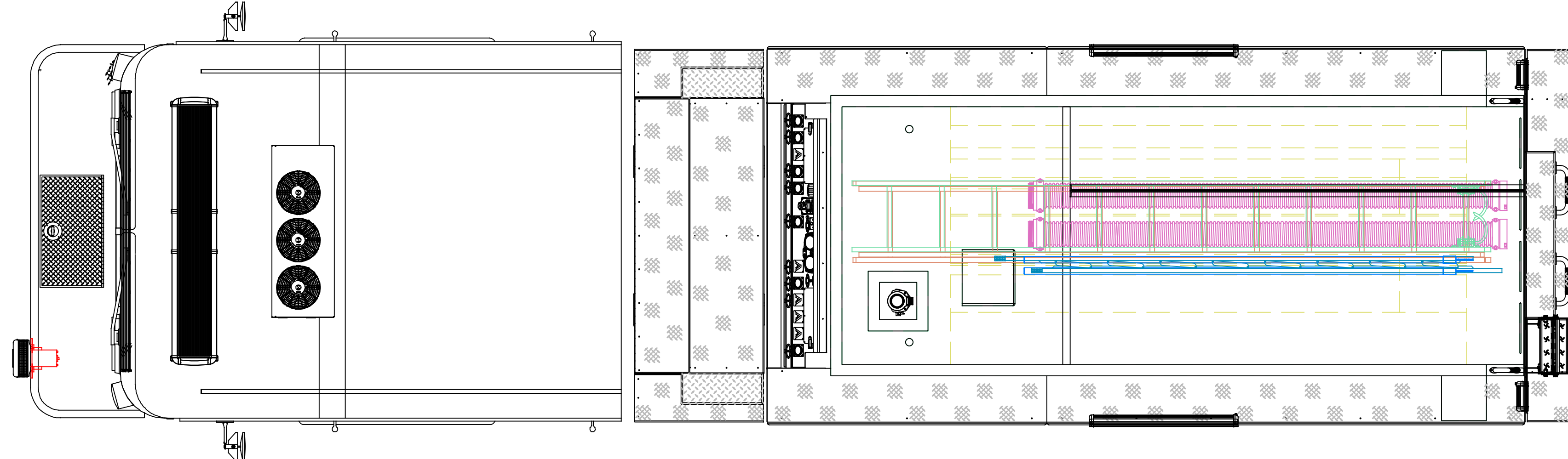
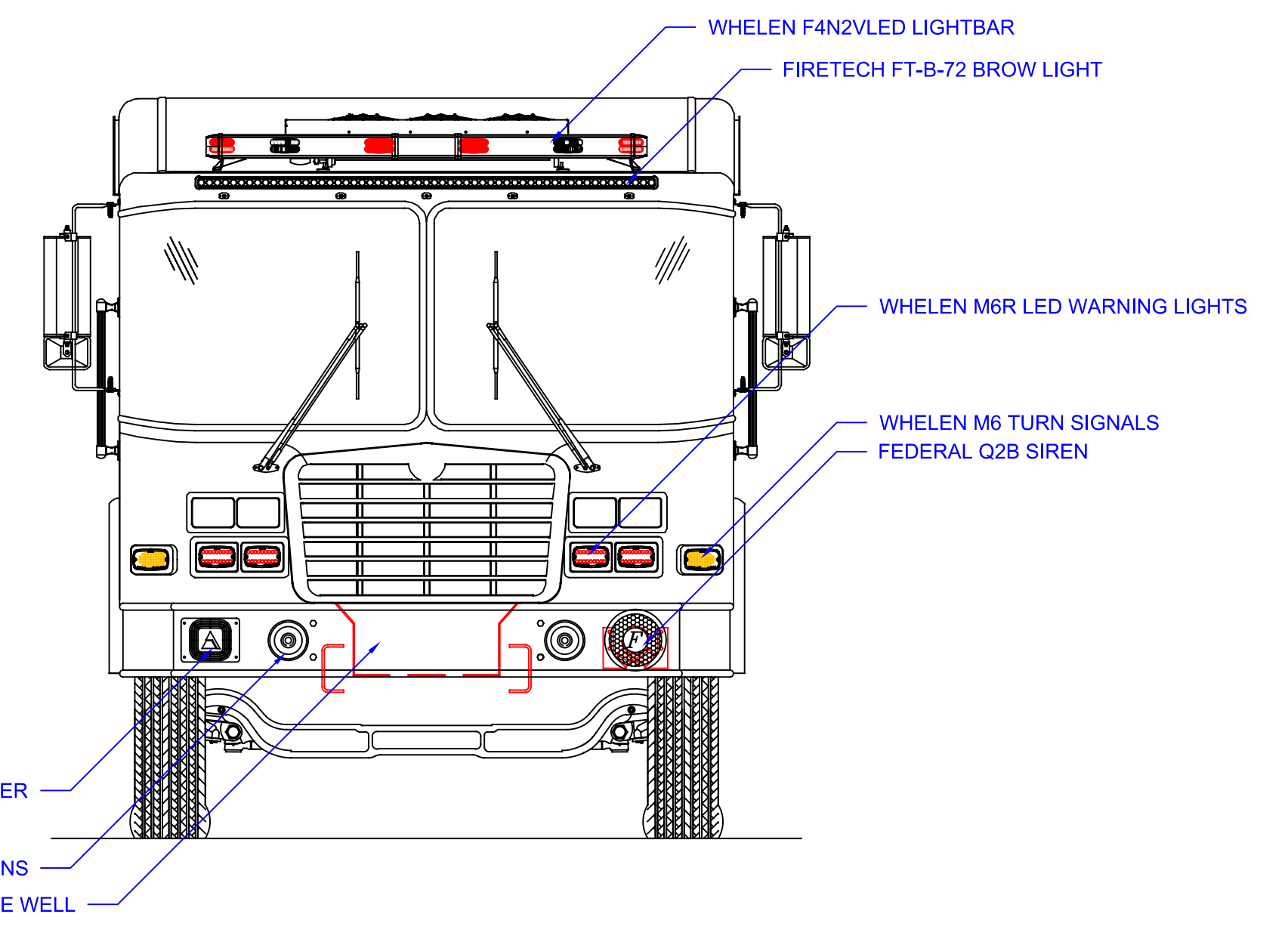
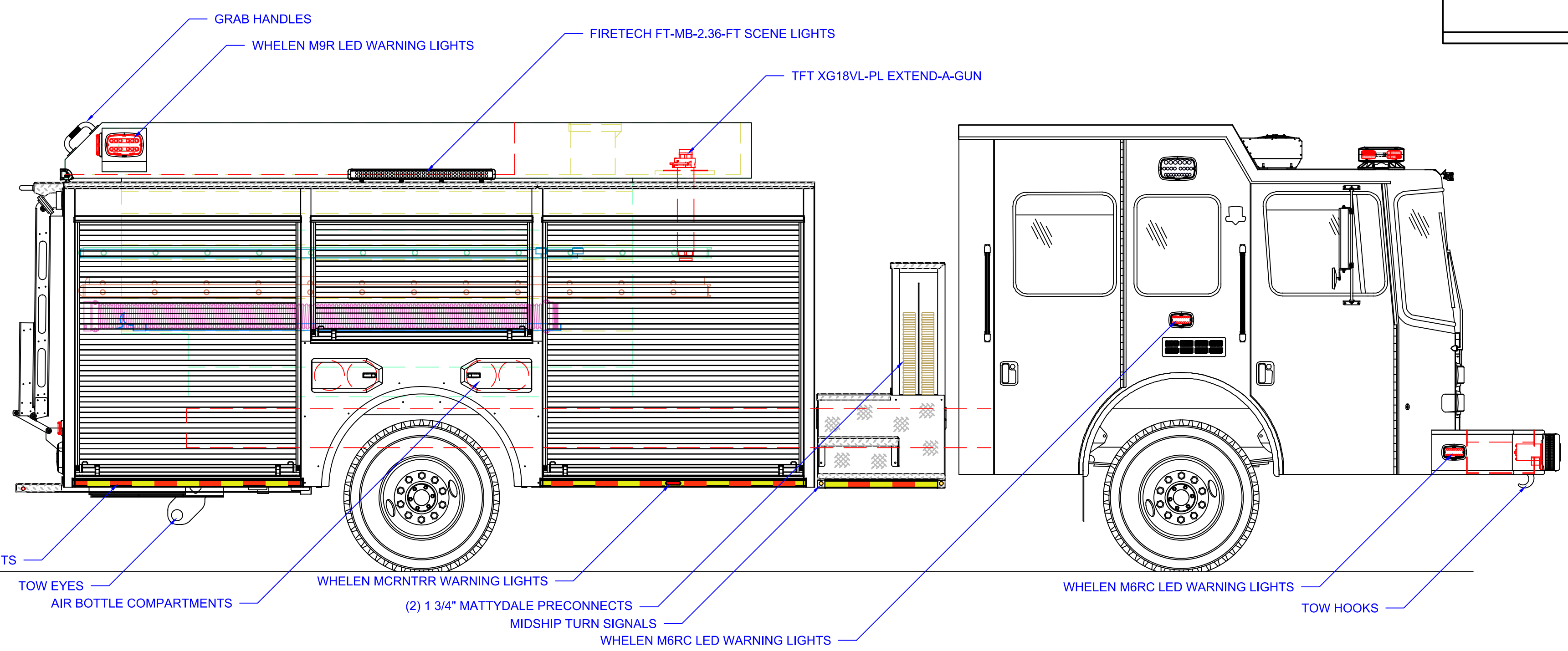
CONTRACT # 2565 SHEET 2 OF 2

CUSTOMER APPROVAL SIGNATURE:

DATE:

AFE-2565

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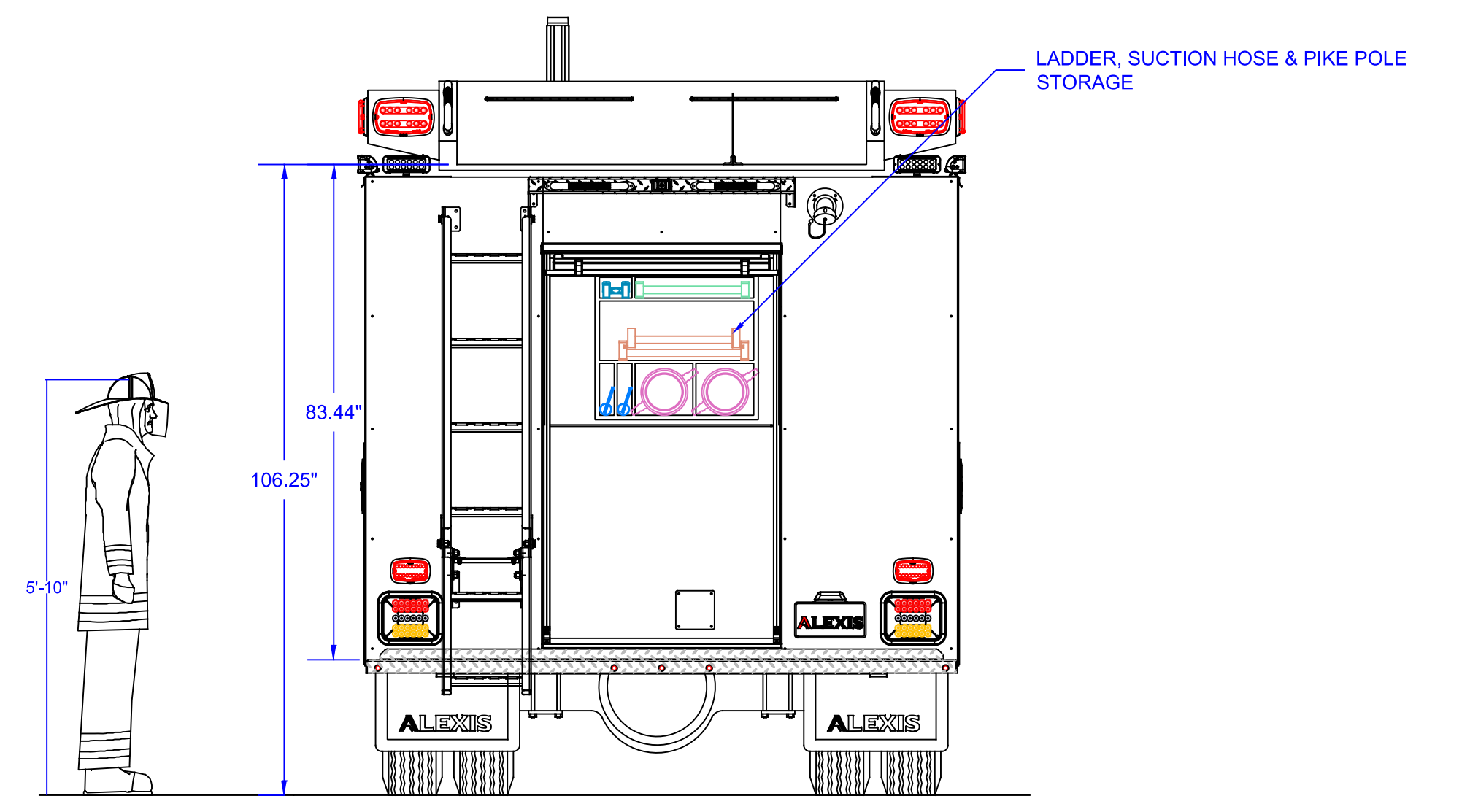
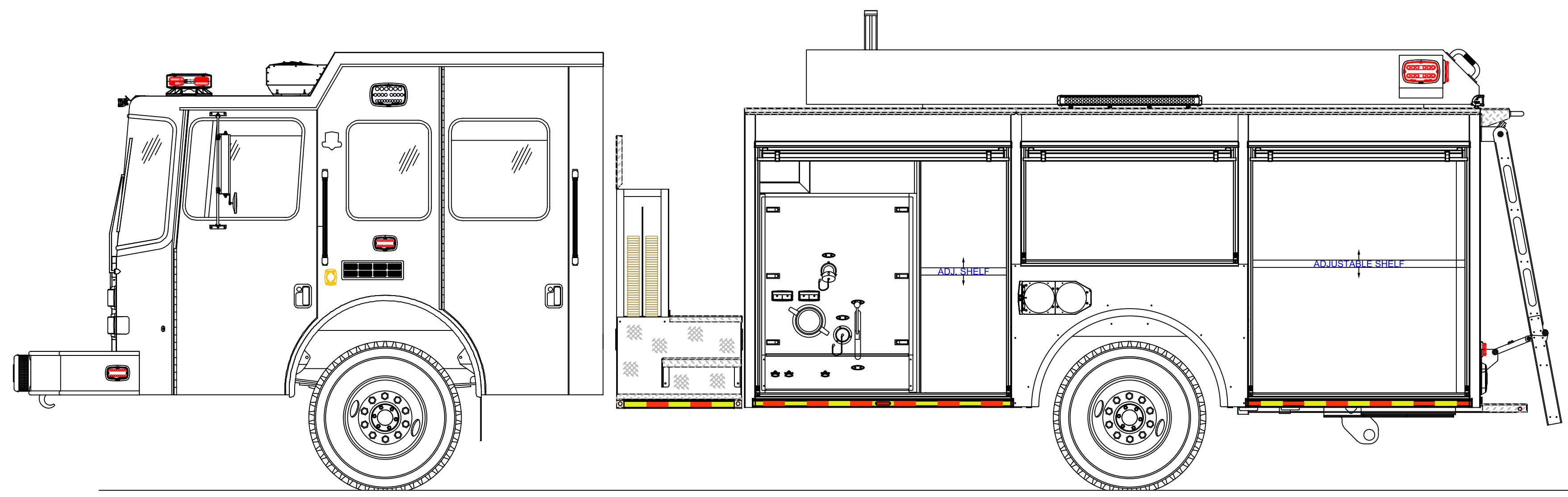
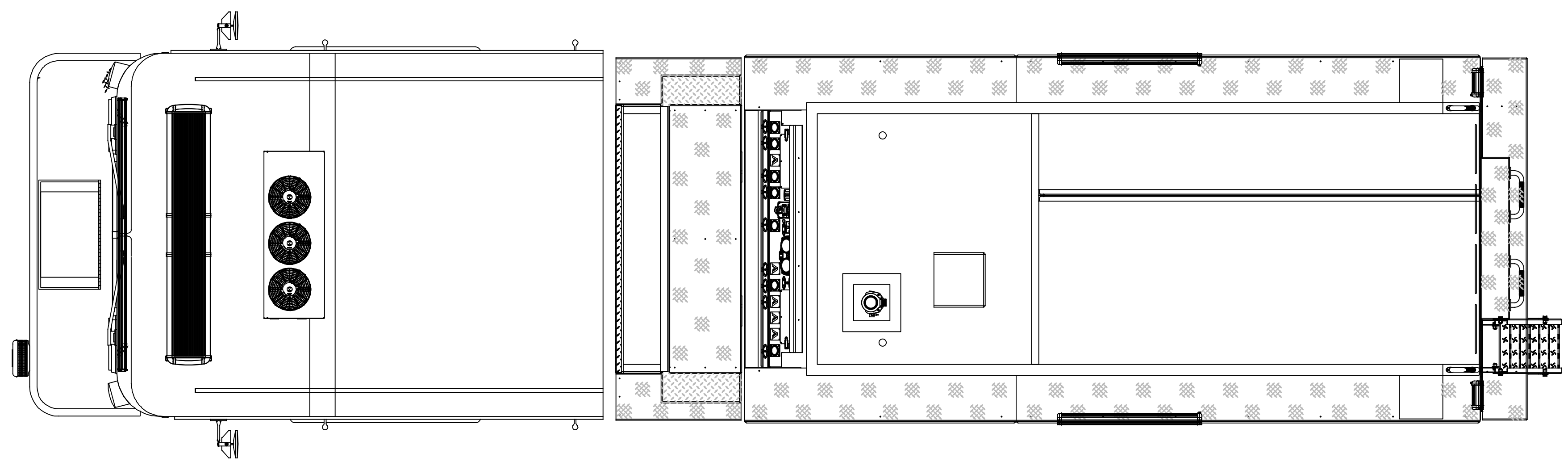
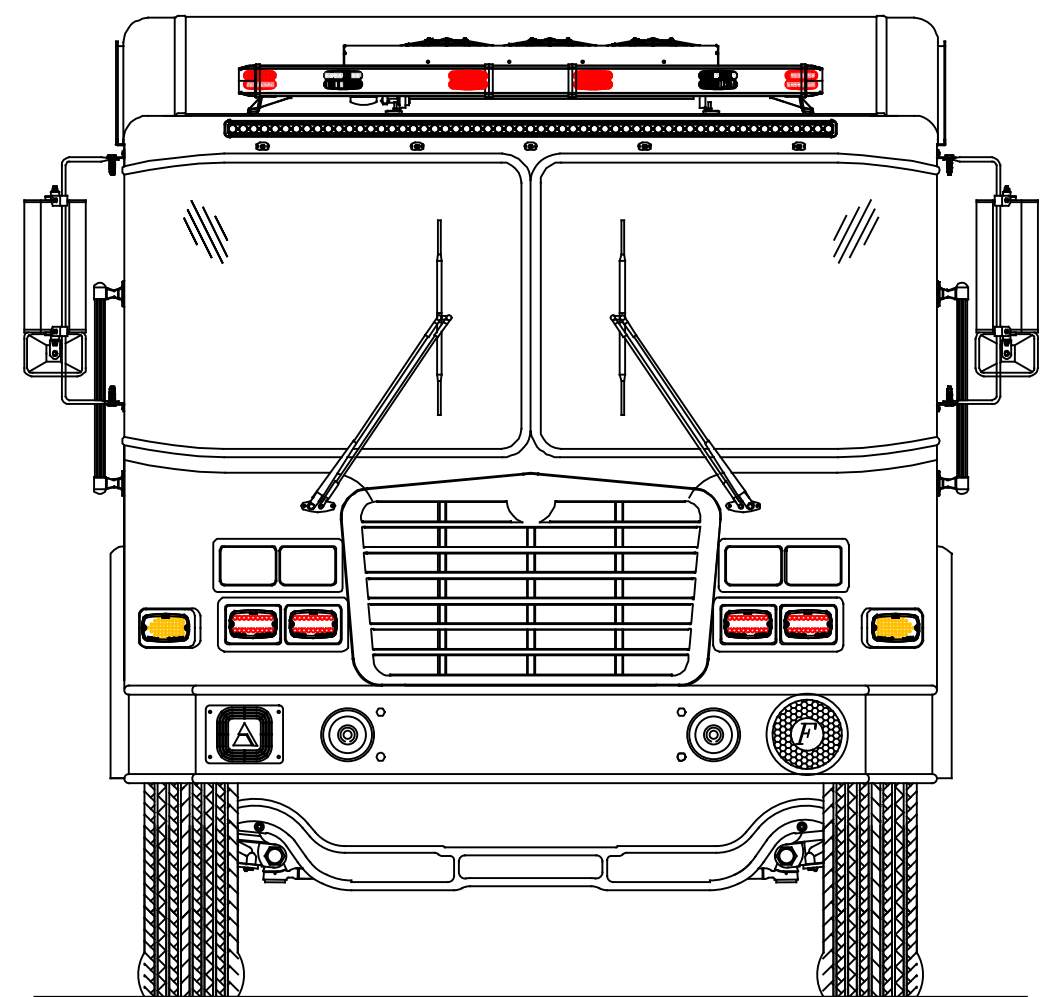
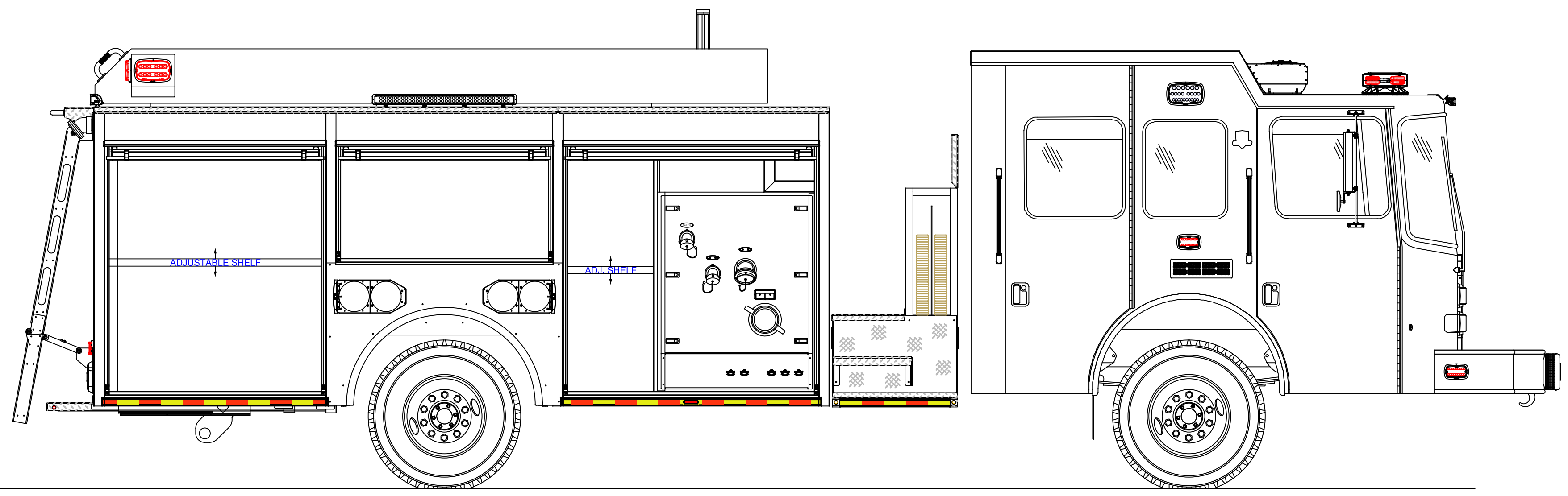
**EQUALIZER**  
 ALEXIS FIRE EQUIPMENT  
 ALEXIS, IL

SIZE: D SCALE: 1/2" = 1' DWG NO: EQ-B89  
 CONTRACT #: 2565 SHEET 1 OF 2

CUSTOMER APPROVAL SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

DATE: \_\_\_\_\_

**AFE-2565**  
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DRAWN: M. TINKHAM 11/2/23  
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**ALEXIS** FIRE EQUIPMENT CO.  
 P.O. BOX 549, ALEXIS, ILLINOIS 61412

**EQUALIZER**  
 ALEXIS FIRE EQUIPMENT  
 ALEXIS, IL

SIZE: D SCALE: 1/2" = 1' DWG NO: EQ-B89  
 CONTRACT #: 2565 SHEET 2 OF 2



 Alexis Fire Equipment  
 109 East Broadway / Alexis, IL 61412  
 800-322-2284  sales@alexisfire.com  
 AlexisFire.com

Alexis Fire Equipment Company  
Alexis, IL

We hereby propose to furnish, after your acceptance, approval, and proper execution of the accompanying contract, the fire apparatus as follows:

One (1) Alexis Demo #2565 Top Mount Equalizer

As per specifications attached herewith.

