SVI Western Demo
Heavy Rescue
Build Specification

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LIABILITY INSURANCE

Bidder shall furnish with the bid a certificate of insurance for;

Workman's Compensation and Employer's Liability Insurance covering all employees.

General Liability each occurrence of $1,000,000.00, General Aggregate of $2,000,000.00 including Products Completed / Operations Aggregate.

Personal Injury of $1,000,000.00, Fire damage of $50,000.00 and Medical expense of $10,000.00. Automobile liability of $1,000,000.00 combined single limit (each accident), including any auto, all owned autos, scheduled autos, hired autos, non-owned autos, and garage liability.

Excess Umbrella Liability coverage of $2,000,000.00 each occurrence, Aggregate of $2,000,000.00.

All insurance policies must be;

- Maintained for the life of the contract,
- Must provide ten (10) days notice before cancellation,
- Must cover all operations of the contractor, or anyone employed by them.

INTERNET IN-PROCESS SITE

The Bidder shall post and maintain a website where the Customer will be able to view digital images of their apparatus as its being manufactured. The digital images shall be posted once a week starting when the body begins production or when the cab/chassis arrives and shall continue until the final completion of the apparatus.

ENGINEERING DRAWINGS

The evaluation of bids shall also be based on design, engineering reliability, and completeness of drawings. No bidder's proposal shall be considered unless complete engineering drawings to these specifications are submitted with the request for proposal package. Failure to submit factory prepared blueprints with bid shall result in automatic rejection. Submission of "bid drawings" are in addition to "production drawings" which must be submitted for Customer approval prior to construction. Bid drawings shall allow the Customer the ability to fully evaluate required product.

The engineering drawings shall be produced on computer aided design (CAD) equipment to assure critical tolerance and detail only available with CAD equipment. The drawings shall be on "B" size paper, 17" x 11" in size, and views must be 1/4" = 1' - 0" scale. This shall allow the Customer the ability to compare drawings of all manufacturers on an "equal" basis. The drawings shall be completed only by the body manufacturer, and must be exactly to Customer specifications. Submission of "similar to" drawings or "statements referring to later submission of drawings after award of contract" shall be automatically rejected.

Since the request for proposal package will require extensive evaluation by Customer, all Bidders must submit exactly the same engineering drawings at the same scale, on the same size paper. For easy comparison of drawings, they must be on a 36" x 24" sheet as follows:

- All bid drawings will be stamped BID DRAWING.
- All items shown on the drawing will be pre-designed with regards to layout and functionality prior to the completion of the BID DRAWING.
- Two (2) 36” x 24” color drawings will be supplied with the bid proposal. Black and white or blue line drawings will not be accepted.
- There shall be five (5) views of the truck with the doors closed (Top, Left, Right, Front, Rear), four (4) views of the truck with the doors open (Top, Left, Right, Rear) and four (4) views of any walk-in area (Top, Left, Right, Rear)
- All compartment door openings and usable space shall be clearly shown in inches.

- The trucks overall length, height, width, wheelbase and cab-to-axle dimensions shall be clearly shown.
- The angles of approach and departure shall be shown in the maximum loaded condition to the nearest degree.
- All lighting packages will be clearly shown on the drawing and verified accurate per the most current NFPA standards (when applicable).
- The exterior view shall show all scene lights, marker lights, speakers, horns, exhaust, tow points, exterior outlets, windows, winch receivers, tow hitches, exterior ladders and any other item important to the function of the vehicle.
- The open view shall show all trays, shelves, air system components, hydraulic components, tool boards, storage modules and any other items important to the function of the vehicle
- The interior view for all walk-in areas shall show all seating positions, desks, cabinets, windows, tech equipment, radio locations and any other item important to the function of the vehicle
- Any changes to the BID drawing will require a revision which will be clearly annotated in the upper right hand side of the drawing showing the revision number, reason for the revision, date and who made the changes

Text Block Items;

- Purchaser's name.
- Body size and material type.
- Chassis manufacturer and model number.
- Unit description.
- Wheelbase (WB) , Cab-to-axle (CA) distance.
- Overall length (OAL), Overall width, (OAW), Overall height (OAH).
- Scale, date, drawn by, drawing number and sheet number.