TOTAL APPARATUS.....\$ \*

\* Does not include any applicable taxes. Any local or state tax, if applicable, must be added to the above price.

Shipment of completed apparatus shall be made within 550 calendar days after our approval of properly signed contract, subject to causes beyond our control. This proposal is made subject to your acceptance within thirty (30) days from date of same. If acceptance is delayed beyond that period, we will, upon request, advise you of any increase in said amount which may be occasioned by causes beyond our control.

Respectfully submitted,  
ALEXIS FIRE EQUIPMENT COMPANY

By: \_\_\_\_\_

"QUALITY HAS NO SUBSTITUTE"



 Alexis Fire Equipment  
109 East Broadway / Alexis, IL 61412  
 800-322-2284  sales@alexisfire.com  
 AlexisFire.com

## PAYMENT TERMS

The chassis payment shall be made within ten (10) days of invoicing.

A progress payment of \$ \_\_\_\_ shall be made within ten (10) days of invoicing, upon the initial construction of the apparatus body. The \_\_\_\_ Fire Department may **DEDUCT \$ \_\_\_\_** from the front page price for this payment.

The balance of the contract plus any contract alterations shall be payable upon the delivery of the finished unit.

Upon payment, the Alexis Fire Equipment Company shall furnish the purchaser a "Statement of Origin" or the necessary validated documents required for title application.

*Additional payment terms available upon request.*



 Alexis Fire Equipment  
109 East Broadway / Alexis, IL 61412  
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### **ISO 9001:**

Alexis Fire Equipment Company operates 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.



Alexis Fire Equipment  
109 East Broadway / Alexis, IL 61412  
800-322-2284 sales@alexisfire.com  
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## SERVICE CENTER:

The Alexis Priority-One service team is staffed with factory trained mechanics ready to meet your service requirements. Our staff is continually working on maintaining updated EVT and ASE certification.

The Alexis Service Team is available 24 hours a day, 7 days a week for your service emergencies. We use the latest paging system for fast, efficient and reliable service.

Our service facility covers an area of approximately 14,000 square feet.

The Alexis Service Team can assist you in fire apparatus service, ambulance service, aerial device maintenance, generator and rescue tool maintenance and service, and air pack inspections. Our staff can provide our customers with a complete apparatus training program, meeting the latest training requirements.

Alexis is a single source warranty center for the following manufacturers: Spartan Motors, Darley, Hale, and Waterous.

Our service team has over 50 years of cumulative experience in the fire service industry. In addition, they are backed by our fabrication, electrical, and paint and finish departments. This combination of training and hands-on experience offers true reliability and dependability.

Alexis keeps detailed documentation of all repair, maintenance, and inspection performed by our personnel. With time and manpower at such a premium among many fire departments, why not allow the Alexis Service Team to set up and maintain records for your fleet?

The Alexis Service Team is committed to providing prompt and courteous service, quality products and fair pricing.

Business: Alexis Fire Equipment Company  
Location: 109 East Broadway Alexis, IL 61412  
Phone: 800-322-2284





 Alexis Fire Equipment  
109 East Broadway / Alexis, IL 61412  
 800-322-2284  sales@alexisfire.com  
 AlexisFire.com

**DELIVERY:**

The finished apparatus shall be picked up by the dealer organization at the plant site of the Alexis Fire Equipment Company in Alexis, Illinois.

To insure proper break-in of all drive train components while under warranty, the finished apparatus shall be delivered to the purchaser under its own power.

The apparatus shall be covered by comprehensive and liability insurance during the delivery period. The purchaser shall assume the insurance obligation on acceptance, and at that time shall present to the manufacturer's agent a certificate of verification, showing liability, comprehensive and collision insurance coverage.



**GENERAL INFORMATION:**

**LOCATION**

The Alexis Fire Equipment facilities are located at 109 East Broadway, Alexis, Illinois 61412. We maintain a complete stock of parts and services available around-the-clock. We also propose to maintain parts and service for a minimum period of twenty (20) years on all apparatus which is manufactured.

**NOTATION**

To further assure the customer of our ability to manufacture quality fire apparatus, we are proud of the fact that Alexis Fire Equipment Company is family-owned and has been in the fire apparatus business since 1947. All apparatus manufactured by Alexis Fire Equipment are designed and built to meet the requirements of the latest edition of NFPA 1901.

**PERSONNEL CAPACITIES**

To meet the spirit of N.F.P.A. 1500 paragraph 6.3.1, this apparatus has been designed to transport not more than six (6) people.

6.3 Riding in Fire Apparatus

6.3.1 All persons riding in fire apparatus shall be seated and belted securely to the vehicle by seat belts in approved riding positions and at any time the vehicle is in motion. Standing or riding on tailsteps, sidesteps, running boards or in any other exposed position shall be specifically prohibited.

**MAXIMUM TOP SPEED:**

To meet the intent of NFPA 1901 4.15.2, the top speed of the vehicle shall not exceed 68 MPH or the manufacturer's maximum fire service speed rating for the tires installed on the apparatus, whichever is lower.

**INFORMATION TO BE PROVIDED:**

Alexis Fire Equipment Company shall supply, at the time of delivery, the following documents:

- A) The manufacturer's record of apparatus construction details, including the following information:
1. Owner's name and address
  2. Apparatus manufacturer, model, and serial number.
  3. Chassis make, model, and serial number.
  4. GAWR of front and rear axles.
  5. Front tire size and total rated capacity in pounds.
  6. Rear tire size and total rated capacity in pounds.
  7. Chassis weight distribution in pounds with water and manufacturer mounted equipment.
  8. Engine make, model, serial number, number of cylinders, bore, stroke, displacement and compression ratio, rated horsepower and related speed, and no-load governed speed.
  9. Type of fuel and fuel tank capacity.
  10. Electrical system voltage and alternator output in amps.
  11. Battery make and model, capacity in CCA.
  12. Transmission make, model, and type.
  13. Pump to drive through the transmission (yes or no)
  14. Engine to pump gear ratio used
  15. Pump make, model, rated capacity in g.p.m., serial number, number of stages, and impeller diameter in inches.
  16. Pump transmission make, model, and serial number.
  17. Priming device type.
  18. Type of pump pressure control system.
  19. Auxiliary pump make, model, rated capacity in g.p.m., serial number, number of stages, and impeller diameter in inches.
  20. Water tank certified capacity in gallons.
  21. Aerial device type, rated vertical height in feet, rated horizontal reach in feet, and rated capacity in pounds.
  22. Paint numbers
  23. Company name and signature of responsible company executive.
- B) If the apparatus has a fire pump, the pump manufacturer's certification of suction capability.
- C) If the apparatus has a fire pump, a copy of the apparatus manufacturer's approval for stationary pumping applications.
- D) If the apparatus has a fire pump, the engine manufacturer's certified brake horsepower curve for the engine furnished, showing the maximum no-load governed speed.
- E) If the apparatus has a fire pump, the pump manufacturer's certification of hydrostatic test.
- F) If the apparatus has a fire pump, the certification of inspection and test for the fire pump.
- G) If the apparatus has an aerial device, the certification of inspection and test for the aerial device.
- H) If the apparatus has an aerial device, all the technical information required for inspections to comply with NFPA.



- I) Weight documents from a certified scale - showing actual loading on the front axle, rear axle(s), and overall vehicle (with the water tank full but without personnel, equipment, and hose) - shall be supplied with the completed vehicle.
- J) Written load analysis and results of the electrical system performance tests.
- K) If the apparatus is equipped with a water tank, the certification of water tank capacity.
- L) If the apparatus has a fire pump, two (2) copies of the pump operation and maintenance manual.
- M) Two (2) destination effective wiring diagrams.
- N) Copies of electrical and mechanical component manuals for equipment purchased on or with the apparatus.
- O) A sketch of the booster tank indicating all dimensions and baffle locations.
- P) If the apparatus has a pump, one (1) certification of third party test

**WARRANTY:**

Alexis Fire Equipment Co., Inc. warrants each new piece of Ashland Series fire and rescue apparatus to be free from defects in material and workmanship under normal use and service. Our obligation under this warranty is limited to repairing or replacing, as the company may elect, any part or parts thereof which shall be returned to us with transportation charges prepaid, and as to which examination shall disclose to the company's satisfaction to have been defective, provided that such part, or parts shall be returned to us not later than one year after delivery of such vehicle. Such defective part or parts will be repaired or replaced free of charge and without charge for installation to the original purchaser. All water tanks will be warranted as stated herein and may have extended warranty as explained elsewhere in the Alexis Fire Equipment Co. Proposal.

This warranty will not apply:

- 24. To normal maintenance service or adjustments.
- 25. To any vehicle which shall have been repaired or altered outside of our factory, in any way so as, in our judgement, to affect its stability, nor which has been subject to misuse, negligence, or accident, nor to any vehicle made by us which shall have been operated at a speed exceeding the factory rated speed, or loaded beyond the factory rated load capacity.
- 26. To the chassis and associated equipment furnished with chassis, signaling device, generators, batteries or other trade accessories. These are usually warranted separately by their respective manufacturers.
- 27. To work performed by an outside service without prior authorization obtained from Alexis Fire Equipment.



28. To costs incurred from an outside service for non-warranty related items.

This warranty is in lieu of all other warranties, expressed or implied, and all other representations to the original purchaser and all other obligations or liabilities, including liability for incidental or consequential damages on the part of the company. We neither assume or authorize any other person to give or assume any other warranty or liability o the company's behalf unless made or assumed in writing by the company.

**LENGTH AND/OR HEIGHT LIMITATIONS:**

**OVERALL HEIGHT:**

There shall be no overall height restrictions.

**OVERALL LENGTH:**

There shall be no overall length restrictions.

**CHASSIS MODIFICATIONS:**

**MUD FLAPS:**

Each rear fender shall be extended with a black rubber mud flap, thus preventing splash and road debris from damaging the apparatus body.

**WHEEL DRESS HUB AND NUT COVERS:**

The front and rear wheels shall be dressed with polished hub covers and lug nut covers.

**LABELS:**

A permanent plate in the driving compartment shall specify the quantity and type of the following fluids used in the vehicle:

- Engine Oil
- Engine Coolant
- Chassis Transmission Fluid
- Pump Transmission Lubrication Fluid



- Pump Primer Fluid (if applicable)
- Drive Axle(s) Lubrication Fluid
- Air-Conditioning Refrigerant
- Air-Conditioning Lubrication Oil
- Power Steering Fluid
- Cab Tilt Mechanism Fluid
- Transfer Case Fluid
- Equipment Rack Fluid
- CAFS Air Compressor System Lubricant
- Generator System Lubricant
- Front Tire Cold Pressure
- Rear Tire Cold Pressure
- Maximum Tire Speed Ratings

A final manufacturer's certification of the GVWR or GCWR along with a certification of each GAWR, shall be supplied on a label affixed to the vehicle.

A sign that reads "Occupants Must Be Seated and Belted When Apparatus Is in Motion" shall be provided. The sign shall be visible from each seated position.

A label that states the number of personnel the vehicle is designed to carry shall be located in an area visible to the driver.

A sign stating the overall height of the vehicle in feet and inches, the overall length of the vehicle in feet and inches, and the GVWR in tons shall be provided and mounted. The sign shall be visible to the driver of the vehicle while seated.

A label stating "Do Not Wear Helmet While Seated" shall be visible from each seating position.

A label stating "All Equipment Stored in the cab shall be properly secured" shall be visible from each seating position.

A "Do Not Ride" label shall be visible near all stepping and standing surfaces

### **FUEL TANK:**

The chassis shall incorporate a rear fuel tank installed by the chassis manufacturer. The fill and vent shall be installed behind the left rear wheel in a recessed housing with a hinged stainless steel door, Model 101426. The fill shall be labeled with the type of fuel intended.



### **CAB TILT PENDANT CONNECTION:**

The chassis supplied cab tilt connection shall be mounted on the right side of the apparatus. For a pumper, the receptacle shall be located on the discharge panel. For a rescue, the receptacle shall be located in the R1 compartment.

### **AIR LIMITER:**

A limiter valve shall be installed on the chassis air reserve tank, eliminating the use of all air accessories when the chassis air pressure is under 100 psi, thus reserving all available air for braking effort.

### **HELMET STORAGE:**

To meet the intent of NFPA 14.1.8.4.1, the helmet for each occupant shall be stored in an exterior compartment.

### **PUMP AND PIPING:**

#### **MIDSHIP PUMP:**

MANUFACTURER: Hale Fire Pump Co.  
MODEL: DSD150

CAPACITY: 1500 gpm. @ 150 psi.  
SUCTION SIZE: 6" NST

#### **PUMP ASSEMBLY**

The pump shall be of a size and design to mount on the chassis rails of commercial and custom truck chassis, and have the capacity of 1500 gallons per minute (U.S. GPM), NFPA-1901 rated performance.

The entire pump shall be assembled and tested at the pump manufacturer's factory.

The pump shall be driven by a driveline from the truck transmission. The engine shall provide sufficient horsepower and RPM to enable pump to meet and exceed its rated performance.

The entire pump shall be hydrostatically tested to a pressure of 600 psi. The pump shall be fully tested at the pump manufacturer's factory to the performance spots as outlined by the latest NFPA Pamphlet No.



1901. Pump shall be free from objectionable pulsation and vibration.

The pump body and related parts shall be of fine grain alloy cast iron, with a minimum tensile strength of 30,000 psi. (2069 bar.) All metal moving parts in contact with water shall be of high quality bronze or stainless steel. Pump utilizing castings made of lower tensile strength cast iron not acceptable.

Pump body shall be vertically split, on a single plane for easy removal of entire impeller assembly including clearance rings

Pump shaft to be rigidly supported by two bearings for minimum deflection. The bearings shall be heavy-duty, deep groove ball bearings in the gearbox and they shall be splash lubricated.

Pump impeller shall be hard, fine grain bronze of the mixed flow design; accurately machined hand ground and individually balanced. The vanes of the impeller intake eyes shall be hand ground and polished and be of sufficient size and design to provide ample reserve capacity utilizing minimum horsepower.

Impeller clearance rings shall be bronze, easily renewable without replacing impeller or pump volute body.

The pump shaft shall be heat-treated, electric furnace, corrosion resistant stainless steel. Pump shaft must be sealed with double-lip oil seal to keep road dirt and water out of gearbox.

### GEARBOX

Pump gearbox shall be of sufficient size to withstand up to 16,000 lbs. ft. of torque of the engine. The drive unit shall be designed of ample capacity for lubrication reserve and to maintain the proper operating temperature.

The gearbox drive shafts shall be of heat-treated chrome nickel steel and at least 2<sup>3</sup>/<sub>4</sub>" in diameter, on both the input and output drive shafts. They shall withstand the full torque of the engine.

All gears, both drive and pump, shall be of highest quality electric furnace chrome nickel steel. Bores shall be ground to size and teeth integrated and hardened, to give an extremely accurate gear for long life, smooth, quiet running, and higher load carrying capability. An accurately cut spur design shall be provided to eliminate all possible end thrust. (No exceptions.)

The pump ratio shall be selected by the apparatus manufacturer to give maximum performance with the engine and transmission selected.





### **PRIMING PUMP:**

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

The priming pump shall be controlled from the pump operator's panel.

### **DRIVELINES:**

The chassis drivelines shall be modified to accept the pump drivelines. The pumping system drivelines shall be manufactured by the apparatus manufacturer. The drivelines shall be professionally balanced by the apparatus manufacturer to ensure complete system balance.

### **6" SUCTION:**

One (1) 6" NST suction shall be located on each side of the apparatus body. The suctions shall be open and not gated. An inlet screen and a 6" handle cap shall be included.

### **SHORT SUCTION MANIFOLDS:**

The pump manifold on each side of the vehicle shall be equipped with a "short" suction tube to allow the attachment of adapters without excessive overhang.

### **PUMP DRAINS:**

The entire pump and its controls shall be drainable with a master drain piped to the lowest points of the pump and its control piping. The master drain shall be of a threaded design that will seal all drain points without allowing recycle.

### **HALE MECHANICAL SEAL:**

The mechanical seal must be 2" in diameter and shall be spring loaded, maintenance free and self-adjusting. Mechanical seal construction shall be a carbon sealing ring, stainless steel coil spring, Viton rubber cup, and a tungsten carbide seat with Teflon backup seal.

### **AIR PUMP SHIFT:**



The shifting mechanism shall be a heat-treated, hard anodized aluminum power cylinder, with stainless steel shaft. The assembly shall be plumbed utilizing a 3/8" air line for maximum performance. An in-cab control for rapid shift shall be provided that locks in road or pump.

For automatic transmissions, three green warning lights shall be provided to indicate to the operator(s) when the pump has completed the shift from Road to Pump position. Two green lights to be located in the truck driving compartment and one green light on pump operators panel adjacent to the throttle control. For manual transmissions, one green warning light will be provided for the driving compartment. All lights shall have appropriate identification/instruction plates.

### **INTAKE PRESSURE RELIEF VALVE**

One (1) Task Force Tips model #A1860 pressure relief valve shall be provided. The valve shall have an easy to read adjustment range from 90 to 300 PSI with easy to read 90, 125, 150, 200, 250, 300 psi settings and an "OFF" position. Pressure adjustment can be made utilizing a 1/4" hex key, 9/16" socket or 14mm socket. For corrosion resistance the cast aluminum valve shall be hardcoat anodized with a powder coat interior and exterior finish. The valve shall be configured for either a Waterous or Hale pump, and have a 2-1/2" male NH threaded discharge outlet and a "DO NOT CAP" label near discharge outlet. The valve shall meet NFPA 1901 requirements for pump inlet relief valve. The unit shall be covered by a five-year warranty.

### **REQUIRED PUMP TESTING:**

If the fire pump has a rated capacity of 750 gpm or greater capacity, the pump shall be tested after the pump and all its associated piping and equipment have been installed on the apparatus. The tests shall be conducted at the Alexis facility and certified by an EVT Certified pump operator. The certification shall include (at least) the following tests: the pumping test, the pumping engine overload test, the pressure control system test, the priming device tests, and the vacuum test. If the apparatus is equipped with a water tank, the water tank to pump flow test shall be included.

A test plate shall be provided at the pump operator's position that gives the following information: the rated discharges and pressures, the speed of the engine determined by the certification test for each unit, the position of the parallel/series pump as used, and the no-load governed speed of the engine stated by the engine manufacturer on a certified brake horsepower curve. The plate shall be completely stamped with all information at the factory and attached to the vehicle prior to shipping.

### **PUMP CERTIFICATION:**



Upon final apparatus delivery, the original copy of the certificate of inspection by an independent third party shall be furnished.

The pumping system shall be capable of delivering:  
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 MODULE - TOP MOUNT:**

**An incorporated pump module shall be located between the chassis cab and the front of the body.** The pump operator's panel shall be located across the top of the apparatus, and the suction/discharge panels shall be located on the left and right sides of the apparatus.

The top mounted pump operator's panel shall incorporate three (3) E10 Series LED lights, which shall be switched with the pump panel light switch. The discharge panel on each side shall be illuminated with the compartment interior lighting, with one (1) additional compartment light located ahead of the compartment divider on each side.

An automotive rubber seal shall be adhered to the pump panel to reduce vibration that may occur during pump operation or road application. The panel shall be attached to the framing with 3/16" pin, 1" knuckle, continuous stainless steel hinges. The hinges shall be attached with stainless steel fasteners.

The top mount operator's panel shall be hinged for access to the individual gauges and the electrical components. The suction/discharge panels shall have removable panels for pump, valve, and piping access. **Each suction/discharge panel shall be secured with a four (4) latch (approximate) system.**

All pump panel gauges and controls shall be identified with color-coded tags.

### **PUMP CONTROLS:**

The top mount pump panel shall incorporate Innovative Controls Pistol Grip controllers.

### **PUMP OPERATOR'S PANEL:**

The pump operator's panel shall include the following:

### **PRESSURE GOVERNOR and MONITORING DISPLAY**

One (1) Fire Research PumpBoss series PBA401-D00 pressure governor and monitoring display kit shall be installed. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module case shall be waterproof and have dimensions not to exceed 6 3/4" high by 4 5/8". The control knob shall be 2" in diameter with no mechanical stops, have a serrated grip, and a red idle push button in the center. It shall not extend more than 1 3/4" from the front of the control module. Inputs for monitored engine information and outputs for engine control shall be on the J1939 databus. Inputs from the pump discharge and intake pressure sensors shall be electrical.

The following continuous displays shall be provided:

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

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

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

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

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

The governor shall operate in two control modes, pressure and RPM. No discharge pressure or engine RPM variation shall occur when switching between modes. A throttle ready LED shall light when the



interlock signal is recognized. The governor shall start in pressure mode and set the engine RPM to idle. In pressure mode the governor shall automatically regulate the discharge pressure at the level set by the operator. In RPM mode the governor shall maintain the engine RPM at the level set by the operator except in the event of a discharge pressure increase. The governor shall limit a discharge pressure increase in RPM mode to a maximum of 30 psi. Other safety features shall include recognition of no water conditions with an automatic programmed response and a push button to return the engine to idle.

The pressure governor and display shall be programmed to interface with a Cummins engine.

### **MASTER GAUGES:**

One (1) 4½" compound gauge with a range of 30-0-400 PSI.

One (1) 4½" pressure gauge with a range of 0-400 PSI

### **WATER TANK INDICATOR**

One (1) Fire Research TankVision Pro model WLA300-A00 tank indicator kit shall be installed. The kit shall include an electronic indicator module, a pressure sensor, and a 10' sensor cable. The indicator shall show the volume of water in the tank on nine (9) easy to see super bright RGB LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The indicator case shall be waterproof, manufactured of Polycarbonate/Nylon material, and have a distinctive blue label.

The program features shall be accessed from the front of the indicator module. The program shall support self-diagnostics capabilities, self-calibration, six (6) programmable colored light patterns to display tank volume, adjustable brightness control levels and a datalink to connect remote indicators. Low water warnings shall include flashing LEDs at 1/4 tank, down chasing LEDs when the tank is almost empty, and an output for an audio alarm.

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

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

### **LINE READING GAUGES:**

One (1) line reading gauge supplied for each discharge. The gauge shall have a 2½ diameter face with a graduated output scale of 0-400 PSI with black print on a bright white background. The gauge shall be



constructed with a Zytel housing, acrylic lens and polished stainless steel bezel. The Zytel nylon case shall be temperature compensated with an internal breathing diaphragm to permit a fully filled case and to allow for a rigid lens with a distortion free viewing area.

A 1/4" brass male NPT fitting shall be centrally located on the rear of the housing and feature the Kem-X socket and freeze protection system that isolates the gauge from contaminants. The gauge utilizes a phosphor bronze Bourdon tube filled with a freeze proof liquid isolated by a diaphragm. The gauge shall be filled with low temperature glycerin for an operating range of -40 to +150 degrees Fahrenheit, which prevents bouncing of the readout needle and provides for an accuracy rating of plus or minus 1% across the entire scale of the gauge.

**COLOR CODED TAGS:**

Color coded tags with chrome plated bezels shall be provided. Unless otherwise specified all tags shall be color coded to NFPA recommendations and shall be located at the control location, intake/discharge location, and at the drain port location.

Alexis Standard Tags:

Front Bumper Jump Line	Orange
Preconnect #1	Red
Preconnect #2	Yellow
Preconnect #3	Seafoam
Discharge #1	White
Discharge #2	Blue
Discharge #3	Black
Discharge #4	Green
Discharge #5/Water tower	Purple
Deluge/deck gun	Silver
Large-diameter hose	Yellow with white border
Foam line(s)	Red with white border
Booster reel(s)	Gray
Inlets	Burgundy

**TEST PORTS:**

Vacuum and pressure test ports shall be provided on the pump operator's panel for connection of the pump test gauges.



### **PUSH BUTTON ON PUMP PANEL FOR AIR HORNS:**

There shall be a push button provided on the pump panel to activate the air horns.

### **MIDSHIP WALKWAY**

A 22" wide walkway shall be incorporated behind the cab and ahead of the body. The walkway shall be framed and supported with an extruded aluminum frame work. The walkway shall be constructed of 3/16" thick 3003-H12 polished aluminum treadplate and attached to the substructure with stainless steel threaded fasteners.

### **RUNNING BOARDS**

The running boards shall be constructed of 3/16" thick 3003-H14 aluminum treadplate and shall be attached to the outriggers on the pump module. The aluminum treadplate meets NFPA standard 13-7.3: all exterior surfaces have a minimum slip resistance of .68.

### **RUB RAILS - RUNNING BOARDS:**

Bolt on aluminum rub rails shall be installed one (1) each side on the running boards. Said rub rails will be fabricated of a polished "C" channel aluminum, mounted to the running board utilizing 1/4" plastic spacers.

The rub rails shall incorporate the LED ground lights. Each light strip shall run the full length of each rub rail.

The channel designed rub rail shall incorporate a highly reflective red and fluorescent yellow green reflective stripe to aid in apparatus protection.

### **STAINLESS STEEL PUMP PANELS:**

The top mount pump operator's panel and discharge panels shall be manufactured of 12 gauge stainless steel material. The pump operator's panel shall include a full width light hood.

The lights shall be activated by a switch located on the pump operator's panel.

### **2 1/2" DISCHARGE PIPING:**

One (1) 2 1/2" discharge(s) shall be located on the left side of the apparatus. Each discharge valve shall



be located behind the body panel and controlled from the top mount pump operator's panel. Each discharge shall include a self-locking 2½" quarter-turn ball valve, a 2½" chrome cap with chain, and a sweep elbow of at least 30 degrees downward.

Each above valve shall be manually controlled.

### **2 ½" DISCHARGE PIPING:**

One (1) 2 ½" discharge(s) shall be located on the right side of the apparatus. Each discharge valve shall be located behind the body panel and controlled from the top mount pump operator's panel. Each discharge shall include a self-locking 2½" quarter-turn ball valve, a 2½" chrome cap with chain, and a sweep elbow of at least 30 degrees downward.

Each above valve shall be manually controlled.

### **3" DISCHARGE(S), APPARATUS RIGHT SIDE:**

One (1) 3" discharge(s) shall be located on the right side of the apparatus with each valve behind the body panel. Each discharge shall be controlled from the top mount pump operator's panel. A 2½" gauge shall be adjacent to each control. Each 3" and larger discharge shall include an Akron Slo-Cloz adapter.

### **DISCHARGE ADAPTER:**

The 3" discharge shall incorporate one (1) 3" NST LHF x 5" Storz 30 degree elbow with blind cap.

Each above valve shall be manually controlled.

### **3" DISCHARGE, APPARATUS REAR:**

One (1) 3" discharge shall be located at the rear of the apparatus on the right side. The discharge shall be controlled from the pump operator's panel. The valve shall measure 3" and include an Akron 7830 with an Akron Slo-Cloz adapter.

One (1) Trident 01.054.20 3" FNST Swivel x 2½" MNST elbow with cap and chain shall be supplied for the 3" discharge.

Each above valve shall be manually controlled.





### **TANK TO PUMP LINE:**

One (1) 3" tank to pump line shall be installed into the tank to the suction side of the pump. It shall have 4" piping and valved with a 3" full flow valve. The valve shall be controlled from the pump operator's panel. The tank line shall incorporate a check valve in the line to meet NFPA 1901.

### **LINE DRAINS FOR DISCHARGES:**

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

### **VENTED DISCHARGE CAPS:**

Each discharge shall incorporate a vented cap designed to relieve stored pressure in the line when disconnected.

### **GATED SUCTION, LEFT SIDE:**

One (1) 2½" gated suction shall be located on the left side of the apparatus. It is to be piped 2½" i.d., including an Akron 2½" full flow quarter turn valve, and a 2½" NST female swivel with plug and chain. It is to be controlled from the suction location.

### **FIXED MONITOR PIPING:**

One (1) 3" discharge shall be located on the deck over the pump compartment. The discharge shall be flanged to adapt to a permanent mounted deck pipe. The piping shall be reinforced to allow rated deck pipe flow without piping distortion. The discharge valve shall be a quarter turn 3" full flow valve located in the pump compartment. It shall be controlled from the pump panel. The deluge and its control shall be positioned so the pump operator shall have complete control. The valve shall be a slow close valve per NFPA requirements.

Each above valve shall be manually controlled.

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

One (1) Task Force Tips model # XG18PL-PL manually telescoping waterway shall be installed. The waterway shall be capable of being lowered to deck level (or into a monitor well) for storage and



transportation and shall be capable of being raised to an extended height of 18" by lifting a quick release latch located at the base of the extension tube. This latching device shall be capable of locking the waterway in either the raised or lowered position while maintaining the ability to horizontally rotate the monitor device 360 degrees.

A sensor shall be located on the waterway that signals a 12 volt indicator light installed in the cab to illuminate to indicate that the monitor is raised.

The aluminum riser shall have a 3" waterway; hardcoat anodized finish and be furnished with a 3" male NPT inlet and a 3" male NPT outlet. The unit shall have a unique serial number and be covered by a five-year warranty.

#### **MATTYDALE PRECONNECT MODULE - (2) 1½":**

One (1) independent preconnect module shall be located directly behind the chassis cab, above the pump. The module shall be manufactured of stainless steel material, self supported, and shall incorporate two (2) deep cut preconnect hose beds. On each side of the module, outboard of the frame rails, an area shall be provided to facilitate nozzle storage. Each nozzle shall be retained in the storage area behind the preconnect cover.

Two (2) 1½" preconnects shall be provided in the module. The preconnects shall incorporate a 1½", 180° swivel adapted to 1½" fire hose thread. The waterways shall be 2" i.d. and include a 2" full flow quarter turn ball valve that is controlled from the operator's panel (NFPA 4-7.2).

Each preconnect shall have the capacity to contain a minimum of 200 ft. of 1¾" hose with nozzle. The preconnects shall be designed as to allow the extension of hose to the left or right side of the apparatus body.

Each above valve shall be manually controlled.

#### **MATTYDALE PRECONNECT COVER:**

The Mattydale preconnect area shall be covered with a polished aluminum treadplate cover. It is to be hinged at the front or rear with a stainless steel continuous design hinge and retained with two (2) single point latches.

The aluminum treadplate cover shall incorporate hypalon end flaps on each side.



The hypalon cover shall be red in color.

**TANK FILL RECYCLE:**

One (1) 2" waterway shall be incorporated from the pressure side of the pump to the tank. The line shall be controlled from the pump panel and valved with a 2" ball valve to allow a pump cooling recycle or tank fill when pumping from draft. When fully opened, it shall have the capacity to refill the tank at 750 gpm when pumping at 100 psi.

**VALVING:**

Each and every apparatus valve must be an Akron Stainless Steel Ball Valve, per the following specifications.

An Akron Brass Generation II Swing-Out™ Valve, shall be provided. The valve shall have an all brass body with flow optimizing stainless steel ball and dual polymer seats. The valve body shall be of universal design and accept multiple actuators. The valve shall be capable of dual directional flow while incorporating a self-locking ball feature using an automatic friction lock design and specially designed flow optimizing stainless steel ball. The stainless steel ball shall have HydroMax™ technology. All stainless steel parts must be 316 grade for increased resistance to corrosion. The valve shall not require lubrication of seats or any other internal waterway parts, and must be capable of swinging out of the waterway for maintenance by the removal of six bolts. The valve shall be compatible with a slow closing devise. This valve shall be actuated using a manual handle. The handle shall be quickly adjustable to one of eight handle positions and require only 90° travel. The valve shall be manufactured and assembled in the United States. Product must carry a 10 year manufacturer's warranty.

**WARRANTY, AKRON BRASS BALL VALVE:**

We warrant Akron Brass Swing-Out Valves for a period of ten (10) years after purchase against defects in material or workmanship. Akron Brass will repair or replace any Swing-Out Valve which fails to satisfy this warranty. Repair or replacement shall be at the discretion of Akron Brass. Electrical Components shall carry our standard five (5) year warranty. We will not be responsible for: Wear and tear; and by improper installation use, maintenance; negligence of the owner or user; repair or modification after delivery; failure to follow our instructions or recommendations; or anything else beyond our control. WE MAKE NO WARRANTIES EXPRESS OR IMPLIED, OTHER THAN THOSE INCLUDED IN THIS WARRANTY STATEMENT, AND WE DISCLAIM ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. Further we will not be responsible for any consequential, incidental, or indirect damages (including, but not limited to, any loss of profits) from any cause whatsoever. No person has authority to change this



warranty.

**PIPING:**

All waterways described herein shall be of schedule 40 threaded stainless steel pipe, schedule 10 welded stainless steel, or "aeroquip" hose. Each shall be installed with the proper couplings to allow apparatus twisting, flexing, and complete removal for service or replacement.

**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 (10) years or 100,000 miles from the date of delivery.

**PIPING CERTIFICATION:**

Upon final apparatus delivery, a certification sheet shall accompany the unit stating that all piping and the pump have been hydrostatically tested to 250 psi.

**BODY:**

**BODY WARRANTY:**

Alexis Fire Equipment Company hereby extends its standard one-year fire and rescue apparatus warranty to include defects in materials and workmanship of the body as well as structural defects which, in the sole opinion of the company, substantially affect the total integrity of the body. This warranty is extended only to the original user-purchaser.

Alexis Fire Equipment warrants the 3/16" aluminum bodies, under normal use and with reasonable maintenance, shall remain structurally sound for a period of 10 years or 100,000 miles as long as the design of the apparatus complies with Alexis engineering practices.

The Company reserves the right to require any such repairs to be made either at Alexis Fire Equipment Company, Inc. or another approved service facility, at the option of Alexis Fire Equipment. Transportation cost to and from the servicing location is the responsibility of the user-purchaser.



The warranty shall be null and void if, upon inspection by the Company, the alleged defect is determined to have been caused by abuse, modification, accident, neglect, or lack of proper maintenance.

This warranty does not apply to the following items that are covered by a separate warranty: paint finish, hardware, door assemblies, moldings, and other accessories attached to the body. In addition, this warranty does not apply to any part or accessory manufactured by others and attached to the body.

Alexis Fire Equipment will be given a reasonable opportunity to investigate all claims. The purchaser must commence any action arising out of, based upon or relating to agreement or the breach hereof, within twelve (12) months from the date the cause of the action occurred.

Alexis Fire Equipment makes no other warranty, expressed or implied, with respect to the apparatus body and all implied warranties of merchantability and fitness for a particular purpose are hereby disclaimed.

**BODY:**

**BODY SUB FRAME:**

The body subframe system shall be independent of the chassis frame and is to be constructed of aluminum structural material. The subframe shall be mounted in a manner that allows the body to float independent of the chassis frame. However, the unit will be secured in compliance with all chassis manufacturers' frame requirements, as well as with all SAE FMVSS standard requirements. The chassis frame shall be completely cushioned from the subframe system with closed cell rubber.

**FRONT BODY PANEL:**

The front of the body is manufactured of aluminum treadplate for ease of maintenance and protection of the lower body area.

**REAR BODY PANEL:**

The rear of the body shall be smooth aluminum material, in preparation for Chevron striping.

**WHEEL HOUSING, ALUMINUM TREADPLATE:**

The rear wheel housing shall be constructed of aluminum treadplate and shall incorporate a polished stainless steel fenderette. The circular interliner shall be manufactured of 1/8" smooth aluminum



**TAILSTEP:**

The tailstep shall be constructed of .190 thick 3003-h14 aluminum treadplate. The tailstep shall be a bolt-on tailstep for ease of removal and repair. The aluminum treadplate meets NFPA standard 13-7.3: all exterior surfaces have a minimum slip resistance of .68.

The tail step shall incorporate 45° tapered corners.

The tail step shall be 12" deep

**REAR TOW EYES:**

Two (2) ¾" thick steel tow eyes shall be securely fastened to the rear frame rails, one (1) on each side below the body

**DUAL BOTTLE AIR BOTTLE COMPARTMENT(S):**

Three (3) Model 101400-1X air bottle storage compartment(s) shall be located in the apparatus wheel well assemblies. For ease of access, each bottle shall be stored within an individual storage tube manufactured of poly material. The compartment shall incorporate a vertically hinged stainless steel door with a black push button latch. Each compartment shall have the capacity to carry two (2) air bottles.

LOCATION: One (1) Left and Two (2) Right

**HOSE BED:**

The hose bed shall be located over the booster tank, and must be accessible from the tail step and from its open top. The hosebed shall be incorporated with the booster tank and shall be manufactured of poly material. The hose bed compartment shall have a minimum capacity of 55 cu. ft. and a minimum width of 63". The rear corners of the hose bed side walls shall be tapered for improved access.

**HOSEBED FLOOR:**

The floor of the hosebed shall incorporate a channel system for improved air flow and to aid in the drainage of accumulated moisture on the floor, NO EXCEPTIONS.

**LIGHT BOXES:**



The side wall of the hosebed on each side shall incorporate light boxes for mounting of rear upper warning lights and rear/side scene lights. The light boxes shall be built-in, manufactured of the same material as the hosebed and tank, and paint to match the apparatus body, NO EXCEPTIONS.

The side panels of the hose bed shall be painted to match the lower cab color.

### **HOSE BED DIVIDER:**

One (1) divider shall be located in the hose bed. It shall be constructed of 3/16" aluminum plate. The divider shall be designed for future adjustability with locking blocks in aluminum channels at the front and the rear of the hose bed.

Each hose bed divider shall incorporate hand hold cutouts to assist in accessing the hose bed.

### **HOSE BED COVER:**

One (1) custom tailored hypalon hose bed cover shall be included with the apparatus body. It shall be manufactured of a flame retardent material with a grab tensile of 480 x 500 lbs. and a tonge tear of 160 x 150 lbs. It shall be crack resistant to -40° Fahrenheit and have an adhesion lbs./in of 10.0 lbs. The hose bed cover shall be fitted to the hose bed and retained with a double woven shock cord on the front and both sides. The shock cord shall system shall utilize nylon hooks spaced every 10"-12". The cover shall be sand weighted across the rear flap and shall also include two (2) 2" wide nylon straps with teflon buckle to meet NFPA requirements.

The hosebed cover shall include a 3 year warranty.

The hypalon cover shall be red in color.

### **COMPARTMENTATION:**

#### **COMPARTMENT DESIGN:**

The compartmentation shall be fabricated of 3/16" (.1875") thick 5052 H32 aluminum. The compartmentation is designed to be an intricate part of the body and subframe for maximum compartment support. The compartment tops shall be fabricated of aluminum treadplate material The material shall be formed over each compartment top to act as drip protection over each compartment opening. The compartment flooring will be sweep out design. The front face of the compartments shall be aluminum treadplate and the rear face the compartments shall be smooth aluminum in preparation for Chevron striping.



The specified lighting in each compartment shall be switched automatically with the doors. The lighting shall meet the requirements of NFPA 13.10.5

**NON-PAINTED ROLL-UP DOORS:**

The compartments shall have ROM Series IV Roll-up Shutter Doors with a satin finish. The doors shall be made of an anodized aluminum slat incorporating an exclusive seal that prohibits water intrusion, absorbs shock, eliminates clatter, and provides quiet, vibration-free performance. The lift bar shall be a D-shaped bar for strength and ease of use.

**TALL BOTTOM RAIL:**

Each ROM door shall incorporate a tall bottom rail for improved accessibility.

**LEFT SIDE BODY SHALL BE AS FOLLOWS:**

**L1**

A roll-up door compartment assembly with a door opening of 68" wide x 63" high x 25" deep shall be incorporated on the apparatus left side ahead of the rear wheels.

The compartment shall include the following:

One (1) vertical compartment divider separating the pumping system from the balance of the compartment.

Unistrut Tracking

One (1) full depth adjustable shelf (ves)

E45 Series LED strip lights to illuminate the entire area. The lights shall run the entire height of the compartment on each side of the door opening.

**L2**

One (1) compartment with a roll-up door shall be located above the wheel well on the left side. It shall have a door opening of 57" wide x 27" high x 25" deep.





The compartment shall include the following:

Unistrut Tracking

E45 Series LED strip lights to illuminate the entire area. The lights shall run the entire height of the compartment on each side of the door opening.

### **L3**

A roll-up door compartment assembly with a door opening of 58" wide x 63" high x 25" deep shall be incorporated on the apparatus left side behind the rear wheels.

The lower area shall be transverse with the R3 compartment.

The compartment shall include the following:

Unistrut Tracking

One (1) full depth adjustable shelf (ves)

E45 Series LED strip lights to illuminate the entire area. The lights shall run the entire height of the compartment on each side of the door opening.

### **RIGHT SIDE BODY SHALL BE AS FOLLOWS:**

### **R1**

A roll-up door compartment assembly with a door opening of 68" wide x 63" high x 25" deep shall be incorporated on the apparatus right side ahead of the rear wheels.

The compartment shall include the following:

One (1) vertical compartment divider separating the pumping system from the balance of the compartment.

Unistrut Tracking

One (1) full depth adjustable shelf (ves)



E45 Series LED strip lights to illuminate the entire area. The lights shall run the entire height of the compartment on each side of the door opening.

**R2**

One (1) compartment with a roll-up door shall be located above the wheel well on the right side. It shall have a door opening of 57" wide x 27" high x 25" deep.

The compartment shall include the following:

Unistrut Tracking

E45 Series LED strip lights to illuminate the entire area. The lights shall run the entire height of the compartment on each side of the door opening.

**R3**

A roll-up door compartment assembly with a door opening of 58" wide x 63" high x 25" deep shall be incorporated on the apparatus right side behind the rear wheels.

The lower area shall be transverse with the L3 compartment.

The compartment shall include the following:

Unistrut Tracking

One (1) full depth adjustable shelf (ves)

E45 Series LED strip lights to illuminate the entire area. The lights shall run the entire height of the compartment on each side of the door opening.

**REAR COMPARTMENT SHALL BE AS FOLLOWS:**

A roll-up compartment assembly with a door opening of 37" wide x 61" high x 30" deep shall be located at the rear of the apparatus.

**TRANSVERSE OPENING:**

The side compartments behind the wheel shall be made transverse or interconnecting with the rear



compartment. This transverse compartment will be full body width and must be accessible from the left side, right side or the rear compartment area.

The rear compartment shall include the following:

E45 Series LED strip lights to illuminate the entire area. The lights shall run the entire height of the compartment on each side of the door opening.

### **LADDER STORAGE:**

The ladders shall be stored in a compartment located through the booster tank. The compartment shall be manufactured of poly material and shall be accessible from the rear compartment of the apparatus through the rear roll up door.

The ladder and suction hose storage shall have the capacity to contain the following: One (1) 24' 2-section ladder, one (1) 14' Roof Ladder with hooks, one (1) 10' attic ladder, two (2) 10' lengths of hard suction hose and two (2) pike poles.

One (1) 24' 2-Section Ladder

One (1) 14' Roof Ladder with Hooks

One (1) 10' Attic Ladder

Two (2) 10' Length(s) of Hard Suction Hose

Two (2) Pike Pole(s)

### **PIKE POLE TUBE:**

Two (2) pike pole tube(s) shall be installed on the ladder storage compartment.

### **RUB RAILS:**

Bolt on aluminum rub rails shall be installed, below the compartment doors. Said rub rails will be fabricated of a polished "C" channel aluminum, mounted to the body surface utilizing ¼" plastic spacers. The channel designed rub rail shall incorporate a highly reflective red and fluorescent yellow green reflective stripe to aid in apparatus protection.



The rub rails shall incorporate the LED ground lights and LED lower warning lights. Each light strip shall run the full length of each rub rail.

**STAINLESS STEEL TOP ACCESS LADDER:**

One (1) Sure-Grip Stainless steel access ladder shall be provided at the rear of the apparatus. Sure-Grip is a collapsible, self-retracting ladder that provides safety and security while ascending or descending. The ladder stores in a low profile position parallel to the truck body. To use, the bottom section simply flips down and the ladder pulls out to a comfortable climbing angle. When finished, the bottom section flips up and locks in place.

The Sure-Grip Ladder is constructed of stainless steel and uses stainless hardware to provide dependable use in all environments. The standard ladder is provided with a # 4 finish. Aluminum non-skid surface steps provide traction and safety in any condition. Sure-Grip Ladder is designed to meet all NFPA standards.

The access ladder shall incorporate 36" knurled stainless steel grab handles, one (1) each side.

LOCATION: Left Side

**DURATILE TILE ON FLOOR:**

The floor of each main body compartment shall be covered with black Duratile Tile.

**VERTICAL UNISTRUT IN COMPARTMENT:**

The unistrut tracking as previously specified shall be vertically installed on the compartment walls for use with adjustable shelving. The tracking will allow the shelving to be adjustable to height with an eight (8) bolt lock. The tracking shall be installed from the floor of the compartment to approximately 4" below the ceiling of the compartment, allowing full height adjustability.

**ADJUSTABLE SHELVING:**

The adjustable shelving as previously specified shall be installed in the apparatus compartmentation, utilizing the unistrut tracking. Each shelf shall be manufactured in a "U" break design, with 2" lip on front and rear of shelf. Each shelf shall be manufactured from a .190 material.