VEHICLE STABILITY SUPPLIED WITH CAB/CHASSIS

The cab/chassis shall be 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.

ROADABILITY

The apparatus, when loaded to its estimated in-service weight, shall be capable of the following performance while on dry, paved roads that are in good condition:

(1) From a standing start, the apparatus shall be able to attain a speed of 35 mph (55 km/hr) within 25 seconds on a level road.
(2) The apparatus shall be able to attain a minimum top speed of 50 mph (80 km/hr) on a level road.
(3) The apparatus shall be able to maintain a speed of at least 20 mph (32 km/hr) on any grade up to and including 6 percent.

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.

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 (85 km/ hr) or the manufacturer’s maximum fire service speed rating for the tires installed on the apparatus, whichever is lower.

SERVICEABILITY

The fire apparatus shall be designed to allow the manufacturer's recommended routine maintenance checks of lubricant and fluid levels to be performed by the operator without lifting the cab of a tilt-cab apparatus or without the need for hand tools.

Where special tools are required for routine service on any component of the apparatus, such tools shall be provided with the apparatus.

Apparatus components that interfere with repair or removal of other major components shall be attached with fasteners, such as cap screws and nuts, so that the components can be removed and installed with ordinary hand tools. These components shall not be welded or otherwise permanently secured into place.

CONSTRUCTION DOCUMENTATION

The contractor shall supply, at the time of delivery, at least one (1) copy of the following documents:

(1) The manufacturers record of apparatus construction details, including the following information:
  (a) Owner's name and address
  (b) Apparatus manufacturer, model, and serial number
  (c) Chassis make, model, and serial number
  (d) GAWR of front and rear axles and GVWR
  (e) Front tire size and total rated capacity in pounds (kilograms)
  (f) Rear tire size and total rated capacity in pounds (kilograms)
  (g) Chassis weight distribution in pounds (kilograms) with water and manufacturer-mounted equipment (front and rear)
  (h) Engine make, model, serial number, rated horsepower and related speed, and governed speed; and if so equipped, engine transmission PTO(s) make, model, and gear ratio
  (i) Type of fuel and fuel tank capacity
  (j) Electrical system voltage and alternator output in amps
  (k) Battery make, model, and capacity in cold cranking amps (CCA)
  (l) Chassis transmission make, model, and serial number; and if so equipped, chassis transmission PTO(s) make, model, and gear ratio
  (m) Ratios of all driving axles
  (n) Maximum governed road speed
  (o) Pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
  (p) Pump transmission make, model, serial number, and gear ratio
  (q) Auxiliary pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
  (r) Water and Foam tank certified capacity in gallons or liters
  (s) Paint manufacturer and paint number(s)
  (t) Company name and signature of responsible company representative
  (u) Weight documents from a certified scale showing actual loading on the front axle, rear axle(s), and overall fire apparatus (with the water tank full but without personnel, equipment, and hose)
(2) Certification of compliance of the optical warning system
(3) Siren manufacturer's certification of the siren
(4) Written load analysis and results of the electrical system performance tests
(5) Certification of slip resistance of all stepping, standing, and walking surfaces
(6) If the apparatus has a fire pump, the pump manufacturer's certification of suction capability
(7) If the apparatus is equipped with a fire pump and special conditions are specified by the purchaser, the pump manufacturer's certification of suction capacity under the special conditions
(8) If the apparatus has a fire pump, a copy of the apparatus manufacturer's approval for stationary pumping applications

(9) If the apparatus has a fire pump, the engine manufacturer's certified brake horsepower curve for the engine furnished, showing the maximum governed speed
(10) If the apparatus has a fire pump, the pump manufacturer's certification of the hydrostatic test
(11) If the apparatus has a fire pump, the certification of inspection and test for the fire pump
(12) If the apparatus is equipped with an auxiliary pump, the apparatus manufacturer's certification of the hydrostatic test
(13) When the apparatus is equipped with a water tank, the certification of water tank capacity
(14) If the apparatus has an aerial device, the certification of inspection and test for the aerial device
(15) If the apparatus has a foam proportioning system, the foam proportioning system manufacturer's certification of accuracy and the final installer's certification the foam proportioning system meets this standard
(16) If the system has a CAFS, the documentation of the manufacturer's pre delivery tests
(17) If the apparatus has a line voltage power source, the certification of the test for the power source
(18) If the apparatus is equipped with an air system, air tank certificates, the SCBA fill station certification *(see 24.9.7)*, and the results of the testing of the air system installation
(19) Any other required manufacturer test data or reports

OPERATIONS AND SERVICE DOCUMENTATION

The contractor shall deliver with the fire apparatus at least two (2) sets of complete operation and service documentation covering the completed apparatus as delivered and accepted.

The documentation shall address at least the inspection, service, and operations of the fire apparatus and all major components thereof.

The contractor shall also deliver with the fire apparatus the following documentation for the entire apparatus and each major operating system or major component of the apparatus:

(1) Manufacturer's name and address
(2) Country of manufacture
(3) Source for service and technical information
(4) Parts replacement information
(5) Descriptions, specifications, and ratings of the chassis, pump (if applicable), and aerial device (if applicable)
(6) Wiring diagrams for low voltage and line voltage systems to include the following information:
    (a) Pictorial representations of circuit logic for all electrical components and wiring
    (b) Circuit identification
    (c) Connector pin identification
    (d) Zone location of electrical components
    (e) Safety interlocks
    (f) Alternator–battery power distribution circuits
    (g) Input/output assignment sheets or equivalent circuit logic implemented in multiplexing systems
(7) Lubrication charts
(8) Operating instructions for the chassis, any major components such as a pump or aerial device, and any auxiliary systems
(9) Precautions related to multiple configurations of aerial devices, if applicable
(10) Instructions regarding the frequency and procedure for recommended maintenance
(11) Overall apparatus operating instructions
(12) Safety considerations
(13) Limitations of use
(14) Inspection procedures
(15) Recommended service procedures
(16) Troubleshooting guide
(17) Apparatus body, chassis, and other component manufacturer's warranties
(18) Special data required by this standard
(19) A material safety data sheet (MSDS) for any fluid that is specified for use on the apparatus

The contractor shall deliver with the apparatus all manufacturers' operations and service documents supplied with components and equipment that are installed or supplied by the contractor.

NFPA REQUIRED DOCUMENTATION FORMAT - CD-ROM

The vehicle construction details and the operations and service documentation as required per NFPA 1901 latest edition shall be provided on a CD-ROM. These manuals shall be divided into sections for ease of reference. There shall be two (2) copies of the CD-ROM provided with the completed vehicle.

STATEMENTOF EXCEPTIONS

The contractor shall deliver with the fire apparatus either a certification that the apparatus fully complies with all requirements of this standard or, alternatively, a Statement of Exceptions specifically describing each aspect of the completed apparatus that is not fully compliant with the requirements of this standard at the time of delivery.

The Statement of Exceptions shall contain, for each noncompliant aspect of the apparatus or missing required item, the following information:

(1) A separate specification of the section of the applicable standard for which compliance is lacking
(2) A description of the particular aspect of the apparatus that is not in compliance therewith or required equipment that is missing
(3) A description of the further changes or modifications to the delivered apparatus that must be completed to achieve full compliance
(4) Identification of the entity that will be responsible for making the necessary post delivery changes or modifications or for supplying and installing any missing required equipment to the apparatus to achieve full compliance with this standard

Prior to, or at the time of, delivery of the apparatus, the Statement of Exceptions shall be signed by an authorized agent of the entity responsible for final assembly of the apparatus and by an authorized agent of the purchasing entity, indicating mutual understanding and agreement between the parties regarding the substance thereof.

An apparatus that is delivered subject to a Statement of Exceptions other than a certification of full compliance shall not be placed in emergency service until the apparatus has been modified as necessary to accomplish full compliance with this standard.