**TANK:**



## **BOOSTER TANK:**

The tank shall have a capacity of 1000 US gallons complete with a lifetime warranty. The tank manufacturer shall mark the tank and furnish notice that indicates proof of warranty. The purpose of the markings and notice is to inform department personnel who store, stock, or use the tank that the unit is under warranty. Markings may be brief but should include a short statement that a warranty exists, the substance of the warranty, its duration, and who to notify if the tank is found to be defective.

The tank shall be constructed of ½" thick PT2E polypropylene sheet stock. This material shall be non-corrosive stress relieved thermo-plastic and U.V. stabilized for maximum protection.

The booster tank shall be of a specific configuration and so designed to be completely independent of the body and compartments. All joints and seams shall be nitrogen welded and tested for maximum strength and integrity. The transverse swash partitions shall be manufactured of 3/8" PT2E polypropylene (natural in color) and extend from approximately 4" off the floor to just under the cover. The longitudinal swash partitions shall be constructed of 3/8" PT2E polypropylene (natural in color) and extend from the floor of the tank through the cover to allow for positive welding and maximum integrity. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow. All swash partitions interlock with one another and are welded to each other as well as to the walls of the tank.

## **FILL TOWER AND COVER**

The tank will have a combination vent and manual fill tower. The fill tower will be constructed of ½" PT2E polypropylene and shall be a minimum dimension of 8" x 8" outer perimeter. The tower will be located in the left front corner of the tank. The tower will have a ¼" thick removable polypropylene screen and a PT2E polypropylene hinged type cover. Inside the fill tower, approximately 4" down from the top, shall be fastened a combination vent overflow pipe. The vent overflow shall be a minimum of schedule 40 polypropylene pipe with a minimum I.D. of 4" that is designed to run through the tank and shall be piped behind the rear wheels.

The tank cover is constructed of ½" thick PT2E polypropylene and UV stabilized, to incorporate a multi three-piece design which allows for individual removal and inspection if necessary. The tank cover will be recessed 3/8" from the top of the tank and shall be welded to both sides and longitudinal partitions for maximum integrity. Each one of the three covers will have hold-downs consisting of 2" polypropylene dowels spaced a maximum of 30" apart. These dowels will extend through the covers and be welded to the transverse partitions. This will assist in keeping the cover rigid under fast filling conditions. A minimum of two (2) lifting dowels shall be drilled and tapped ½" x 13" to accommodate the lifting eyes.



## SUMP

There will be one (1) sump standard per tank. The sump shall be constructed of ½" PT2E polypropylene and be located in the left front quarter of the tank. The sump will have a minimum 3" NPT threaded outlet on the bottom for a drain plug. This shall be used as a combination cleanout and drain. All tanks shall have an anti-swirl plate located approximately 2" above the sump.

## OUTLETS

There will be two (2) standard tank outlets: one for the tank to pump suction line which will be a minimum of a 3" NPT coupling and one for a tank fill line which will be a minimum of a 2" NPT coupling. All tank fill couplings will be backed with flow deflectors to break up the stream of water entering the tank, and be capable of withstanding sustained fill rates of up to 1000 GPM. All auxiliary outlets and inlets must meet all NFPA guidelines in effect at the time of manufacture.

## MOUNTING

The UPF Poly Tank IIE shall rest on the body cross members with an unsupported area not to exceed 530 sq. inches on tanks up to 40" in height. On tanks over 40" in height, an unsupported area of not more than 400 sq. inches must be maintained. All tanks shall be isolated from the cross members through the use of hard rubber strips with, a minimum thickness and width dimension of .250 x 2" and a minimum Rockwell hardness of 60 durometer. Additionally, the tank must be supported around the entire bottom outside perimeter and captured both front and rear as well as side to side to prevent the tank from shifting during vehicle operation. A picture frame type cradle mount shall be utilized with a minimum of 2" x 2" x .250 structural material.

Although the tank is designed on the free-floating suspension principle, it shall be required that the tank have hold down restraints half way between the front and the rear of the tank. These restraints shall be made of 3" x 3" x ¼" angle approximately 6" long. The restraints shall be mounted to the side walls of the hose bed and extend down so that they rest approximately ½" above the top of the tank. The tank shall be completely removable without disturbing or dismantling the apparatus structure.

Upon final apparatus delivery, proper evidence and certifications shall be presented indicating the tank has the capacity of flow to the pump 80% of its rated capacity at a flow rate of 1000 GPM.

## **12 VOLT ELECTRICAL:**

## **ELECTRICAL WARRANTY:**



Alexis Fire Equipment Co., Inc. warrants each new piece of Ashland Series fire and rescue apparatus to be free from defects in material and workmanship under normal use and service. Our obligation under this warranty is limited to repairing or replacing, as the company may elect, any part or parts thereof which shall be returned to us with transportation charges prepaid, and as to which examination shall disclose to the company's satisfaction to have been defective, provided that such part, or parts shall be returned to us within three (3) years or 30,000 miles after delivery of such vehicle. Such defective part or parts will be repaired or replaced free of charge and without charge for installation to the original purchaser.

Items specifically covered are:

- Electrical harnesses and harness installation
- Printed circuit board
- Switches, circuit breakers and relays

Items excluded are:

- Chassis electrical systems and components installed by chassis manufacturer
- Separately manufactured items installed by Alexis Fire Equipment including, but not limited to; batteries, sirens, battery chargers, inverters, lightbars and similar equipment. (These are covered by warranties supplied by the manufacturer of the components).
- Periodic tightening and cleaning of connection terminals as this is considered routine maintenance
- Normal wear, abuse, accident, negligence or un-approved alteration of original parts.

Should repairs become necessary under the terms of this warranty, the extent of that repair shall be determined solely by Alexis Fire Equipment and shall be performed solely by Alexis Fire Equipment or a repair facility designated by Alexis. The expense of any transportation to or from such repair facility shall be that of the purchaser and is not an item covered by this warranty.

Alexis Fire Equipment reserves the un-restricted right at any time to make changes in design of and/or improvements on its products without thereby imposing any obligation on itself to make corresponding changes or improvements in or on its products theretofore manufactured.

### **12 VOLT ELECTRICAL SYSTEM:**

Our electrical system is engineered to provide many years of dependable, trouble free service.

The 12 volt apparatus wiring shall be completely independent of the chassis electrical system. The system shall incorporate a state-of-the-art electrical distribution center. The center shall include a microprocessor, automatic reset circuit breakers, and switching relays.



 Alexis Fire Equipment  
109 East Broadway / Alexis, IL 61412  
 800-322-2284  sales@alexisfire.com  
 AlexisFire.com

The microprocessors are housed in a weather resistant enclosure. All processors are fully tested, and modern production processes guarantee long-term reliability in the most rigorous environments. The microprocessors handle the numerous switching functions without the excessive use of relays and the need for excess wiring.

The system can be expanded by adding additional processors and required components to meet desired specifications.

The weather tight modular service center shall be placed in a water-tight compartment in the apparatus body. The service center housing shall be manufactured of aluminum and shall incorporate an access door. Since the microprocessor is of weather resistant design and enclosed in the service center, the electrical system has redundant protection against moisture and corrosion. Redundant protection from the elements dramatically improves reliability and durability.

Wiring harnesses shall be custom made for each truck. Each harness shall be encased in a split barrel, nylon type loom which will be moisture resistant and flame resistant to a minimum of 280° F. Loop outs shall be made at the harness factory utilizing sealed sonic weld technology instead of open-ended butt splicing. The harnesses shall feature Deutsch heavy duty all metal connectors.

Unlike terminal strips, binding post and other open-wiring systems, the Deutsch HD series is a completely sealed unit. The elimination of open wiring systems does away with contamination from moisture, dust, lubricating oils, road salt, and other environmental hazards encountered in heavy duty use. The connector shall provide a multiple keying system that positively prevents mis-mating and makes plug/receptacle coupling quick and easy. The modular harness system will allow for quick and efficient complete body transfer if needed.

An independent switching station shall be centrally located in the apparatus cab. The switches shall be of a rocker type illuminating design. Each switch shall be color coded, and include a description indicating its intended use. Each switch shall be removable for service and replacement. Each switch shall be rated at 10 amp at 250 volts AC and shall act as inputs for the microprocessor.

All electrical circuit feeder wiring supplied and installed by the apparatus manufacturer shall be stranded copper alloy conductors of a gauge rated to carry 125% of the maximum current for which the circuit is protected. Insulation shall be in accordance with SAE J1128, low tension primary cable, type SXL or GXL, and wired to SAE J1292, automobile, truck, truck-tractor, trailer and motor coach wiring, for such loading at the potential employed. Voltage drops in all wiring from the power source to the using device shall not exceed 10%. Overall covering of conductors shall be 280° F (143° C) minimum flame retardant, moisture resistant loom or braid. All connections shall be made with lugs or terminals





mechanically secured to the conductors. Wiring shall be thoroughly secured in place and suitably protected against heat, oil, and physical damage. Wiring shall be color coded and printed with a circuit function code over each conductor's entire length.

Circuits shall be provided with properly rated low voltage over-current protective devices. Such devices shall be readily accessible and protected against excessive heat, physical damage and water spray, switches relays, terminals, and connectors shall have a direct current rating of 125% of maximum current for which the circuit is protected.

Wiring Diagrams: Two (2) destination effective wiring diagrams shall be furnished with the apparatus. The wiring diagrams shall incorporate notations to assist an individual with limited electrical experience in the service of the apparatus electrical system.

NOTE: All wiring and components shall meet or exceed current N.F.P.A. codes.

### **LOAD MANAGEMENT:**

The 12 volt load management functions shall be incorporated within the microprocessor based 12 Volt electrical system without the need for a separate load manager.

### **12 VOLT DISTRIBUTION CENTER:**

The 12 Volt distribution center shall be located in the L1 compartment on the front wall, behind an access panel. The access panel shall incorporate a laminated wiring diagram for ease of maintenance of the electrical system.

A 12 volt fan shall be provided in the distribution center to enhance the air flow around the electrical equipment. The fan shall be switched with the master switch.

### **ELECTRICAL SYSTEM PERFORMANCE TESTS:**

The apparatus low voltage electrical system shall be tested and certified per the current NFPA standard. The certification shall be delivered to the purchaser with the apparatus.

### **DOCUMENTATION:**

At the time of delivery, the manufacturer shall provide the following:

- (a) Documentation of the electrical system performance tests;



(b) A written load analysis, including:

1. The nameplate rating of the alternator;
2. The alternator rating;
3. Each component load comprising the minimum continuous load;
4. Additional loads that, when added to the minimum continuous load, determine the total connected load;
5. Each individual intermittent load.

**RADIO:**

One (1) radio(s) shall be installed by the customer after receipt of the completed apparatus.

No radio wiring shall be supplied in the console area.

**OPTICAL WARNING SYSTEM:**

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

**EMERGENCY WARNING LIGHTS:**

For the purpose of defining and measuring the required optical performance, the apparatus shall be divided into four warning zones. The four zones shall be determined by drawing lines through the geometric center of the apparatus at 45° to a line lengthwise of the apparatus through the geometric center. The four zones shall be designated A, B, C, and D in a clockwise direction with zone A to the front of the apparatus. Each zone shall have an upper and lower warning level.

Effective coverage of all four zones, both upper and lower, as required by the latest NFPA Edition shall be provided.

**LIGHTBAR:**

The lightbar shall be supplied on the chassis by the chassis manufacturer.

**FRONT WARNING LIGHTS:**



The front warning lights shall be supplied on the chassis by the chassis manufacturer.

**WARNING LIGHTS (SIDE):**

The rub rails on each side of the body shall incorporate integral outward facing Red LED strip lights. In addition to the Red LED strip light, the rub rail on each side ahead of the rear wheels shall incorporate one (1) Whelen Model MCRNTR Red Micron LED light. These lights shall be switched from the in cab switch panel.

**WARNING LIGHTS (SIDE):**

One (1) Whelen Model 90RR5F\*R Red Super Linear LED light shall be mounted on the right (officer's) side of the vehicle, in the upper area. The light shall be switched from the in cab switch panel.

One (1) Whelen Model 90RR5F\*R Red Super Linear LED lights shall be mounted on the left (driver's) side of the vehicle, in the upper area. The light shall be switched from the in cab switch panel.

These lights fill the requirements of Zones B & D Upper.

Each light shall be mounted utilizing a chrome plated flange.

Each light shall incorporate a colored lens.

**WARNING LIGHTS (REAR UPPER):**

Two (2) Whelen Model 90RR5F\*R Red Super Linear LED lights shall be mounted on the rear of the vehicle, in the upper area. The lights shall be switched from the in cab switch panel. These lights fill the requirements of Zone C Upper.

Each light shall be mounted utilizing a chrome plated flange.

Each light shall incorporate a colored lens.

**WARNING LIGHTS (REAR):**

Two (2) Whelen Model 60R02F\*R red Super Linear LED lights shall be mounted on the lower rear area of the vehicle. These lights shall be switched from the in cab switch panel. These lights fill the requirements of Zone C Lower.



Each light shall be mounted utilizing a chrome plated flange.

Each light shall incorporate a colored lens.

**REAR DRIVING SIGNALS:**

The rear driving signals shall consist of two (2) Code 3 7X9STTRBZ LED lights, one (1) each side of the apparatus at the rear. The 7X9 LED lights shall incorporate red brake/tail, amber turn, and white backup in a single light head. The mounting shall include a chrome bezel.

**TURN SIGNALS-MIDSHIP:**

One (1) S34 Series amber LED midship turn light shall be mounted on each side of the apparatus ahead of the rear wheels.

**ICC LIGHTING:**

S34 Series LED Clearance lights shall be installed on the apparatus. They shall be hermetically sealed cartridge lights for ease of service and durability.

**LED REAR LICENSE PLATE BRACKET:**

There shall be a Cast Products LED license plate bracket provided at the rear of the apparatus.

**PUMP COMPARTMENT LIGHT:**

One (1) 5" 12-volt T41 Series LED light shall be installed in the pump compartment. The light shall be switched with pump panel lights.

**HAZARD LIGHT:**

A red, LED flashing light located in the driving compartment shall be illuminated automatically whenever the apparatus parking brake is not fully engaged and any passenger or equipment compartment door is open, any ladder or equipment rack is not in the stowed position, a stabilizer system is deployed, a powered light tower is extended, or any other device is opened, extended, or deployed that creates a hazard or is likely to cause damage to the apparatus if the apparatus is moved. The light shall be marked "Do Not Move Apparatus When Light Is On".

**FIRETECH 12-VOLT LED SCENE LIGHT(S):**



One (1) FireTech FT-MB-2.36-FT-\* 40" Double Stack 38,016 lumen LED bar scene light(s) shall be mounted in the specified location(s). The lights shall be switched from the in-cab switching station.

Each Firetech Hi Viz scene light bar shall be surface mounted in the specified location.

Each Firetech Hi-Viz scene light shall be white in color.

SIDE SCENE LIGHT LOCATION(S): One (1) Each Side

**FIRETECH 12-VOLT LED SCENE LIGHT(S):**

One (1) FireTech FT-MB-2.6-FT-\* 8" 6,336 lumen LED bar scene light(s) shall be mounted in the specified location(s). The lights shall be switched from the in-cab switching station.

Each Firetech Hi-Viz scene light shall be white in color.

REAR SCENE LIGHT LOCATION(S): One (1) Each Side

**HOSEBED STRIP LIGHTING - LED:**

Two (2) E45 Series LED Strip lights shall be provided at the front of the apparatus hose bed. The lights shall be switched with the parking brake.

**BACK-UP CAMERA INSTALLATION:**

The chassis supplied back-up camera shall be installed in the rear body panel, above the rear compartment door.

**BRACKETING:**

**INTERMEDIATE REAR STEP:**

A 45" wide intermediate rear step constructed of 12 gauge star punch stainless steel material shall be located at the rear of the apparatus below the hose bed. The step shall be 8" deep.

The intermediate rear step shall incorporate a cutout in the center for backup camera mounting, if applicable.



**GRAB HANDLES:**

Two (2) 8.5" knurled bright stainless steel 1¼" O.D. grab handles shall be installed at the on the top of the hose bed taper at the rear of the apparatus, one (1) each side.

**GRAB HANDLES:**

Two (2) 12" knurled bright stainless steel 1¼" O.D. grab handles shall be installed at the on the face of the rear intermediate step, outboard on each side

Each grab handle shall have a natural stainless steel finish

**FINISH:**

**APPARATUS BODY FINISH:**

The final finish of the apparatus shall conform to fire apparatus standards, exhibiting excellent gloss durability and color retention properties.

**PREPARATION:**

Since the removal of all contaminates and oxidation is essential to the final effect of a finish system, the apparatus shall be pre-cleaned with wax and grease remover and towel dried prior to evaporation.

A 10-step standard body preparation shall be completed.

When the substrate is prepared, the entire body shall be cleaned by washing again with wax and grease remover and towel dried.

**PRETREAT AND PRIMERS:**

The pretreat and primer applications shall be made in two (2) independent steps. A application of a combined pretreat/primer product will not be allowed as a substitute.

The prepared substrate shall be pretreated with Acid Curing 2 Component Transparent Primer. This pretreat shall be designed to provide corrosion protection and to create an adhesive bond between the substrate and the surface applications.

To enhance adhesion and top coat gloss, a 2 component epoxy primer shall be applied.



All the primed surfaces shall be sanded smooth, thus removing all texture and surface imperfections and creating a finish base that will meet the rigid requirements of the fire and emergency services.

### **TOP COATS:**

Two (2) coats (0.5 - 2.0 mils) urethane base coat shall be applied in a professional manner. After the base coats have cured properly, two (2) coats of a high solids urethane clear coat shall be applied.

All surface imperfections shall be removed by buffing and polishing.

### **PAINT WARRANTY:**

The apparatus shall be covered by a five (5) year paint warranty.

Following are the covered defects and exclusions.

Covered Defects shall include only the following list of defects:

- Peeling or delaminating of the topcoat and/or other layers of paint.
- Cracking or checking.
- Loss of gloss caused by cracking, checking or hazing.

Defects resulting from the following conditions are excluded from the Warranty:

- Hazing, chalking or loss of gloss caused by improper care, abrasive polishes, cleaning agents, heavy-duty pressure washing, or aggressive mechanical wash systems
- Rock chips are not covered under this warranty.
- Paint deteriorating caused by abuse, scratches, chips, gloss reduction, accidents, acid rain, chemical fallout or acts of nature
- Claims presented without proper Warranty documentation
- Failure on finishes performed by Non-PPG Commercial Certified Technicians
- Failures on finishes due to inadequate film builds
- Failures due to improper cleaning or surface preparation or failure to follow the product use instructions

### **BODY UNDERCOATING:**

The apparatus body assemblies shall be undercoated.



The hose bed interior walls shall remain natural finish.

**COMPARTMENT INTERIOR FINISH:**

The interior of the compartments shall be natural finish aluminum

**CAB LETTERING:**

Vinyl lettering as described below shall be applied to the chassis cab door, one (1) each side. Each letter shall be 2½" to 3½" high and hand applied.

Vinyl letters/numbers shall be applied to the chassis cab fender area, one (1) each side. Each letter/number shall be 2½" to 3½" high and hand applied.

The lettering vinyl style shall be simulated gold leaf.

The lettering font style shall be Eurostile Bold.

The lettering font highlight type shall be shadow.

**LAMINATION WARRANTY:**

The apparatus shall be covered by a two (2) year warranty against defects in material and workmanship with the graphics process

**REFLECTIVE STRIPING:**

The finished apparatus shall be striped with 4" reflective Scotchlite striping.

The reflective striping shall be white in color.

**REFLECTIVE STRIPING IN THE CAB:**

Two-inch red and white striped retro-reflective material shall be placed on the inside of each opening cab door. The material will be at least 96 square inches, meeting current NFPA standards.

**DIAMOND GRADE CHEVRON STRIPING:**





The rear of the apparatus shall be striped with Diamond Grade retro-reflective striping. The striping shall be applied in a chevron pattern sloping downward and away from the centerline of the apparatus at a 45° angle. The striping shall be single color alternating between red #3992 and fluorescent yellow-green #3983.

The striping shall be applied in the following locations: Full height on the rear of the compartments on each side and above the rear compartment door.

**EQUIPMENT:**

One (1) Duo-Safety #10-585A aluminum folding 10' attic ladder(s).

One (1) Duo-Safety 14-775A, 14' Roof Ladder(s) with hooks.

One (1) Duo-Safety #24-900A, 24' 2 Section ground ladder(s).

Two (2) 10' Length(s) of 6" diameter hard suction hose, coupled 6" LHF x 6" RLM. (Not rated for hydrants)

**NFPA EQUIPMENT CLARIFICATION:**

Any equipment specified in the “Minor Equipment” section (e.g. hose, nozzles, adapters, AED, traffic cones, traffic safety vests, etc.) of NFPA 1901 for each apparatus classification (see below) which is not specified in this proposal shall be considered to be customer supplied and installed.

Apparatus Type	NFPA Section
Pumper	5.8
Initial Attack	6.7
Mobile Water Supply	7.7
Aerial	8.8
Quint	9.8
Special Service	10.5
Mobile Foam	11.9





# HOSE CAPACITIES

DWG NO.

**EQ-B89**

**11/17/2023**

Customer Alexis Fire Equipment  
 Calculated By M. Tinkham

Contract No. 2565  
 Rev. No. 01 CMS

<b>HOSE BED</b>		Length		121		Hose Size							
		Width		69		Amount							
		Height		12		DF		0	0	0	0	0	
		Cu. Ft.		57.98	0.00	Cu. Ft.		0.00	0.00	0.00	0.00	0.00	
		Total		57.98		Total Need		0.00		0.00			

<b>MATTYDALES</b>		Length		73	73		Hose Size						
		Width		5	5		Amount						
		Height		30	30		DF		0	0	0		
		Cu. Ft.		6.34	6.34	0.00	Cu. Ft.		0.00	0.00	0.00		
		Total		12.67		Total		0.00		0.00			

<b>CARTRIDGE LAYS</b>		Length					Hose Size						
		Width					Amount						
		Height					DF		0	0	0		
		Cu. Ft.		0.00	0.00	0.00	Cu. Ft.		0.00	0.00	0.00		
		Total		0.00		Total		0.00		0.00			

<b>HOSE TRAYS</b>		Length					Hose Size						
		Width					Amount						
		Height					DF		0	0	0		
		Cu. Ft.		0.00	0.00	0.00	Cu. Ft.		0.00	0.00	0.00		
		Total		0.00		Total		0.00		0.00			

<b>HOSE WELLS</b>		Length		24			Hose Size		1 3/4				
		Width		18			Amount		150				
		Height		11			DF		26	0	0		
		Cu. Ft.		2.75	0.00	0.00	Cu. Ft.		2.26	0.00	0.00		
		Total		2.75		Total		2.26		2.26			

Standard Hose Dimensions per NFPA (2003 Edition)

1 3/4" lays 3 1/4" wide	DF=	26	1" FORESTRY lays 1 3/4" wide	DF=	10
2" lays 3 3/4" wide	DF=	32	1 1/2" FORESTRY 2 1/2" wide	DF=	14
2 1/2" lays 4 1/2" wide	DF=	41			
3" lays 5 1/4" wide	DF=	50			
4" lays 6 1/2" wide	DF=	58			
5" lays 8" wide - Angus	DF=	96			
5" lays 8-1/2" wide - Cotton	DF=	102			
6" lays 9 1/2" wide	DF=	108			





### **NFPA 1901**

The National Fire Protection Association "Standard for Automotive Fire Apparatus, current Edition, is hereby adopted and made a part of these specifications for the componentry supplied in the incomplete chassis.

### **NO TRANSPORTATION CHARGES**

The chassis shall be picked up by the OEM.

### **CUSTOM FIRETRUCK CHASSIS**

The chassis shall be designed and manufactured by a custom chassis manufacturer and shall be designed and constructed specifically for heavy duty fire service use, with adequate strength and capacity for all components as detailed within these specifications.

The chassis manufacturer shall demonstrate evidence of manufacturing similar custom vehicles for at least fifty (50) years.

The chassis shall be equipped with state-of-the-art technology to not only enhance the operation of the actual apparatus, but to ease the workload of the crew and provide the highest level of safety & survivability, while increasing the longevity and serviceability of the vehicle itself.

### **CHASSIS FRAME**

The frame shall be designed to industry standards. The manufacturer shall provide a lifetime frame side rail warranty to the original purchaser of the chassis. The frame rails shall be 10.50" x 3.50" x .375" heat treated steel.

A 3/4 length inner frame side rail liner with dimensions of 9.687" x 3.125" x .3125" shall be provided for additional strength and reduce deflection. The frame liner shall extend from the centerline of the front axle and taper 45 degrees forward and shall extend to the rear of the main frame rail.

The frame side rails shall be 110,000 psi minimum yield and shall have a minimum section modulus of 30.38 cubic inches, in the frame liner area, calculated by using the square corner shape method. The resulting frame rail resistance to bending moment shall be 3,341,800 inches per pound per rail.

To ensure the maximum clamp load for the fastener prevailing torque the crossmembers shall be bolted in place using grade 8 bolts, hardened washers, and grade "C" distorted thread locknuts. Flanged head fasteners shall not be acceptable. The top of the frame rails shall be free of bolt heads.

Frame engine cutouts shall be made with a plasma torch to minimize the heat affected zone of the cut. All cutouts shall have a minimum of 6.00 inch transitions between rail flange cut depths to reduce the stress concentrations throughout the cutout area. The root of all transition areas shall have a minimum of a 2.00 inch radius to reduce stress concentrations at the root.

### **FRAME RAIL FINISH**

The main frame rails, frame liner and main frame cross-members behind the pump shall galvanized to reduce the effect of harsh road chemicals.

## **FRAME FASTENERS**

Fasteners employed to attach the main frame rails to the main frame cross-members shall be Zinc plated to reduce the effect of harsh road chemicals.

## **CAB MAIN FRAME CROSSMEMBER**

In addition to the rear cab support cross-member there shall be a main frame cross member mounted in the rear cab area. This cross-member shall be a wide base flanged design to provide frame spacing and excellent strength to prevent frame paralleling. Every frame cross-member shall be bolted in place using grade 8 bolts, hardened washers, and grade "C" distorted thread locknuts.

## **FRONT AXLE**

The front axle shall be a MERITOR model "MFS20-133A-N" with a 21,500 lb. capacity.

## **CRAMP ANGLE**

The chassis shall have a turning cramp angle of 45-degrees. Both left and right turns have a full 45° cramp angle with tires and wheels mounted on the axle and installed in the chassis.

The 45° cramp angle is achieved irrespective of options such as front suctions and disc brakes.

## **FRONT AXLE OIL SEALS**

The front axle shall be equipped with oil bath type oil seals as supplied on the axle from the axle manufacturer. The spindles shall be equipped with transparent covers for oil level inspection.

## **FRONT AXLE DISC BRAKES**

MERITOR DiscPlus, EX-225, air disc brakes shall be installed on the front axle. The DiscPlus air disc brakes shall provide improved fade resistance and wet weather performance. The rotors shall be vented to facilitate brake cooling.

## **FRONT SUSPENSION**

The front suspension shall be a pin and shackle design. Front springs shall be a minimum of nine (9) leaf elliptical type, 53" x 3-1/2" x .5" forged steel. The front springs shall have a military wrapper for safe operation. For a smooth ride the spring rate shall not exceed 3,300 lbs/in deflection.

All front spring pins shall be ground heat treated steel with grease fittings for lubrication.

The entire front suspension shall be designed for heavy duty custom fire apparatus with a capacity at ground of 21,500 lbs.

## **SHOCK ABSORBERS**

Double acting hydraulic shock absorbers are to be installed.

## **STEERING SYSTEM**

The steering shall be equipped with dual SHEPPARD integral power steering gears. The engine shall be equipped with a gear driven pump.

The power steering fluid shall be monitored electronically and shall send a visual warning to the instrument panel when the fluid level falls below normal.

A remote steel reservoir shall be provided with the ability to check and fill the fluid level when the cab is in the raised position.

## **FRONT TIRES**

The front tires shall be Goodyear 425/65R22.5 (L) tubeless radial Armor Max MSA mud/snow tread.

The front tire stamped load capacity shall be 22,800 pounds per axle with a nominal speed rating of 68 miles per hour when properly inflated to 120 pounds per square inch.

## **ALUMINUM FRONT WHEELS**

Polished aluminum wheels shall be supplied and installed on the front axle.

## **SINGLE REAR AXLE**

The rear axle shall be a MERITOR model "RS-30-185" (Heavy Duty) with a 31,000# capacity for the fire service.

## **MERITOR DIFFERENTIAL**

The rear axle shall contain a Meritor 185 Series differential with a 19.625 inch diameter ring gear utilizing hypoid-Generoid gearing and 2.25 inch diameter axle shafts.

## **AXLE DIFFERENTIAL LUBE**

The axle shall have the initial factory fill made with non-synthetic axle lube meeting the axle manufacturer's recommendations.

## **REAR AXLE OIL SEALS**

The rear axle shall be equipped with premium oil bath type oil seals as supplied on the axle from the axle manufacturer.

## **REAR AXLE BRAKES**

The rear brakes shall be Cam type, 16-1/2" X 7" (419 x 178), S-Cam, air operated heavy-duty brakes for increased stopping power and brake life in severe braking applications.

The "S" cam brakes shall incorporate a double anchor pin design, for stability and smooth consistent stopping. The camshafts shall be heat treated with rolled spline construction.

The rear axle shall be equipped with automatic slack adjusters (ASA) to provide optimum brake performance.

## **VEHICLE TOP SPEED**

The rear axle shall be geared for a top speed of 67 to 71 mph at engine governed RPM.

## **NFPA TOP SPEED STATEMENT**

NFPA-1901, 2016 Edition - 4.15.2: The maximum top speed of fire apparatus with a GVWR over 26,000 lb (11,800 kg) shall not exceed either 68 MPH (105 km/hr) or the manufacturer's maximum fire service speed rating for the tires installed on the apparatus, whichever is lower.

NFPA-1901, 2016 Edition - 4.15.3: If the combined water tank and foam agent tank capacities on the fire apparatus exceed 1250 gal (4732 L), or the GVWR of the vehicle is over 50,000 lb (22,680 kg), the maximum top speed of the apparatus shall not exceed either 60 MPH (105 km/hr) or the manufacturer's maximum fire service speed rating for the tires installed on the apparatus, whichever is lower.

The speed selected on this apparatus exceeds 60 MPH (105 km/hr) and the customer is aware of NFPA-1901 and the top speed that will be achieved with the finished apparatus.

Truck gearing shall be such to provide for a customer requested top speed at engine governed RPM. If the top speed exceeds NFPA requirements listed above the engine ECM will have road speed limiting programmed so the maximum attainable speed that will not exceed that limit. This is field adjustable with Cummins Insite.

## **SINGLE AXLE REAR SUSPENSION**

The rear springs shall be a minimum of seventeen (17) main including four (4) auxiliary leaves. The rear suspension shall have a rating of 31,000 lbs. Capacity. The rear suspension shall be a "self-leveling" slipper type with a main torque leaf that contains a military wrapper. The torque leaf shall contain a bronze bushing for long service life.

The rear hangers are to be of the slipper design. For a smooth ride the rear suspension deflection rate shall not exceed 3,790 lbs. per inch.

One (1) inch diameter rear suspension U-bolts are required.

Two (2) main frame cross members shall be mounted in the rear suspension area, bolted to the frame rail as a rear suspension support member. Each cross member shall be a wide base flanged design to provide frame



spacing and excellent strength to prevent frame paralleling. Each cross member shall be bolted in place using grade 8 bolts, hardened washers, and grade "C" distorted thread locknuts.

## **AIR SYSTEM**

An air brake system meeting the requirements of the FMVSS-121 shall be provided. The system shall consist of three (3) reservoirs with a 4,362 cu. in. volume. The air system shall consist of the following components:

Dual air system with dual gauges and a warning light and buzzer. A spring actuated parking brake built into the rear axle brakes with a manual control and warning light the in cab. These shall automatically apply in case of air system failure. A mechanical means of releasing the spring brake shall be provided in the event of total loss of air pressure.

A quick build up system shall be provided, capable of building enough air pressure to release the spring brake in less than thirty (30) seconds, when starting with the entire air system at zero pounds pressure.

The brake system shall be a split system. One (1) system serving the rear brakes and one (1) system serving the front brakes. The two (2) systems shall be connected with a double check valve that shall automatically shuttle air from the front system to the rear system should loss of air pressure occur. This system shall also modulate the amount of air so the spring brakes shall apply in direct relationship to the amount of pressure applied to the treadle valve.

The brake system shall be equipped with a Bendix SR-7 valve to provide modulated spring brakes in the event there is low air pressure in the rear axle air supply reservoir.

The spring brakes shall be piped in such a manner that if the treadle valve is depressed while the spring brakes are applied, the spring brakes shall release and remain released as long as the treadle valve is depressed. They shall reapply immediately when the treadle valve is released.

The piping in the air system shall be 2-ply nylon reinforced color coded tubing for all stationary lines.

## **AIR DRYER**

The air system shall include a BENDIX AD-9 air dryer.

The air dryer shall have a spin on desiccant cartridge.

The air dryer shall incorporate an integral turbo cutoff valve. The turbo cutoff valve shall close the path between the air compressor and the air dryer purge valve during the compressor "unload" cycle. This shall allow the air dryer to purge the water and contaminants without any loss of turbo boost or engine horsepower.

A 12-Volt heated moisture ejector shall be an integral part of the air dryer. This heater shall be thermostatically controlled. The electrical connection for the heater shall use a sealed electrical connector to protect against moisture and corrosion.

The use of this air dryer increases the base air system volume by 200 cubic inches.

## **ACCESSORY AIR RESERVOIR**

One (1) 2181 cu. in. additional reservoir shall be connected to the chassis air system to provide an air supply for accessories such as air powered tools. This reservoir shall include a pressure protection valve on the inlet side to allow full use of this tank without draining air from the chassis air system.

### **DEDICATED AIR HORN RESERVOIR**

One (1) 2181 cu. in. additional reservoir shall be connected to the chassis air system to provide an air supply for the chassis air horns. This reservoir shall include a pressure protection valve on the inlet side to allow full use of this tank without draining air from the chassis air system.

### **MANUAL DRAINS W/LANYARD**

All air reservoirs shall be supplied with manual pull type drain valves with lanyards. The reservoir drain valves shall allow the accumulation of contaminants that are collected in the reservoirs to be drained off to the atmosphere.

Each lanyard shall be attached to the perimeter of the body with a black label, white lettering above the lanyard attachment point labeled "Air Tank Drain".

### **MERITOR/ROCKWELL/WABCO ABS BRAKE SYSTEM**

A four channel, single rear axle model, MERITOR/ROCKWELL/WABCO ABS Braking System shall be supplied.

A frame mounted electronic control unit (ECU) shall monitor and control wheel speed during braking. Wheel sensors, constantly monitoring wheel speed, send information to the ECU. If a wheel begins to lock the ECU transmits an electrical impulse to modulator valves that can apply, release, or hold the air pressure in the brake chambers. The rapid modulation of air pressure prevents wheel lock-up and increases driver control.

This ABS system shall be a 4S/4M system with four (4) wheel speed sensors and four (4) modulator valves.

If a fault occurs in one wheel, that wheel shall have normal (non-ABS) brake function. The other wheels shall continue to provide the ABS function. If the ABS system should fail completely, the brake control shall be returned to normal (non-ABS) braking.

An ABS warning light shall be installed on the driver's dash message center. This warning light shall cycle through a test stage at the point of ignition turn on and remain illuminated until the vehicle reaches approximately four (4) MPH. The light shall illuminate in other conditions to warn of an ABS system failure and shall illuminate when the diagnostic function is activated.

### **MUD/SNOW SWITCH**

The Meritor/Rockwell/Wabco ABS shall be supplied with a mud and snow switch. This switch shall increase the ATC threshold to allow a momentary wheel slip to obtain traction under extreme mud and snow conditions.

### **MERITOR/WABCO STABILITY ENHANCEMENT SYSTEM**



A Meritor / Wabco Roll Stability Control (RSC) System shall be provided on the apparatus chassis. The RSC shall assist in managing road conditions that may result in a vehicle rollover.

The RSC shall intervene to regulate the vehicle's deceleration functions by automatically reducing engine torque, engage the vehicle retarder and apply pressure to the brakes.

Electronic Stability Control (ESC) shall be included building upon the established RSC system by sensing the tendency of the vehicle to spin around and automatically applying the brakes to reduce that risk.

This system conforms to the requirements of NFPA-1901 4.13.1.2 - If the apparatus is equipped with a stability control system, the system shall have, at a minimum, a steering wheel position sensor, a vehicle yaw sensor, a lateral accelerometer, and individual wheel brake controls.

### **REAR TIRES**

The rear tires shall be Goodyear 315/80R22.5 (L) tubeless radial G-751 MSA highway tread.

The rear tire stamped load capacity shall be 33,080 pounds per axle with a nominal speed rating of 68 miles per hour when properly inflated to 120 pounds per square inch.

### **ALUMINUM WHEELS**

Four (4) polished aluminum wheels shall be supplied and installed on the single rear axle. The wheels shall be highly polished on the outboard side.

### **TIRE PRESSURE MONITORING DEVICE**

Each tire installed on the apparatus shall be equipped with a tire pressure monitoring device. The device shall consist of a valve stem cap with an LED tire alert to indicate tire pressure conditions. The LED will flash when the tire drops 8 psi below the factory setting.

### **LASER ALIGNMENT**

The chassis shall have a laser alignment performed at the factory before delivery.

**Toe In Front Axle** - The toe in on a vehicle is set to reduce tire wear and to insure that the vehicle shall steer in a straight line. Toe in measurements are set to a positive 2.5 millimeters total, giving the vehicle 1.25 millimeters from side to side.

**Toe In Rear Axle** - The toe in on the rear wheels is set up slightly different in that the axle and wheels are set to ride the "crown" of the road. This is achieved by adjusting the toe to a measurement of no less than 1 millimeter, but no more than 2 millimeters. The ideal measurement is 1.5 millimeters total for both sides.

**Cramp Angle** - Cramp angle is set to achieve the greatest turning radius possible with the selected components of the vehicle. Each front wheel is set to zero degrees. The wheel is then turned until it reaches the steering stops. This measurement is the cramp angle.

### **DIESEL ENGINE**

The chassis shall be powered by a Cummins diesel engine as described below:

MODEL:	L9-450
NUMBER OF CYLINDERS:	Six
BORE AND STROKE:	4.49 in (114 mm) x 5.69 in (145 mm)
DISPLACEMENT:	543 cu. in. (8.9L)
MAX HP:	450 hp (336 kW) @ 2100 RPM
TORQUE:	1250 lb-ft (1696 N-m) @ 1300 RPM
GOVERNED RPM:	2200
CURVE:	FR96230EV

Standard Equipment on the engine to include the following:

OIL FILTER:	A full flow / by-pass combination
LUBE OIL COOLER:	High efficiency non-drainback full flow cooling
FUEL FILTERS:	Two fuel filters providing 3 / 10 micron absolute filtration
STARTER:	12 volt
AIR COMPRESSOR:	A Wabco 18.7 cfm compressor shall be provided

## **ENGINE COOLANT RADIATOR**

The engine coolant radiator shall have sufficient capacity to perform under the engine manufacturer installation requirements. The chassis manufacturer shall demonstrate the ability to meet this requirement with the submittal of an approved IQA to the fire department for the apparatus.

This radiator shall have HRPOS top and bottom tanks. These tanks shall have a material thickness of 11 gauge. The top and bottom tanks shall be attached to the header assemblies with a minimum of forty (40) fasteners. These fasteners shall not exceed a center distance of 1.938 inches to reduce the possibility of tank leaks. These fasteners shall be torqued to a value of 29.5 ft-lbs.

The header plates shall be made of 16 gauge brass.

The radiator tubes shall be constructed of .0066 inch thick brass and have a dimensional size of .076 inch x .625 inch. These radiator tubes shall have welded tube seams.

The radiator shall contain three (3) rows of tubes arranged in an inline profile across the radiator core. The entire radiator shall contain (231) tubes. These tubes shall have a smooth bore to allow for radiator cleaning.

In the critically stressed area, where the radiator tubes are attached to the header plates, this joint shall be accomplished with a welding process on the coolant side. In addition to the welded joint a solder fillet joint shall occur on the air side of the core creating a continuous dual bond.

The radiator shall have a louvered serpentine type core that contains fins constructed of .0024 inch thick copper. These fins shall be spaced to a maximum density of 14 fins per inch of radiator tube. Each fin shall have a louvered surface for high cooling efficiency.

The radiator shall contain an integral coolant de-aeration tank. This tank shall be designed to remove entrapped air or gas from the coolant side of the radiator.

The radiator side rails shall have integrally designed support gussets for the transition to the header attachment.

The bottom tank of the radiator shall have a drain valve for coolant removal.

The bottom tank of the radiator shall have a transmission cooler with a plate-type design. The plates shall have internal turbulators to break up laminar oil flow across the surface. The cooler shall have 1311 square inches of surface area for water surface contact and heat transfer.

The radiator system shall be pressurized with a cap rated per the cooling system requirements of the specific engine manufacturer.

The high efficiency engine fan shall be encompassed with a radiator shroud to provide the proper air flow from the fan blade to the radiator.

The perimeter of the radiator shall have recirculation baffles to eliminate the possibility of recirculation of "hot" air to the face of the radiator core. The bottom of the radiator shall have a recirculation baffle from the radiator to the frame rails.

## **COOLANT RECOVERY SYSTEM**

A coolant recovery system shall be installed on the chassis. This tank is designed to capture coolant overflow when the engine coolant warms and expands. As the engine cools the overflow is then pulled out of the tank and back into the radiator, thus maintaining proper coolant levels.

## **CHARGE AIR COOLER RADIATOR**

The engine charge-air cooler shall have sufficient capacity to perform under the engine manufacturers installation requirements. The chassis manufacturer shall demonstrate the ability to meet this requirement with the submittal of an approved IQA to the fire department for the apparatus.

This radiator shall have cast aluminum side tanks. These tanks shall have a material thickness of .200. These tanks shall be attached to the charge-air core with the ALBRAZE construction technique.

The external air fins shall be louvered serpentine and constructed of .006 inch thick aluminum.

The internal air fins shall be of the lance-and-offset design for greater air turbulence and higher efficiency. The internal fins are to be constructed of .010 inch thick aluminum.

The charge-air cooler shall be mounted directly in front of the engine coolant radiator. To reduce vibration rubber "iso" mounts shall be used for mounting of the charge-air cooler to the engine radiator.

The charge-air cooler shall contain thermal expansion slots to allow the expansion and contraction of the charge-air core over the wide range of temperatures that are expected in operation.

The charge air piping between the engine and charge-air cooler shall be aluminum tubing with a wall thickness of .065 inch. The system shall utilize four (4) ply silicone rubber woven Nomex hoses with stainless steel pressure bands. These bands are designed to maintain the hose shape under the pressure of the turbocharger boost air. All clamps used on the charge air piping are to be stainless steel constant torque and shall be installed at each joint.

## **LONG LIFE COOLANT**

The coolant system shall contain a mixture to keep the coolant from freezing to a temperature of -34 degrees F.

The coolant supplied shall be Long Life Coolant compatible with the engine manufacturer's requirement.

## **COOLANT HOSES**

The entire chassis cooling system shall have premium rubber hoses. All clamps to be stainless steel worm drive type clamps.

## **COOLANT SYSTEM CLAMPS**

Single wire constant torque clamps shall be used for all cooling system hoses.

## **HEATER LINE SHUT OFF VALVES**

The heater circuit shall have quarter turn shut off valves installed on both the supply and return lines to allow a complete shut off of coolant flow to the cab heaters in hot seasons of the year. These valves shall be installed in addition to the valves in the heater unit(s).

## **ENGINE AIR INTAKE FILTER**

The engine shall be equipped with a Cummins Fleetguard heavy duty air filter. The filter shall be easily field serviceable.

## **ENGINE OIL**

The engine shall have the initial factory fill made with a non-synthetic engine oil meeting the engine manufacturer's recommendations.

## **ENGINE DRAIN PLUG**

A magnetic drain plug shall be installed in the engine oil pan.

## **ENGINE BRAKE**

A "JACOBS" Engine Brake shall be supplied.

The Driver shall have an on/off and a high/low engine brake control switch.

Activation of the engine brake shall occur at zero throttle position. The transmission ECU shall be programmed to operate in the pre-select downshift mode to maximize the retarding power of the engine brake.

The brake lights shall illuminate when the Jacobs Brake is in operation.

The Jacobs Brake shall be inoperative when the chassis is in pump mode.

The "JACOBS" engine brake shall be covered under the standard five (5) year Cummins engine warranty.

### **ENGINE FAST (HIGH) IDLE**

The chassis shall be equipped with an Electronic Idle Control (EIC) for the electronic engine. Preset speed is factory adjustable.

The fast idle provision shall only function when the parking brake is set and the transmission is in neutral. Manual selection of the fast idle shall be controlled by a driver's momentary switch.

Automatic activation of the fast idle shall occur when a low voltage condition exists, the truck is in neutral and the parking brakes are applied.

Cancellation of the fast idle shall be achieved by resetting the manual switch or by depressing the service brake pedal.

### **AUXILIARY ENGINE COOLER**

The cooling system shall have one (1) SENDURE auxiliary engine cooler mounted in the upper radiator water pipe. The apparatus shall have the fire pump water circulated to the cooler from a valve located on the apparatus pump panel.

### **SPARK ARRESTOR**

A spark arrestor shall be installed to the chassis air intake system. This arrestor shall be affixed to the inlet of the air cleaner housing mounted above the radiator to filter out airborne embers.

### **FAN DRIVE**

A fully variable fan drive system shall be installed on the engine. Variable operation is required to reduce fan noise and improve response time and lower off-speed for maximum efficiency. Control of the fan operation is entirely from the engine and fan ECM with no manual override controls.

### **EXHAUST SYSTEM**

A single exhaust pipe shall be provided for the engine. The exhaust pipe shall be supplied with a heat wrap. The wrap shall extend from the engine turbo charger to just below the frame rail.

The exhaust tubing from the turbocharger to the exhaust after treatment device shall be stainless steel.

### **CUMMINS AFTERTREATMENT SYSTEM**

The chassis shall be equipped with a compliant Cummins exhaust after treatment system.

### **TAILPIPE**

The tailpipe shall extend from the exhaust muffler/aftertreatment device to the rear of the vehicle making a 90° bend to exit the vehicle ahead of the rear tires on the curbside of the vehicle. The end of the pipe shall be cut square or perpendicular to the exhaust pipe centerline.

The pipe shall be unpolished stainless steel.

An exhaust gas diffuser shall be furnished on the end of the tailpipe.

### **DIESEL EXHAUST FLUID SYSTEM**

The chassis shall be equipped with a five (5) gallon Diesel Exhaust Fluid (DEF) reservoir system.

The reservoir shall contain a Multifunctional Head Unit (MFHU) that contains integrated level and temperature sensors. The MFHU also shall contain a coolant powered heater to thaw DEF in conditions below 12°F (-11°C) to meet governmental regulations.

The reservoir shall be located on the left frame rail behind the front axle beneath the cab. The mounting system shall use stainless steel mounting brackets to reduce the possibility of corrosion.

### **TRANSMISSION**

The transmission shall be an Allison 3000EVS automatic transmission with electronic controls.

The transmission shall be equipped with a lock-up control circuit that shall automatically shift the transmission into 4th gear lock-up when the pump is shifted into gear.

### **TRANSMISSION COOLER**

An automatic transmission cooler shall be provided as an integral part located in the bottom tank of the radiator. It shall be designed to withstand 165 psi working pressure and an intermittent pressure of 250 psi. The cooler shall be of sufficient size to maintain the operating temperature within the recommended limits of the transmission manufacturer.

### **TRANSMISSION FLUID**

The transmission shall be provided with heavy-duty transmission fluid meeting Allison specification TES-389.

### **FIVE SPEED PROGRAMMING**

The transmission shall be programmed for five speeds.

First - 3.49  
Second - 1.86  
Third - 1.41  
Fourth - 1.00  
Fifth - 0.75  
Reverse - 5.03



The transmission shall be able to shift from first through fifth gear without operator intervention. The chassis shall be geared for the top speed in 5th gear.

## **AUTOMATIC NEUTRAL**

The transmission shall be provided with circuitry to provide automatic neutral. Setting the parking brake commands the transmission to neutral when the park brake is applied, regardless of drive range requested on the shift selector. Requires re-selecting drive range to shift out of neutral.

After the transmission has been activated with the automatic neutral feature the shift lever must be returned to neutral and back to drive for midship pump operations.

## **REMOTE FLUID LEVEL SENSING**

The chassis shall be equipped with an electronic low fluid level indicator system for the engine oil, transmission oil, engine coolant and power steering fluid as part of the instrumentation package. This system eliminates the need for daily checking of fluid levels with manual dipsticks.

Coolant over temperature sensors are only capable of sensing excessive coolant temperature caused by clogged radiators, malfunctioning thermostats, failed water pumps or any other “circulation” problem. Upon loss of coolant, however, these temperature sensors must try to respond to hot air which, being a poor thermal conductor, results in signals that arrive only after the engine is severely damaged.

In a like manner, under leaking oil conditions low oil pressure signals are not obtained until the oil pump is starved for oil. Since the oil pump draws liquid from the very bottom of the crankcase pan, these signals arrive only after virtually all oil has been lost. Again, the damage has already occurred.

The liquid level sensor provides an early warning that fluid is being lost and allows corrective action to be taken before damage can occur. By using a sensor to turn on an indicator light, the low fluid level condition is communicated immediately to the operator.

## **ENGINE COOLANT**

The coolant level sensor is located in the upper radiator reservoir. The corresponding LED indicator light is included in the display module.

## **ENGINE OIL**

The engine oil sensor is in the engine oil sump. It monitors the oil level at approximately the 50% level. The corresponding LED indicator light is located to the right of the instrument panel at the engine enclosure console in clear view of the driver.

## **POWER STEERING FLUID**

The power steering fluid sensor is located in the power steering fluid reservoir at the same level as the “Add” indicator on the dip stick. The corresponding LED indicator light is located to the right of the instrument panel at the engine enclosure console in clear view of the driver.

## **FUNCTION**

The LED indicator lights will illuminate when the ignition is placed in the ON position as a test to insure that the warning circuits are working. They will go out when the starter button is pressed if normal fluid levels are detected. One or more of the lights staying on indicates a low fluid level in the corresponding system(s). Any time the engine is ON and a low fluid level is detected, the appropriate light will illuminate. The sensor output will reset when the ignition is turned off.

## **TRANSMISSION OIL**

The transmission oil sensor is in the transmission oil sump. The fluid level indicator is integrated into the shift selector. Accessing the fluid level status is dependent upon the style of shift selector provided.

The transmission fluid level status is accessed through the “mode” function of the shift selector controls. First, park the vehicle on a level surface, shift to N (Neutral), and apply the parking brake. If equipped with a pushbutton shift selector, simultaneously press the Up and Down arrow buttons. If equipped with a lever shift selector, press the display mode button one time. A code will be displayed on the shift controls indicating that the oil level is HI, LO or OK. If the level is HI or LO, the display will also indicate the number of quarts of oil necessary to be added or removed to bring the oil level into the OK range. It may also display an error code that explains why fluid level information is not available. The fluid level check may be delayed until the following conditions are met:

- The fluid temperature is above 60°C (140°F) and below 104°C (220°F).
- The transmission is in N (Neutral).
- The engine is at idle.
- The transmission output shaft is stopped.
- The vehicle has been stationary for approximately two minutes to allow the fluid to settle.

See the Care and Maintenance section of the transmission Owner’s Manual for a more detailed description of the fluid check procedure along with a complete list of error codes.

## **DRIVELINES**

Universal joints and driveshafts shall be SPICER 1760 series or equal. The driveshaft tube shall be a minimum of 4.09" diameter with a .180" tube wall thickness. The driveshaft slip joints shall be coated to reduce sliding friction and thrust under high torque loads. Permanent driveline installations shall be balanced to prevent vibration.

## **FUEL TANK**

The fuel tank shall have a capacity of 50 gallons (US) and be D.O.T. certified. It shall be mounted with stainless steel straps bolted to the bottom frame flange to allow for easy removal. The tank construction shall be of 12 gauge steel with single fuel pickup and return tubes. The baffled tank shall be vented to prevent low vacuum and facilitate rapid filling.

The tank shall have a 2.00 inch NPT fill to the driver's side of the chassis.

The fuel tank sending unit is to be mounted to the driver's side of the fuel tank for easy replacement without removing body panels.

## **FUEL LINES**

Polyamide fiber, nylon braided, reinforced tubing with push-on reusable fittings shall be provided for the chassis fuel lines.

## **FUEL/WATER SEPARATOR**

The Cummins engine shall be equipped with an integrated fuel / water separator with a self venting bottom drain valve. This filter shall be able to remove up to 95% of dissolved water and up to 99% of free standing water.

## **ALTERNATOR**

A 360 Amp NIEHOFF alternator shall be installed on the engine. The alternator shall be regulated by a remote mounted regulator.

## **PUMP DRIVELINE JACKSHAFT**

A temporary driveline "jackshaft" shall be installed on the chassis to facilitate pump mounting by the apparatus manufacturer. The design is such that the temporary "jackshaft" is placed where the pump transmission shall be on the finished apparatus. The apparatus manufacturer shall remove the "jackshaft" and install the water pump and reinstall the permanent drivelines. NO driveline modification is required by the apparatus manufacturer.

The permanent driveshafts shall be balanced from the chassis manufacturer.

## **FIRETRUCK CAB**

The apparatus shall be designed to operate in emergency conditions. These conditions require the apparatus to maneuver into confined areas, and operate at prolonged periods of time, under extreme circumstances. To facilitate in these operations a cab-over-engine design is required in order to reduce the overall length, and turning radius of the apparatus thus increasing the maneuverability.

The cab design must be such to provide safe and efficient transport of emergency personnel. The cabin shall be designed with four (4) side doors of the largest size possible and with a grab handle and step arrangement to provide ease of entry and egress.

There shall be up to ten (10) positions available for occupant transport pending cab configuration. The number of seats and seating locations are described in detail later in this document.

The apparatus cab shall be of the latest in automotive design, styling and appearance.

## **CAB MATERIALS AND CONSTRUCTION**

The extruded aluminum cab shall have the following material gauges as a minimum:

- Cab floor - 3/16 inch (.190 inch) aluminum
- Front skin - 3/16 inch (.190 inch) aluminum
- Cab side panels - 3/16 inch (.190 inch) aluminum

- Cab rear wall - 3/16 inch (.190 inch) aluminum
- Cab driver's floor - 3/16 inch (.190 inch) aluminum
- Cab officer's floor - 3/16 inch (.190 inch) aluminum
- Cab crew area floor - 3/16 inch (.190 inch) aluminum
- Cab roof - 3/16 inch (.190 inch) aluminum
- Cab doors - 3/16 inch (.190 inch) aluminum

**Roof Rail Section:** Extending from the front to the rear of the cab, above the doors, the cab shall have an extruded aluminum section. This section shall be designed to interlock with the roof sheet and incorporate the door drip molding in one single piece.

**Upper Transverse Member:** Amid ship in the cab there shall be a boxed beam header assembly located transverse in the cab from left to right.

**Front Door B-Post:** This vertical box section of the cab located behind each of the front doors provides the slam post for the door latch assembly. This section also is a main member in the cab skeletal system. The B-Post ties into the Upper Transverse Member to provide torsional stiffness in the open space design of the cab.

**Rear Door D-Post:** The box assembly design of the rear door D-post provides an anchor for the rear door latch assembly. This section is the main vertical support at the cab rear corner providing the anchor point for the rear wall structural lattice network.

**Roof Panel Rails:** The roof panel sub-assembly shall have extruded hat section supports bonded to the roof skin. These roof hat sections shall be joined to the Cab Roof Rail Section to complete the upper cab skeletal structure. These completed Roof Panel Rails shall provide a grid for maximum roof crush and deflection strength. The roof shall support a minimum weight of 250 lbs. / sq. ft. without permanent roof deformation.

**Rear Wall Rails:** The rear wall assembly shall have extruded hat section supports bonded to the wall skin. These sections shall be joined to the Roof Panel Rails and to the rear door slam post and floor provide a rear wall grid structure with maximum strength.

**Cab Front Wall:** The front wall of the cab shall be designed with a double wall construction to reduce the effects of exterior noise in the crew and operator compartment.

## **CAB DIMENSIONS**

The cab shall have the following dimensional requirements:

- Overall Width - 100.00 inches
- Roof - 12.00 inches Raised
- Center of front axle to back of cab - 60.00 inches
- Center of front axle to front of cab - 74.00 inches
- Windshield area - 4,200 sq. in. minimum
- Front grille opening - 478 sq. in. minimum
- Combined side grille opening - 84 sq. in. each minimum
- Cab full tilt angle - 45 degrees minimum

The cab interior shall have the following dimensional requirements:

- Drivers side floor width - 22.50 inches minimum
- Floor to the ceiling in the driver and officers area of the cab - 59.50 inches minimum
- Floor to the top of the engine enclosure - 28.00 inches maximum
- Officers side floor width - 24.50 inches minimum
- The measurement across the floor from the rear wall to the first vertical portion of the engine enclosure - 43.25 inches and the floor width from step well to step well shall be no less than 84.00 inches
- Floor to the ceiling in the rear of the cab - 65.50 inches minimum

## **CAB DOORS**

The cab entry and egress shall be designed for a firefighter in full turnout gear. Each door shall open a minimum of ninety degrees to afford the firefighter maximum space.

The doors shall be of a flush design each having exposed, one-piece, polished stainless steel hinges. The hinge shall be made of 12-gauge material with a minimum hinge pin diameter of 1/4 inch.

The door windows shall have interior and exterior glass weather seals to prevent the influx of exterior air.

The doors shall have exterior and interior paddle type latches for ease of opening with a gloved hand. The paddle latches are to have a rubber gasket, on the outside, separating the handle from the finished painted surface.

## **FRONT DOORS-BARRIER STYLE**

The cab front doors shall be of the barrier design with an open lower step area. The doors shall be a minimum of 38.75 inches wide by 64.00 inches high. Each door shall have a roll down window with a minimum glass viewing area of 773 square inches per door. There shall be a fixed piece of forward glass in each of the front doors.

## **REAR CAB DOORS-BARRIER STYLE**

The rear cab doors shall be similar to the forward doors and shall be located directly behind the front wheel well area. These doors shall be 34.00 inches wide by 76.00 inches high. Each door shall have a roll down window with a minimum glass viewing area of 670 square inches per door.

## **INTERIOR DOOR LOCKS**

All doors shall have door locks with interior controls and exterior keyed door locks. The installation shall be in conformance with FMVSS 206, with specific adherence to 49 CFR 571.206 Section 4.1.3 requiring that "Each door shall be equipped with a locking mechanism with an operating means in the interior of the vehicle". All doors shall be keyed alike. The doors shall be equipped with appropriate safety interlocks to prevent accidental locking of the doors when closed.

## **CAB GLASS**

AS-1 safety laminate glass shall be used in a two piece, wrap around design with a minimum 3760 square inches of windshield area for maximum visibility. The windshield shall have the style of a one-piece assembly with the practical installation of two pieces for lower replacement cost. The windshield shall be readily available from a nationally recognized automotive glass manufacturer that maintains local distribution outlets.

All glass shall be tinted.

All fixed glass shall be installed with a one-piece triple locked rubber lacing material. Due to long term appearance two-piece chrome trim lock lacing is not desired.

## **SUNVISORS**

The driver and officer side of the cab shall be equipped with a sun visor. The vinyl covered visors shall be a minimum of 19.00 inches by 7.00 inches.

## **DRIVER SIDE ELECTRICAL CABINET**

An electrical cabinet designed to house the main battery electrical disconnect and facilitate the installation of an onboard battery charger or battery conditioner, shall be provided under the driver's seat. A bolt on limited access; aluminum zolatone painted hatch, shall be installed on the front side of the seat riser. The access hatch shall have a louvered section to provide air circulation to the cabinet.

## **WINDSHIELD WIPERS**

Two speed electric pantograph wipers shall be installed. These wipers shall have minimum 24.00 inch blades and have 28.50 inch wet arm electric pump washers. A 70 ounce minimum windshield washer reservoir shall be furnished.

## **FASTENERS**

All cab exterior fasteners shall be stainless steel type fastened to the cab with nutserts.

## **BATTERY ACCESS**

The rear cab steps shall have a removable kick panel, providing access to the batteries for routine maintenance and inspection.

## **CAB CORROSION TREATMENT**

The cab shall have a corrosion preventative material conforming to Mil Spec C-16173-C, Grade 1, applied during and after construction. A 10-year warranty against perforation due to rust or corrosion shall be furnished for the cab.

## **TRANSMISSION SELECTOR**

The transmission shall be controlled by a push button type shift control. It shall be internally illuminated for night operation.

## **TRANSMISSION OIL LEVEL SENSOR**

The transmission shall be equipped with the oil level sensor (OLS). This sensor shall allow the operator to obtain an indication of the fluid level from the shift selector. The sensor display shall provide the following checks, correct fluid level, low fluid level and high fluid level.

## **EXTERIOR DOOR HANDLES - BRIGHT FINISH**

The cab exterior door handles shall have a bright anodized finish.

## **CAB STEP DIMENSIONS**

The front cab steps shall have the following overall dimensional requirements:

- Upper step size 10.25 inches deep by 29.00 inches front to back
- Lower step size 12.00 inches deep by 39.00 inches front to back

The rear cab steps shall have the following overall dimensional requirements:

- Upper step size 6.00 inches deep by 23.00 inches front to back
- Lower step size 9.00 inches deep by 21.00 inches front to back

## **INTERIOR CAB STEP TRIM**

The upper cab steps shall be enclosed behind each entry door. The lower step shall be open, and will be sealed from the underside of the cab to reduce road splash from entering the step area while the vehicle is in motion. The horizontal upper step surfaces shall be integral to the cab, and shall be covered with bright aluminum tread plate. The lower cab steps shall be constructed from stainless steel Laser Grip material, meeting the requirements of NFPA-1901.

The vertical toe kick surface area of the upper cab step wells shall be covered with aluminum tread plate.

## **CAB ENTRY STEPS - BRIGHT FINISH**

The cab entry steps shall have a bright finish.

## **LOWERED CHASSIS CAB STEPS**

There shall be bolt on auxiliary steps for all four (4) cab entry doors that shall be lowered to provide a manageable ground to first step distance. These steps shall be open style for ease of access and constructed with a non-skid stepping surface.

## **AUXILIARY CAB STEPS - BRIGHT FINISH**

The auxiliary cab steps shall have a bright finish.

## **DEF FILL**

The left rear crew step area shall have hinged access to fill the DEF tank without raising the cab.

## **HEATER / DEFROSTER**



A 57,600 BTU heater with a three speed fan shall be mounted in the front of the cab, centered over the windshield. This heater shall have six (6) adjustable vents to assure windshield defogging.

### **DEFROSTER FANS**

Two (2) 6.00 inch windshield defroster fans shall be mounted on the overhead console, one (1) each side of the center of the cab.

### **45,000 BTU AIR CONDITIONING**

A climate control system shall be furnished in the cab. The system shall consist of a 45,000 BTU air conditioning evaporator and 33,400 BTU heater centrally located on the forward slope of the raised roof.

The system is to have a 13.1 cu. in. minimum compressor mounted on the engine to provide the compressed refrigerant to the system. The compressor is to be plumbed to a heavy duty truck, triple fan air conditioning condenser mounted on the cab roof. The condensing unit shall have an aerodynamic shroud that is painted to match the color of the cab roof. There shall be an extended life filter receiver/dryer with a pressure relief valve installed to protect the system from contaminates, moisture, and high pressure. It is to have a sight glass for visual inspection and ease of service.

The evaporator shall have an externally equalized expansion valve and be thermostatically protected to prevent freeze up. Dual high performance 3-speed blowers shall provide a minimum of 650 CFM air flow. Each blower is to be controlled separately. Eight (8) downward facing adjustable diffusers with shutoff capability shall be utilized to direct the air flow through the cab.

The air conditioning controls, on/off switch, thermostat control, and blower switches shall be located on the climate control display module within reach of the driver.

The climate control system shall utilize both automatic and manual control methods.

The climate control display's system standby screen shall maintain all of the climate control functions OFF.

The climate control display's automatic operation screen shall allow the user to select a desired temperature and the climate control system shall automatically choose the temperature mode (cool or heat) and the fan speed (low, medium or high) to maintain the desired temperature.

The climate control display's manual operation screen shall allow the user to set the temperature mode (cool or heat) and the fan speed (low, medium or high) as desired.

### **FLOOR HEAT - DRIVER & OFFICER**

There shall be two (2) quartz heaters provided for floor in the front of the cab, one (1) for the driver and one (1) for the officer's floor area.

The heater shall contain polymer composite heating elements encapsulated in a vacuum sealed quartz tube specifically designed for direct current. The polymer elements shall feature a life expectancy of 10,000 hours and shall be designed to be the ultimate in durability where vibration, moisture, and durability may be a factor. The polymer element shall be vacuum sealed in a "Ruby" Quartz tube to protect it from any moisture or harsh



conditions. Injection molded high temp silicone tube boots shall be designed to absorb vibration and will minimize any shock to the elements.

There shall be one (1) on/off switch provided on the seat box for the driver and one (1) on/off switch provided on the seat box for the officer.

## **EMI/RFI PROTECTION**

The apparatus shall incorporate the latest designs in the electrical system with state of the art components to insure that radiated and conducted electromagnetic interference (EMI) and radio frequency interference (RFI) emissions are suppressed at the source.

The apparatus proposed shall have the ability to operate in the environment typically found in fire ground operations with no adverse effects from EMI/RFI.

EMI/RFI susceptibility is controlled by utilizing components that are fully protected and wiring that utilizes shielding and loop back grounds where required. The apparatus shall be bonded through wire braided ground straps. Relays and solenoids that are suspect to generating spurious electromagnetic radiation are diode protected to prevent transient voltage spikes.

In order to fully prevent the radio frequency interference the purchaser shall be requested to provide a listing of the type, power output, and frequencies of all radio and bio medical equipment that is proposed to be used on the apparatus.

## **BATTERY BOX TRAY - STAINLESS STEEL**

The battery box trays shall be stainless steel to reduce the corrosive potential of the tray. The battery hold down and brackets and hardware shall also be made of stainless steel.

## **BATTERY BOX COVER - STAINLESS STEEL**

To reduce road spray a stainless steel cover shall be installed on each battery box.

## **BATTERY BANK**

A single battery system shall be provided, utilizing four (4) high cycle type Group 31 batteries.

This system shall be capable of engine start after sustaining a continuous 150 amp load for 10 minutes with the engine off (NFPA-1901).

A battery disconnect switch (Rated at not less than 450 amps continuous) shall be used to activate the system and provide power to the power panel. A green pilot light shall illuminate to indicate that the battery bank is activated.

## **BATTERY CABLES**

All battery wiring shall be "GXL" battery cable capable of handling 125% of the actual load. It shall be run through a heat resistant flexible nylon "HTZL" loom rated at a minimum of 300 degrees Fahrenheit. All cable connections shall be machine crimped and soldered.

## **STARTING CIRCUIT**

One (1) engine start button is to be located on the lower right dash panel. It shall be wired to heavy duty solenoid rated at not less than 1100 amps. The battery indicator light is to be located directly above the start button to indicate that the battery bank is on.

## **BATTERY POWER BUS BARS**

There shall be solid copper buss bars utilized for the direct connections between batteries. These buss bars shall be nickel plated for corrosion resistance and provided with color coded heavy shrink tube between the batteries for short circuit protection.

## **BATTERY ON INDICATOR LIGHT**

A steady burning blue Whelen OS Series LED shall be mounted on the driver's dash facing forward to be seen from outside the front of the cab. The light is to illuminate whenever the battery switch is in the on position and the parking brake is set.

## **BATTERY CHARGER**

A Kussmaul Chief Series Auto Charge 4012, 40 Amp, Triple Battery Bank Charger with onboard display shall be installed for charging the batteries. Automatic sensing of the battery condition shall stop charging when the batteries are fully charged.

The charger shall be installed behind the driver's seat in the cab.

The charger shall include the following features:

Dual Battery Type Technology – allows for two (2) dissimilar battery chemistry charging at the same time. Accommodates Flooded, Gelled Electrolyte, AGM, Odyssey®, Lithium Iron Phosphate (LFP), and customized.  
Parasitic Load Compensation (PLC) – allows for user input of total accessory load amps on the vehicle. This allows the charger to shift the absorption stage set point, so the battery voltage drops to the float voltage when the desired current is reached.

Configurable for 3-step or float charging.

## **ON-BOARD ELECTRIC COMPRESSOR**

A KUSSMAUL AUTO AIR model 091-9-12V on-board air compressor shall be supplied. The 12 Volt Auto Pump air compressor designed to maintain the air pressure in the air brake system while the vehicle is not in use. A pressure switch senses when the system pressure drops and starts the compressor which then runs until pressure is restored. All ball bearing construction, lubricated for life, assures reliable operation and requires no servicing. Compressor Output: 0.35 CFM@60 PSI Pressure Switch: Adjustable Set Point-Factory set to 75 PSI Cut-in, 95 PSI Cut-out.

The compressor shall be located in the officer's side step well with a bolt on style access panel, the air compressor shall be permanently wired to the chassis 12 volt electrical system.

### **KUSSMAUL AUTO DRAIN AC**

A KUSSMAUL, AUTO DRAIN 091-9-131 moisture trap shall be installed in the output pressure line of the auto pump. The Auto Drain shall drain the moisture from the trap each time the compressor shuts down. A normally open solenoid valve drains the moisture from the trap each time the compressor shuts down. Easily installed on any 12VDC compressor, the Auto Drain assures that the filter bowl is always drained and does this without intervention by maintenance personnel.

### **REMOTE CONTROL PANEL**

A KUSSMAUL 091-266-RCP remote control panel shall be provided.

### **REMOTE CHARGE INDICATOR LOCATION**

The remote charge indicator shall be located on the driver's seat box adjacent to the master battery switch.

### **SHORELINE AUTO-EJECT**

A KUSSMAUL Super Auto Eject, model 091-55-20-120-XX, with weatherproof cover shall be provided.

The Super Auto Eject is to be completely sealed to prevent internal contamination of the working components.

The internal switch arrangement of the Super Auto Eject shall be designed to close and open the 120-Volt AC circuit after the mating connector is inserted and before the connector is removed. This design shall prevent arcing at the connector contacts to provide long life.

The electrical connection shall be provided as a 120-Volt AC - 20 Amp type using a NEMA 5-20P connector.

### **ELECTRICAL INLET COVER**

The Super Auto-Eject Deluxe OLED cover shall be a Kussmaul 091-55-266-XX model with volt and amp readings built into the cover.

### **ELECTRICAL INLET COVER COLOR**

The Auto-Eject cover shall be yellow in color.

## **ELECTRICAL INLET LOCATION**

The Auto Eject assembly shall be mounted on the exterior of the cab behind the driver's door.

## **BATTERY JUMPER STUDS**

Battery jumper studs shall be provided on the chassis. The jumper studs shall be mounted underneath the cab, on the rear of the driver's side battery box. The studs shall be connected to the chassis batteries with 1/0 color coded cables, red for the positive cable and black for the negative cable. The studs shall be protected with color coded plastic covers when not being used.

## **ENGINE ENCLOSURE**

To reduce the noise in the cab the engine enclosure metal on the inside of the cab shall be completely covered with Acoustiblok sound isolation material. The material shall be sealed at all seams with acoustical sealant.

The engine enclosure inside the cab will be padded with an additional layer of sound and heat absorbing foam and covered with heavy duty vinyl trim upholstery to match or accent the interior of the cab.

The underside of the engine enclosure shall be covered with a sandwiched material for interior cab noise and heat rejection. This sandwiched acoustical material shall have one layer of 1/8" foam, a 3/16" single barrier septum and a 7/8" layer of foam to provide an overall thickness of 1-3/16". The sandwich material shall be chemically bonded to prevent layer separation. A finished surface treatment of metalized film shall be provided on the engine side of the barrier. The acoustical barrier shall be held in place with mechanical fasteners in addition to adhesive.

The insulation for protection from heat and sound shall keep the dBA level within the limits stated in the current edition of NFPA 1901.

## **CAB DOORS - INTERIOR TRIM**

To provided durability the interior of the cab doors shall be finished with full length aluminum panel that is finished with Zolatone high abuse paint.

## **INTERIOR CEILING PADDING AND TRIM**

The cab front interior ceiling shall have a one-piece, removable, vinyl headliner to cover all wiring and tubing used for lights and antenna leads.

## **REAR WALL COVERING**

The rear interior wall of the cab shall have a two-piece, removable, wall covering to finish the interior trim, cover all wiring and tubing used for lights and antenna leads.

## **FLOOR COVERING**

The front and rear floor areas of the cab shall be covered with "HUSHCLOTH" sound barrier floormats. This floormat shall be a three ply material with a 3/16" thick open cell isolation barrier of Polyurethane, a 3/32" thick closed cell Nitrile mid barrier for section reinforcement, and a 1/16" thick embedded pebbled grain wear surface.

## **REAR FACING SEAT BOX COVERING**

The rear facing seat box area of the cab shall be covered with "HUSHCLOTH" sound barrier floormat. This floormat shall be a three ply material with a 3/16" thick open cell isolation barrier of Polyurethane, a 3/32" thick closed cell Nitrile mid barrier for section reinforcement, and a 1/16" thick embedded pebbled grain wear surface. The seat box covering shall blend with the cab interior paint color.

## **REFLECTIVE MATERIAL - INTERIOR CAB DOORS**

The cab front and crew doors shall have a SecuriTrim chevron installed inside each door. The reflective material shall be red/yellow diamond grade 3M 983.

## **LED WARNING LIGHTS - CAB DOOR FOSTER LIGHT**

The interior of each door shall include one (1) 16 inch long X 3/4 inch tall amber Weldon LED warning light. The light shall be mounted on the inside of the door above the door window to the extreme outboard edge of the door so it is visible from the rear of the vehicle. As a traffic warning indicator the light shall activate with a scrolling directional flash pattern which moves from the door hinge area outward on the respective door when it is in the open position.

## **STEERING WHEEL AND COLUMN**

The steering column shall be a DOUGLAS tilt / telescopic type with an integral high beam / turn signal control switch. The column shall have self-canceling design for the turn signal switch. A 4-way warning "Hazard" light switch shall be mounted on the column. For safety, a rubber boot shall be installed to cover the steering shaft from the dash to the floor.

The steering wheel shall be a VIP, 18-inch diameter wood accent-leather wrapped 4-spoke wheel. A lever on the left side of the steering column shall control the telescopic feature.

## **GRAB HANDLES**

One (1) molded grab handle shall be installed on the driver's side on the A Post.

One (1) additional molded grab handle shall be installed inside the cab. The handle shall be located on the officer's side on the A Post.

Two (2) additional molded grab handles shall be installed in the cab. These handles shall be located one each side on the B Posts side of the crew area doors.

## **RADIO COMPARTMENT**



Beneath the officer's seat there shall be a radio compartment with an interior dimensions of 19-1/2" wide x 17" long x 7" high.

### **COMPARTMENT OPEN LIGHT**

A Red Open Compartment Flashing Light, Whelen OS Series LED shall be mounted on the driver's side face of the overhead panel. A chrome flange is to be supplied with the light.

This light is wired with a flasher to the power panel for completion to circuit on the body.

The light circuit shall be wired so that the light circuit is deactivated when the parking brakes of the apparatus are applied.

A label shall be applied adjacent to the light '**DOOR OPEN**'.

Interior Lighting Group - 1871W - 1871SFO

LED Strip Light Interior Light Packages

### **CAB FLOOR LED STEP LIGHTING**

The floor of the cab shall be trimmed with a ribbed aluminum extrusion. The extrusion shall protrude as a approximately 3/4" over the floor area to provide a mounting channel and guard for an LED integrated light. The LED lighting shall illuminate the step area of the cab and all step lights shall be illuminated when any door is opened and the battery selector switch is in the on position. The lighting shall be operable in either white or red depending upon control circuitry.

### **DRIVER & OFFICER AREA LED CAB LIGHTING**

There shall be a white LED strip lighting mounted above the full length of each front door in the cab. The strip light shall be mounted in an aluminum extrusion and shall face the center of the cab. The lighting shall be operable in either white or red depending upon control circuitry.

The lighting shall be operated opening a cab door.

The red LED lighting for the officer door and rear crew area doors shall be operated by a switch in the driver's area.

No Driver Controlled White Light Switch

### **CREW AREA LED CAB LIGHTING**

There shall be a white LED strip light mounted in the cab. The LED strip light shall be mounted on the bolster in the center of the cab and shall run the full width of the cab. The strip light shall be mounted in an aluminum extrusion and shall face the rear of the cab. The lighting shall be operable in either white or red depending upon control circuitry.

## **LIGHT - ACTIVATION**

The lighting shall be activated by opening a cab door.

## **CREW AREA WHITE LED CAB LIGHTING**

There shall be a white LED strip light mounted in the cab. The LED strip light shall be mounted at the ceiling on the rear wall and shall run the full width of the cab. The strip light shall be mounted in an aluminum extrusion and shall face the rear of the cab. The lighting shall be operable in either white or red depending upon control circuitry.

## **LIGHT - ACTIVATION**

The lighting shall be activated by opening a cab door.

## **CREW AREA WHITE LED CAB LIGHTING**

There shall be a white LED strip lighting mounted above the full length of each cab crew door in the cab. The strip light shall be mounted in an aluminum extrusion and shall face the center of the cab. The lighting shall be operable in either white or red depending upon control circuitry.

The lighting shall be operated opening a cab door.

## **No Crew Area Red Light Switch**

All interior cab lighting controlled by the door opening switch circuit shall be color selected by a switch in the driver's area. The selected color shall stay 'in-state' until the selector switch is changed by the driver. Resetting the battery selector switch shall not change the state of color selected.

## **DRIVER'S / OFFICER'S DASH AND SWITCH PANEL**

The housings for the driver's instrumentation and the officer's side housing shall be rugged aluminum fabrications. There shall be a rugged aluminum housing on the top of the engine enclosure between the driver and officer side housings that shall house:

- warning light control switch panel
- siren control head - recessed
- a position for two-way radio installation.

## **CUP HOLDERS**

There shall be two (2) recess mounted cup holders mounted on top of the engine enclosure console.

## **DRIVER INSTRUMENTATION AND CONTROLS**

The gauges shall have red LED back lighting for enhanced visibility. Upon on initial ignition sequence a lamp check function shall illuminate the warning light telltales, the self diagnostic message center shall sequence the

warning light telltales if data link communications are lost. The instrument panel shall include the following gauges and indicators.

- Electronic speedometer with LCD odometer
- Tri cluster gauge that includes:
  - Electronic tachometer
  - Engine coolant temperature gauge, with warning light and buzzer
  - Engine oil pressure gauge, with warning light and buzzer
- Transmission fluid temperature gauge, with warning light and buzzer
- Two air pressure gauges, with warning light and buzzer
- Voltmeter, with low voltage warning light and buzzer
- Fuel level gauge
  
- High beam indicator light
- Parking brake set light
- Turn signal indicator lights

The lighting control panel is to be located to the left side of the instrument panel. The lighting control panel shall include the following:

- Headlight control switch
- Dash rheostat for instrumentation lighting control
- Wiper and washer control switches

The engine control panel is to be located beneath the instrument panel on the driver's right hand side. The engine control panel shall include the following:

- Keyless ignition switch with a green pilot light

The apparatus control panel is located beneath the instrument panel on the driver's left hand side. The apparatus control panel is designed for the location of pump shift controls.

### **AUDIBLE TURN SIGNAL REMINDER**

There shall be an audible alarm that shall sound when the turn signal remains flashing for a distance greater than one mile. The reminder shall not sound when the hazard lights are operating.

### **AUDIBLE LIGHTS ON REMINDER**

There shall be an audible alarm that shall sound when the headlight switch is left in the on position and the ignition is off. The alarm shall self cancel after 2 minutes of operation.

### **AUDIBLE PARKING BRAKE REMINDER**

There shall be an audible alarm that shall sound when the parking brakes are NOT set and the ignition is turned off. This alarm shall self cancel after 2 minutes.



The Parking Brake reminder shall sound an audible alarm when the parking brakes are set and an indicated speed of over two miles per hour occurs.

## **DUAL TRIP ODMETERS**

There shall be two (2) trip odometers in the driver's information center. Each shall be capable of independent operation and reset. They shall be labeled Trip1 and Trip2 when the trip mileage is shown in the LCD panel.

## **SPEEDOMETER ACTIVATED IN PUMP MODE**

The speedometer and odometer shall be activated while in pumping mode.

## **LOW FUEL LIGHT**

A "Low Fuel" warning light and alarm shall be installed in the dash message center. This light shall illuminate when the apparatus fuel level reaches 25% of the fuel remaining.

## **TRANSMISSION OVERHEAT WARNING LIGHT**

A transmission oil temperature light with alarm shall be provided on the dash message center.

## **LOW VOLTAGE WARNING**

A low voltage indicator light shall be installed on the dash message center. An alarm and the dash indicator light shall activate when the system voltage drops below 11.8 volts.

## **AIR CLEANER RESTRICTION INDICATOR**

An air cleaner restriction indicator shall be installed in the driver's message center. The indicator shall provide visual warning when a high air restriction condition exists for a minimum of 4 seconds.

## **LOW COOLANT WARNING**

Low coolant warning shall be accomplished through the engine electronics to provide driver warning via the engine stop warning light.

## **INTERMITTENT WIPER CONTROL**

A rotary combination intermittent electric wiper / washer switch shall be provided on the left hand side of the driver's dash.

## **BACKUP PROXIMITY SYSTEM**

The Vehicle Safety System sensors shall be designed to detect objects within a five-foot range of the rear bumper without requiring any calibration to aid in backing up or parking the vehicle. When the vehicle is in reverse, the sensors will trigger a speaker in the cab to emit an audible alert if an object should happen to get too close. As the vehicle continues to back up, or as the object moves closer, the beeping will get more frequent. If the object

comes within 16.00 inches of the bumper, a solid tone will sound. Audio speaker has three volume levels, low, high and off, to suit driver preferences.

## **CONTROL CENTER**

Mounted on the engine enclosure there shall be a driver / officer control center. This area shall include various controls and functions that must be available to the driver and officer. On the top of the control center there shall be an access panel for maintenance and troubleshooting of devices mounted on the control center.

The switch panel shall be a Class 1 Smart Programmable Switch (SPS) panel installed as a multiplexed node to provide input and output information to the apparatus electrical system. The panel shall have ergonomic rubber molded rocker type switches with backlighting.

The panel shall include one (1) function as a master control switch to allow for preselection of response mode functions. The remaining switches shall be programmed and labeled with the manufacturer standards as to the custom options selected for the vehicle.

## **SWITCH PANEL MODULE**

The switch panel shall include sixteen (16) rocker type switches for use by the apparatus manufacturer for the custom options selected for the completed apparatus.

## **PARKING BRAKE CONTROL VALVE**

The parking brake control valve shall be located in the driver's dash engine control panel.

## **WHITE WARNING LIGHT CUT-OUT SWITCH**

One switch position shall be provided to turn off all forward facing white warning lights for use in inclement weather.

NO Outside Temperature Module Provided

## **MULTIPLEXED ELECTRICAL SYSTEM**

The apparatus shall be equipped with a Class 1 ES-Key Management System for complete control of the electrical system devices. This management system shall be capable of performing load management functions, system monitoring and reporting, and be fully programmable for control of the electrical system.

The ES-Key system shall utilize a Controller Area Network (CAN) to provide multiplexed control signals for "real time" operation. The system shall consist of the following components:

- *Universal System Manager (USM)* - The USM device shall be the CAN network controller and provide various functions to the apparatus such as load management. The USM shall be programmed from a network interface to a PC computer.

- *Power Distribution Module(s) (PDM)* - The PDM shall be a control device on the network with a primary function as power distribution. Receiving control signals from the USM the PDM turns on and off relays providing power to its connected loads. The PDM also shall contain digital switch inputs allowing for input clustering throughout the apparatus.
- *Information Display Module* - For displaying text, warnings and diagnostics. The information Display Module shall allow the fire department to access and change load management shedding priority and maintenance text listing the routine maintenance items and lubrication capacities on the apparatus.
- *Input / Output Module* - The module shall have 16 inputs to communicate with the USM and 3 outputs for various chassis functions.

The ES-Key system shall provide diagnostic capabilities for troubleshooting the electrical system of the apparatus.

### **CHASSIS COLOR CODED WIRING**

All chassis wiring shall be type "TXL" in accordance with S.A.E. J1128 and NFPA-1901. ALL wiring shall be **COLOR CODED** and continuously marked with the circuit number and function.

All wiring to be covered in nylon heat resistant "HTZL" loom rated at a minimum of 300 degrees F exceeding the heat requirements of NFPA-1901.

A battery "loop back" ground circuit shall be supplied for the EDS system to reduce the possible effects of Electromagnetic and Radio Frequency Interference.

The chassis cab, engine and transmission shall be electrically bonded to the chassis frame rails with braided ground straps.

### **ELECTRICAL SYSTEM CONNECTORS**

All multiple conductor electrical connections shall be made with Packard electrical connectors. The Packard connectors shall become mechanically locked when mated.

All single wire terminations requiring special connectors with a ring or spade terminal shall be crimped, and wrapped with heat shrink tubing.

### **INFORMATION DISPLAY MODULE**

The Information Display Module for displaying text, warnings and diagnostics. The information Display Module shall allow the fire department to access and change load management shedding priority and maintenance text listing the routine maintenance items and lubrication capacities on the apparatus. For displaying text, warnings and diagnostics.

### **DUAL PORT USB CHARGING PORT**



A 4.2 amp Dual USB charging port shall be installed in the driver's area of the cab. A second USB charging port shall be installed in the officer's area of the cab.

The USB charging port shall be powered with the battery power switch in the cab.

### **CUP HOLDER**

There shall be a cup holder mounted on top of the engine enclosure console. The black powder coated console shall include two (2) large cup holders and a Kussmaul 091-219 dual port USB charger.

### **BACKUP CAMERA**

There shall be an ASA Audiovox video system provided with the chassis cab.

### **BACK-UP CAMERA MONITOR**

The color monitor shall be manufactured by ASA.

The 7.00 inch color LCD monitor contains a water proof housing, circuit protection, backlit controls, integrated audio speaker, NTSC and PAL video signal compatible, 3-camera inputs, manual (pushbutton) or automatic (trigger) source selection, auto power on (standby) day / night brightness modes, on screen display (OSD) for AV source, picture adjustment and volume level, non-volatile memory for picture and volume adjustment settings, anti-glare / anti-scratch protective lens, detachable sunshield.

### **MONITOR LOCATION**

The monitor for the back-up camera shall be mounted in an overhead position visible to the driver.

### **REAR CAMERA - COLOR - HIGH PERFORMANCE**

There shall be supplied a color, heavy duty high resolution observation camera.

The back up camera system shall be powered with the battery power switch in the cab. Operation of the camera will be by the driver with the monitor controls.

### **CAMERA LOCATION**

The back-up camera shall be shipped loosed in the cab to be installed by the apparatus manufacture.

### **12VDC POWER POINT**

A 12 volt, socket (cigarette lighter) type, receptacle shall be provided with a protective hinged cover.

The power point shall be wired to switched battery power with the appropriate wire size and fuse.

The power point socket shall be provided within reach of the officer.

## **12Vdc POWER CIRCUIT**

A circuit protected 30 amp battery "hot" circuit, a circuit protected 30 Amp battery switched circuit, and a ground circuit with the proper wire size to handle the current shall be provided.

These circuits are provided for two-way radio and/or accessory wiring.

## **CIRCUIT TERMINATION LOCATION**

The radio / accessory power circuit shall terminate in the power panel area of the cab.

## **RADIO ANTENNA MOUNT WIRING**

One (1) NMO mount shall be roof mounted, on the officer's side of the cab.

The antenna mount shall be located 34.00 inches from the front face of the cab and 18.00 inches from the cab side.

The unterminated coax is to be routed in the cab to the radio power circuit termination or officer's seat box if no radio power circuit is requested.

The antenna wiring shall terminate in the center of the cab on top of the engine enclosure.

## **WEATHERPROOF CAP**

One (1) NMO mount black weatherproof cap shall be provided.

## **PUBLIC BROADCAST RADIO**

The cab shall be equipped with an AM/FM Stereo Radio and four (4) ceiling mount recessed speakers.

The radio shall be a Jensen JHD910BT model that shall include the following features:

- Waterproof
- uV and Corrosion Resistant
- Electronic US/Euro AM/FM Tuner
- 30 Programmable Presets (12 AM, 18 FM)
- Non-Volatile Memory for User Settings and Preset Memories
- 7-Channel NOAA Weather Band
- Weather Alert
- Bluetooth Ready
- Auxiliary Audio Input
- 2-Channel Amplified Audio Output



- Backlit Controls with Selectable Illumination Color
- Daylight Readable Display
- Clock with 30-day Backup Power
- Work Timer
- Audible Beep Confirmation Tone

### **ANTENNA**

The antenna shall be a JAN139 6.00 inch Rubber mast top JENSEN Antenna to withstand mobile audio environments with its heavy duty design.

The antenna shall be mounted to the front of the cab on the officer's side roof.

### **RADIO LOCATION**

The radio shall be mounted in the overhead headliner within reach of the driver.

### **ROAD SAFETY KIT**

One (1) 2-1/2# ABC DOT Approved fire extinguisher shall be provided. The fire extinguisher shall be shipped loose with the chassis.

One (1) set of DOT approved hazard triangles shall be supplied with the chassis. They shall be stored in a plastic case and shipped loose with the chassis.

### **CAB CRASHWORTHINESS TEST**

Dynamic tests shall be performed to evaluate the crashworthiness of the proposed vehicle cab configuration to the requirements of NFPA 1901-09 section 14.3.2.

Cab roof strength shall be tested utilizing the dynamic preload criteria from SAE J24221 paragraph 5 specifications and procedures.

Front impact strength integrity shall be tested utilizing SAE J24202 with ECE R293 Annex 3 paragraph 4 equivalent energy.

Quasi-static roof strength shall be based on SAE J2422 paragraph 6 and ECE R293, paragraph 5 specifications and procedures.

A letter of certification shall be provided upon request by the department.

### **EXTERIOR GRAB HANDLES**

The cab shall have extruded aluminum 24" grab handles at each door position. Molded rubber gaskets shall be installed under the grab handles to protect the painted surface of the cab.

### **EXTERIOR GRAB HANDLES - BRIGHT FINISH**



The cab exterior grab handles shall have a bright anodized finish.

### **FRONT GRILLE**

A stylized three-dimensional stainless-steel front grille shall be installed on the cab face

The front grille shall be equipped with a radiator rock guard, behind the grille to assist in preventing damage to the radiator core.

The cab shall have one (1) engine air intake, on each side of the cab. These openings shall be covered with a honeycomb wire screen, and a stainless steel grille.

THE CAB GRILLE SHALL BE DELETED

### **CAB GRILLES - BRIGHT FINISH**

The cab front grille and side grilles shall have a bright finish.

### **CAB MUDFLAPS**

Mud flaps shall be installed behind the front tires. These mud flaps shall be a minimum of 22" wide to protect the underneath of the cab and body.

### **CAB GROUND LIGHTING - LED**

There shall be one (1) white LED strip light in an armored extrusion shall be mounted beneath each cab door. These lights shall be designed to provide illumination on areas under the driver and crew riding area exits.

All cab ground lights shall automatically activate when any cab door is opened.

### **REARVIEW MIRRORS**

Mekra Lang Aero mirrors shall be provided and installed, one (1) on each side of the cab, with a break-away bracket.

The flat glass head shall be heated and remote control. Below the flat mirror there shall be a convex head.

The mirror heads shall have a smooth chrome plated high impact non-metallic housing.

No Mirror Options

### **CAB SIDE WINDOWS**

Two AS-2 tempered glass, fixed side windows, 26-1/2" high x 16" wide shall be furnished, one on each side behind the forward doors. All glass shall be tinted. These windows shall be installed with a one-piece triple locked rubber lacing material.

## **ELECTRIC WINDOWS**

The four (4) roll down door windows shall be equipped with electrically operated mechanisms to control the opening and closing of the windows. The controls shall be with a momentary switch in each door.

Three (3) additional switches shall be supplied in the driver's door to control all four (4) of the power windows from the driver's position.

## **POWERED DOOR LOCKS**

The cab doors shall be supplied with powered door locks. Each door shall have a switch to lock or unlock the doors.

There shall be a remote switch located adjacent to the cab tilt control in the event the doors are accidentally locked.

## **REAR WINDOW SAFETY BARS**

There shall be a one inch black powder coated grab bar installed on each rear door. This bar is to be installed on the rear door frame even with the window in the down position to prevent firefighters from using the glass in the door for a handle.

## **UNDER CAB ENGINE MAINTENANCE LIGHTS**

Two (2) LED engine maintenance lights shall be supplied beneath the cab. These lights shall illuminate automatically when the cab is tilted to the full tilt position.

## **STAINLESS CAB FENDERETTES**

To reduce road splash on the cab sides, stainless steel fenderettes shall be installed around each the wheel opening.

## **STAINLESS CAB FENDERETTES - POLISHED FINISH**

The cab fenderettes shall have a polished finish.

## **EXTERIOR REAR WALL DIAMOND PLATE OVERLAY**

The cab exterior rear wall shall be covered with a single sheet of bright aluminum tread plate to protect the back of the cab from scratches.

## **CAB TILT SYSTEM**

The cab shall tilt a minimum of 45 degrees for ease of serving. Tilting shall be accomplished by means of a tilt pump connected to two (2) heavy duty lift cylinders. It shall be equipped with a positive locking mechanism (service lock) to hold the cab in the full tilt position. Release of the service lock shall be by means of a pull type



cable assembly. The cylinders shall have a velocity fuse at the base to prevent the cab from falling in the event of a hydraulic hose failure. The cab shall be capable of tilting 90 degrees for major engine service, if necessary. The 90 degree cab tilt shall be accomplished by removing the cab cylinder pins, removing one bolt in the steering shaft, and removing the front bumper and treadplate.

The cab shall have a three (3) point cab locking system. To prevent undue stresses in the cab, the cab mounting shall incorporate a five (5) point load mounting system.

The front cab pivot/lock assemblies shall utilize four (4) radially loaded, bonded rubber, axial mounts. These mounts shall have a maximum radial load rating of 925 pounds each and a torsional rating of 25 lbs-in/deg. Two one (1) inch diameter cab pivot pins shall be installed at the front of the cab.

The rear cab lock shall be center point mounted to prevent normal twist of the chassis from affecting the cab mounting, cab structure and windshield areas of the cab. This rear cab lock shall be mounted on a chassis crossmember to provide a stable platform for the locking system. The cab lock shall be mounted to a baseplate that is fastened to rubber isolators to reduce road noise and provide additional movement of the cab lock. This locking system shall automatically open prior to the cab tilting and automatically relatch when the cab is lowered completely into the travel position.

Two (2) outboard frame mounted urethane "V" blocks shall be provided at the rear of the cab. These dual purpose mounts shall align the cab upon lowering as well as provide non-latching support for the cab in the down position. With this system, extreme chassis twist shall allow the cab to move independently of the rear cab supports, reducing the structural stress damage often caused by outboard dual cab locking systems.

An electric-over-hydraulic cab tilt pump shall be supplied. This pump shall have a remote control for cab tilting operation. The control shall be "safety-yellow" in color.

A manual backup shall be provided for use in the event of electrical failure.

## **CAB TILT INTERLOCK**

The cab lift system shall have a cab tilt interlock. The cab tilt shall not be able to be activated unless the master battery switch is in the on position with the parking brake set.

## **BACK-UP ALARM**

A solid state electronic backup alarm shall be installed on the rear of the apparatus and wired to the backup light circuit and shall activate when the transmission is placed into reverse mode.

## **INTERIOR FINISH**

The entire interior of the cab shall be painted with spatter paint, gray in color. Gray spatter paint is selected for ease of repairs when the interior is scratched.

The cab metal finish shall be covered with one coat of base self-etching primer to fill the small surface imperfections.

Then the interior of the cab is to be blocked and a coat of sealer-primer is to be sprayed to the interior finish.

Next a sealer primer is applied and shall be sanded to a smooth finish ready for final color coat application.

Two (2) coats of finished paint are to be applied to a final thickness of 4 mills.

The following interior components shall be finished in black:

- Overhead console
- Sun visors

The interior headliner of the cab shall be gray in color.

The interior rear wall covering of the cab shall be gray in color.

The interior flooring material of the cab shall be gray in color.

The interior door panel material of the cab shall be gray in color.

The engine enclosure covering material in the cab shall be gray in color.

The dash housing, engine enclosure console; when so equipped; and the officer's glove box or console shall be black in color.

## **CAB EXTERIOR FINISH**

The exterior doors and all fixed cab glass are to be removed from the cab prior to the paint and body process beginning.

The final finish of the cab shall be to fire apparatus standards; exhibiting excellent gloss durability and color retention properties.

## **PREPARATION**

The removal of all contaminants and oxidation is essential to the final effect of a finish system, the cab shall be precleaned with a Wax and Grease Remover and prior to evaporation, towel dried.

To remove all oxidation and foreign materials, the cab shall be sanded with a 180 grit abrasive using an orbital type disc sander.

All weld marks and other major surface imperfections shall be filled with a polyester type body filler, prior to body filler application special attention shall be given to the areas requiring filler again sanding and cleaning.

The body fillers shall be thoroughly mixed in accordance with the manufacturer's directions.

After the final coat of filler is sanded, spray polyester shall be applied in sufficient amounts as to provide a final base and sanded with abrasive paper.

## **PRECLEAN**

Within 45 minutes of pretreat the cab must be again washed with a Wax and Grease Remover using a "Scotch brite pad". Towel dry prior to evaporation.

Special precaution shall be taken NOT to saturate any polyester body fillers with the cleaning solvents.

## **PRETREAT AND PRIMERS**

The pretreat and primer applications shall be made in two independent steps. A combined pre-treat/primer one product application shall not be allowed as a substitute.

The prepared substrate shall be pretreated with an acid curing 2-component Transparent Primer. This pretreat shall be designed to provide corrosion protection and to create an adhesive bond between the substrate and the surface applications.

It is critical that the body fillers not receive a saturation of solvents associated with the pretreat application. Only the pretreat over spray resulting from product application to the adjacent metal areas should be allowed to come in contact with the body fillers.

All polyester body fillers are porous, and shall absorb liquids. Solvents when absorbed not only soften but shall create swelling of the polyester filler. After sanding and later shrink the fillers shall create blemishes in the painted surfaces.

Prior to complete primer application, each area with applied body fillers be precoat with a 2-dry applications of primer (sander surfacer) of which shall be allowed to "Touch Dry" between coats. This procedure shall isolate the filled areas and protect them from subsequent product applications.

The primer (sander surfacer) shall be a poly-acrylic resin, zinc and chromate free surfacer that is designed to create a superb surface smoothness, increase the depth of color, and insure top coat gloss.

The cab after pretreat and precoat shall be primed with a 3 to 4 medium applications of a Hi-Build Tintable Surfacer.

To create a finish base that meets the rigid requirements of the fire and emergency service; the primed surface shall be dry sanded smooth thus removing all texture and surface imperfections with a 320 grit (minimum) sanding abrasive.

## **FINISH AND COLOR COATS**

The color coat application shall consist of two to three applications of acrylic urethane color coat. After the color coat has been applied, the cabs shall be sprayed with 1.5 to 2.0 mills of clear coat finish. The clear coat finish is then sanded and buffed to remove any imperfections that can occur during the application of the color coat.

The final finish shall be free of dirt and sags and shall meet a minimum grade of 7 when compared to the "ACT" general orange peel standards by "ACT" Laboratories, Inc. Of Hillsdale, MI.

The final sanding and buffing of the clear coat shall result in a flat / glass like finish. The clear coat shall also provide a UV barrier to prevent fading and chalking.



PPG brand urethane materials will be used for the cab exterior paint.

EACH SEAT BACK SHALL FEATURE THE ALEXIS LOGO

**DRIVER'S SEATING POSITION**

The seat shall be H.O. Bostrom, Sierra 500, ABTS, with air ride suspension, high back seat with 5" of fore and aft slide adjustment. The seat shall have adjustments for height and ride with up to 3" of vertical travel. The seat shall contain a seat mounted 3-point seat belt with a shoulder belt adjustment of 4.7 inches.

**OFFICER'S SEATING POSITION**

The seat shall be H.O. Bostrom, Tanker 500 Series Self-Contained Breathing Apparatus (SCBA) type seat with a fixed bottom cushion and a pivoting head rest. The seat shall contain a seat mounted 3-point seat belt with a shoulder belt adjustment of 4.7 inches.

**SCBA FILLER PADS**

The SCBA seat is to have a filler pad installed to provide a smooth back for the firefighter when the air breathing apparatus is not in use.

**SCBA SEAT BRACKET**

There shall be a H.O. Bostrom SecureAll™ self-contained breathing apparatus bracket mounted into the seat cavity.

**CREW AREA - REAR FACING LEFT OUTBOARD SEAT POSITION**

The seat shall be H.O. Bostrom, Tanker 500 Series Self-Contained Breathing Apparatus (SCBA) type seat with a fixed bottom cushion and a pivoting head rest. The seat shall contain a seat mounted 3-point seat belt with a shoulder belt adjustment of 4.7 inches.

**SCBA SEAT BRACKET**

There shall be a H.O. Bostrom SecureAll™ self-contained breathing apparatus bracket mounted into the seat cavity.

**CREW AREA - REAR FACING RIGHT OUTBOARD SEAT POSITION**

The seat shall be H.O. Bostrom, Tanker 500 Series Self-Contained Breathing Apparatus (SCBA) type seat with a fixed bottom cushion and a pivoting head rest. The seat shall contain a seat mounted 3-point seat belt with a shoulder belt adjustment of 4.7 inches.

**SCBA SEAT BRACKET**



There shall be a H.O. Bostrom SecureAll™ self-contained breathing apparatus bracket mounted into the seat cavity.

**CREW AREA - FORWARD FACING LEFT OUTBOARD SEAT POSITION**

No flip seat was selected to be mounted in this position.

**CREW AREA - FORWARD FACING LEFT INBOARD SEAT POSITION**

The seat shall be H.O. Bostrom, Tanker 500 Series Self-Contained Breathing Apparatus (SCBA) type seat with a fixed bottom cushion and a pivoting head rest. The seat shall contain a seat mounted 3-point seat belt with a shoulder belt adjustment of 4.7 inches.

**SCBA SEAT BRACKET**

There shall be a H.O. Bostrom SecureAll™ self-contained breathing apparatus bracket mounted into the seat cavity.

**CREW AREA - FORWARD FACING RIGHT INBOARD SEAT POSITION**

The seat shall be H.O. Bostrom, Tanker 500 Series Self-Contained Breathing Apparatus (SCBA) type seat with a fixed bottom cushion and a pivoting head rest. The seat shall contain a seat mounted 3-point seat belt with a shoulder belt adjustment of 4.7 inches.

**SCBA SEAT BRACKET**

There shall be a H.O. Bostrom SecureAll™ self-contained breathing apparatus bracket mounted into the seat cavity.

**CREW AREA - FORWARD FACING RIGHT OUTBOARD SEAT POSITION**

No flip seat was selected to be mounted in this position.

**FORWARD FACING SEAT RISER**

The center forward facing seat(s) shall be installed on a powder coated aluminum riser. The front of the seat riser will be open without a restraint system to provide a location for storage of small lightweight gear.

**SEAT COVERING MATERIAL**

The seats shall be covered in gray black Durawear™, a high strength-wear resistant, waterproof fabric.

No Heated Seat Cushions



### **SEAT BELT WARNING LABELS**

The cab shall be equipped with two (2) seat belt warning labels. These labels are to be in full view of the occupants in the seated position.

### **CAB SEAT LOGO**

A Bostrom seat logo shall be provided for each applicable cab area seat.

### **VEHICLE DATA RECORDER**

The Apparatus shall be equipped with a Class1 "Vehicle Data Recorder and Seat Belt Warning System" (VDR/SBW) that is connected to the power train CAN (Controller Area Network) bus consisting of transmission (TCM), engine control (ECM) and antilock brake (ABS) modules mounted on the apparatus. The VDR/SBW will function per NFPA 1901-2009 sections 4.11 (Vehicle Data Recorder) utilizing the power train's J1939 data and 14.1.3.10 (Seat Belt Warning) using the Class1 "Seat Belt Input Module" for seat occupied and belt status information.

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

### **SEAT BELT WARNING SYSTEM**

There shall be a seat belt indicator system supplied in the cab. The indicator system shall indicate seat belt use for each individual seating position when the seat is occupied, the seat belt remains unfastened and the parking brake is released.

A display panel shall be supplied in the dash area. The panel shall have an audible indicators and a red light display to indicate that a seat belt has not been fastened.

### **SEAT BELT WARNING SYSTEM - GRAPHIC MONITOR**

Mounted in the overhead console in the driver's area the seat belt indicator system shall indicate seat belt use for each individual seating position when the seat is occupied, the seat belt remains unfastened and the parking brake is released.

The screen shall be a PCAP touch screen to recognize bare and gloved fingers, even when the display surface is wet. Integration with Class 1 seat belt monitoring module the screen shall be a bright, backlit display provides high contrast text and full color graphics for excellent sunlight readability with a rugged design for extreme environments.

### **FRONT BUMPER**

A stainless steel bumper shall be provided the full width of the cab.

### **BUMPER EXTENSION**

The front frame extension shall be bolted directly to the main rail. The extension and main rail joint shall have a 3/8" thick side plate for reinforcement. The completed apparatus must be able to be lifted at the front bumper without structural damage to the front extension for towing of a disabled vehicle.

The front bumper face shall extend 24.00 inches ahead of the front face of the cab skin.

## **TOW HOOKS**

Two (2) chromed tow hooks shall be provided and shall be attached directly to the front frame extension under the bumper. These tow hooks shall be attached with two Grade 8 bolts with hardened washers and Grade "C" distorted thread locknuts.

## **GRAVELSHIELD**

A gravelshield shall be installed filling the area above the extension rails. This gravelshield shall be constructed of .125" thick NFPA non-skid, non-skid, aluminum treadplate. The gravelshield shall be supported at the front by the top flange of the steel bumper. At the rear, the gravelshield shall be supported by a steel substructure.

## **BRIGHT FINISH GRAVELSHIELD**

The gravelshield shall have a bright finish.

## **CENTER HOSEWELL**

A hosewell shall be mounted between the bumper extension rails in the center of the gravelshield. The hosewell shall be constructed of 11 gauge stainless steel. The hosewell shall be 31-1/2" wide x 9-1/2" deep x 14-1/4" front to back.

## **HOSEWELL COVER**

The center hosewell shall include a diamond plate hinged cover. The cover shall be notched to provide clearance for pre-connected jumpline's to be stowed in the hosewell. A pair of stainless lift latches shall be used to open the lid with a gas shock to hold the lid in the open position.

## **HOSEWELL COVER**

The hosewell cover shall have a bright finish.

## **LIGHTING - CENTER HOSEWELL**

The interior of the center hosewell shall be illuminated with a white LED light strip. The light strip shall have an aluminum extrusion to protect the light from damage. The light shall illuminate when the ground lights are activated on the apparatus.

## **OPEN GRATE MAT - HOSEWELL**

The floor of the hosewell shall be covered with black colored, open grate mat for improved ventilation.

## **FRONT BUMPER UNDERBODY LIGHTING**

There shall be one (1) 36.00 inch white LED strip light in an armored extrusion provided at bottom of the center of the front bumper.

All underbody ground lights shall be switched on when the parking brake is set and the apparatus is running with the master battery switch in the "ON" position.

## **AIR HORNS**

Dual stutter tone air horns shall be recessed into the front bumper, one each side immediately outside of the frame rails.

## **AIR HORN IGNITION CONTROL**

To eliminate inadvertent operation the chassis air horns shall be operable only when the battery selector and ignition switch are in the "ON" position.

## **AIR HORN CONTROL SWITCH**

The chassis air horns shall be controlled by a lanyard with a 'Y-chain'. The lanyard chain shall be mounted to the center of the overhead console within reach of both the driver and officer and shall terminate at the cab center.

## **AIR HORN OPERATION**

The air horn and the electric horn shall be sounded simultaneously by depressing the horn button in the steering wheel.

## **Q2B MECHANICAL SIREN**

The front bumper shall include an electro-mechanical Federal Q2B™ siren which is streamlined, chrome-plated and produces 123 decibels at 10-feet. The siren measures 10.50 inches wide x 10.00 inches high x 14.00 inches deep.

The siren shall be recess mounted on the left (driver's) side through the front face of the bumper.

## **Q2B MECHANICAL SIREN**

The FEDERAL Q2B mechanical siren shall have a bright chrome finish.

## **MASTER WARNING LIGHT CONTROL**

To eliminate inadvertent operation the mechanical siren shall be operable only when the Master Warning Light switch is in the "ON" position and the parking brake is released.

## **SIREN BRAKE SWITCH**



A momentary switch shall be provided in the driver's switch panel for operation of the siren brake.

This switch shall be backlit with the legend "SIREN BRAKE".

## **SIREN CONTROL SWITCH**

One (1) foot switch for the siren shall be provided on left side of the driver's cab floor.

## **CAB ICC MARKER LIGHTING**

Five (5) amber Whelen OS Series LED cab face mounted clearance lights shall be supplied, mounted above the windshield.

Two (2) amber Whelen OS Series LED side clearance lights shall be supplied, one (1) each side mounted ahead of the front door.

An amber diamond shaped reflector shall be mounted on the lower corner of each cab front door adjacent to the door hinge.

## **CAB ICC MARKER LIGHTING - BRIGHT FINISH**

These lights are to be mounted in a chrome flange.

## **HEADLIGHTS**

Four (4) rectangular LED headlights shall be supplied, two (2) each side on the front of the cab, in a bezel assembly.

When the parking brake is released and the master battery switch is in the on position, the low beam head lamps shall be illuminated.

## **HEADLIGHT POSITION**

The headlights shall be mounted in the upper position on the front of the cab to accommodate high profile front bumper items.

## **HEADLIGHTS - BRIGHT FINISH**

The headlights shall have a chrome bezel.

## **TURN SIGNALS**

Two (2) rectangular Whelen M6 series LED turn signal lamps shall be mounted in a separate bezel outboard of the front headlights one (1) each side.

These lights shall be amber in color with a sequential arrow.



The lenses shall be clear in color.

**LIGHT HOUSING - BRIGHT FINISH**

These lights shall be mounted in a chrome plated bezel.

**ZONE A: ROOF MOUNTED LIGHTBAR**

A Whelen Freedom model F4N7VLED, 72.00 inch lightbar system shall be supplied and permanently mounted on the cab roof, as far forward as possible.

This lightbar system shall be supplied with sixteen (16) LED elements, ten (10) red and six (6) white.

This lightbar fulfills the requirements for Upper Zone A and in combination with the upper rear warning devices fulfills the requirements for Upper Zones B, C, and D.

Any white light(s) in the lightbar shall be disabled automatically for the "Blocking Right of Way" mode.

**ZONE A: LOW LEVEL WARNING LIGHTS**

Four (4) Whelen warning lights, M6 Series, Linear Super-LED lightheads shall be mounted two (2) each side on the front of the chassis in a separate housing than the headlights.

These four (4) lights fulfill the requirements for Lower Zone A lower level warning devices.

**WARNING LIGHTS COLOR**

The warning lights shall be red with clear lenses.

**LOW LEVEL WARNING LIGHTS - BRIGHT FINISH**

These lights shall be mounted in a chrome plated bezel.

**ZONE B & D: LOWER SIDE INTERSECTION LIGHTS**

Two (2) Whelen warning lights, M6, Linear Super-LED light heads shall be mounted one (1) on each side of the front bumper with a flange.

**WARNING LIGHTS COLOR**

The warning lights shall be red with clear lenses.

**BUMPER SIDE WARNING LIGHTS - BRIGHT FINISH**



The lights shall be mounted in a chrome plated flange.

### **LOWER B & D: SIDE INTERSECTION LIGHTS**

Two (2) Whelen warning lights, M6, Linear Super-LED light heads shall be mounted one (1) on each side of the cab over the front wheel with a flange.

### **WARNING LIGHTS COLOR**

The warning lights shall be red with clear lenses.

### **CAB SIDE WARNING LIGHTS - BRIGHT FINISH**

The lights shall be mounted in a chrome flange.

### **FORWARD FACING BROW LIGHT**

One (1) brow light shall be provided and mounted centered on the leading edge of the cab roof facing forward.

A HiViz LED brow light model FT-B-72 lamphead shall be provided. The lamphead shall have fifty seven (57) Cree XP-G2 white LEDs, 9 for a center spot light beam pattern, 18 for flood lighting and 30 for scene lighting. The brow light shall be mounted forward facing above the top of the cab roof with the mounting system integrated to the lightbar mounting. The lamphead shall be no more than 2 1/16" high by 72" wide by 2.5" deep.

### **WHITE FINISH**

The lamphead shall be powder coated with a white finish.

There shall be one (1) switch in the driver's area of the cab to control the brow light. This switch shall turn on all of the lighting simultaneously.

Ignition power shall be used to power the brow light switch. This light shall be independent and not be interfaced with the warning light system and parking brake interface.

### **CAB SIDE SCENE LIGHTS**

There shall be two (2) side scene lights installed on the side of the cab between the front and rear cab doors, one (1) each side.

The lighting positions shall be equipped with Whelen M9 EZ (M92SLC) scene lights.

The lights bezels shall have a polished or chrome plated finish.

### **CAB SIDE SCENE LIGHT ACTIVATION**



The cab side scene lights shall be activated by two (2) 12-volt switches in the cab switch panel. One (1) switch for left side scene and one (1) switch for right side scene.

### **CAB SCENE LIGHT CAB DOOR ACTIVATION**

The scene lights on the side of the cab shall be operated by either the front or the rear door on the same side of the cab opening.

### **ONBOARD ELECTRONIC OPERATION AND MAINTENANCE MANUAL**

There shall be a USB drive in the vehicle cab to provide in cab access to electronic copies of the Cab/Chassis Operation and Maintenance Manuals with a cable and laptop.

The following information shall be accessible through the in cab electronic Vehicle Operations Manual (eVom™).

Cab/Chassis Operator's Manual  
Cab/Chassis Construction Bill of Material Parts List

Electrical System:

- Complete wiring schematics for the cab and chassis.
- Diagrams of the cab and chassis showing the wiring harness routing. Each of these diagrams shall include the connectors between the harnesses that provide a hyperlink to a drawing of the actual connector where pin functions can be examined.
- Schematics for each system of the cab and chassis shall be provided with hyperlinks to the connectors for pin designations and to the drawings for harness location.
- As built wiring information

Air System:

- Complete air system schematics for the cab and chassis.
- Diagrams of the cab and chassis showing the air tubing routing.
- Schematics for each system of the vcab and chassis shall be provided with hyperlinks to the tanks and valves and to the drawings for exact location.

### **ELECTRONIC & HARD COPY OPERATOR'S MANUAL**

The manufacturer shall supply additional copies of the apparatus manuals. One (1) USB drive and one (1) hard copy Operator's Manual w/Parts List.

The following information will be included:

Cab/Chassis Operator's Manual  
Cab/Chassis Construction Bill of Material Parts List

## Electrical System:

- Complete wiring schematics for the cab and chassis.
- Diagrams of the cab and chassis showing the wiring harness routing. Each of these diagrams shall include the connectors between the harnesses that provide a hyperlink to a drawing of the actual connector where pin functions can be examined.
- Schematics for each system of the cab and chassis shall be provided with hyperlinks to the connectors for pin designations and to the drawings for harness location.
- As built wiring information

## Air System:

- Complete air system schematics for the cab and chassis.
- Diagrams of the cab and chassis showing the air tubing routing.
- Schematics for each system of the cab and chassis shall be provided with hyperlinks to the tanks and valves and to the drawings for exact location.

## **FIRE APPARATUS SAFETY GUIDE**

Pursuant to NFPA 1901, 2016 edition, 40.20.2.3 (20) one (1) copy of the latest edition of FAMA's Fire Apparatus Safety Guide shall be supplied with the apparatus.