CARRYING CAPACITY

The GAWR and the GCWR or GVWR of the chassis shall be adequate to carry the weight of the completed vehicle when loaded to its estimated in-service weight. The Body Manufacturer shall establish the estimated in service weight during the design of the vehicle

The estimated in-service weight shall include the following:

(1) The chassis, body, and tank(s)
(2) Full fuel, lubricant, and other chassis or component fluid tanks or reservoirs
(3) Full water and other agent tanks
(4) *250 lb (114 kg) in each seating position
(5) Fixed equipment such as pumps, aerial devices, generators, reels, and air systems as installed
(6) Ground ladders, suction hose, designed hose load in their hose beds and on their reels
(7) An allowance for miscellaneous equipment that is the greatest of the values for type of vehicle per NFPA 1901, a Purchaser provided list of equipment to be carried with weights, or a Purchaser specified miscellaneous equipment allowance.

The Body Manufacturer shall engineer and design the vehicle such that the completed unit, when loaded to it's estimated in-service weight, with all movable weights distributed as close as is practical to their intended in-service configuration, does not exceed the GVWR.

A final Body 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.

			Equipment Allowance	
Apparatus Type	**Equipt. Storage Area**	**Apparatus Size**	**lb.**	**kg.**
Special Service Fire Apparatus	Minimum of 120 cu ft (3.4 cu mt) of enclosed compartmentation.	40,001 lb to 50,000 lb (18,001 kg to 23,000 kg) GVWR	6,000	2,700

TESTING

ROAD TEST

Road test shall be conducted in accordance with this section to verify that the completed apparatus is capable of compliance with Roadability Section.

The tests shall be conducted at a location and in a manner that does not violate local, state or provincial, or federal traffic laws.

The tests shall be conducted on dry, level, paved roads that are in good condition. The apparatus shall be loaded to its estimated in service weight.

The engine shall not operate in excess of the maximum governed speed. Acceleration tests shall consist of two runs in opposite directions over the same route. The fire apparatus shall attain a speed of 35 mph (55 km/hr) from a standing start within 25 seconds. The fire apparatus shall attain a minimum top speed of 50 mph (80 km/hr).

If the apparatus is equipped with an auxiliary braking system, the manufacturer shall road test the system to confirm that the system is functioning as intended by the auxiliary braking system manufacturer.

If the apparatus is equipped with an air brake system, the service brakes shall bring the apparatus, when loaded to it's GVWR, to a complete stop from an initial speed of 20 mph (32.2 km/hr) in a distance not exceeding 35 ft (10.7 m) by actual measurement on a paved, level, dry surface road that is free of loose material, oil, or grease.

If the apparatus is equipped with a hydraulic brake system, the service brakes shall bring the apparatus, when loaded to its GVWR, to a complete stop from an initial speed of 30 mph (48.2 km/hr) in a distance not exceeding 88 ft (26.8 m) by actual measurement on a paved, level, dry surface road that is free of loose material, oil, or grease.

LOW VOLTAGE - ELECTRICAL SYSTEM PERFORMANCE TEST

The vehicles low voltage electrical system shall be tested and certified by the manufacturer. The certified test results shall be delivered with the completed vehicle. Tests shall be performed when the air temperature is between 0°F and 110°F (–18°C and 43°C).

TEST SEQUENCE

The following three (3) tests shall be performed in the order in which they appear below. Before each test, the batteries shall be fully charged until the voltage stabilizes at the voltage regulator set point and the lowest charge current is maintained for 10 minutes. Failure of any of these tests shall require a repeat of the sequence.

1. RESERVE CAPACITY TEST

The engine shall be started and kept running until the engine and engine compartment temperatures are stabilized at normal operating temperatures and the battery system is fully charged. The engine shall be shut off, and the minimum continuous electrical load shall be activated for 10 minutes.

All electrical loads shall be turned off prior to attempting to restart the engine. The battery system shall then be capable of restarting the engine. Failure to restart the engine shall be considered a test failure of the battery system.

2. ALTERNATOR PERFORMANCE TEST

TEST AT IDLE

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

TEST AT FULL LOAD

The total continuous electrical load shall be activated with the engine running up to the engine manufacturer's governed speed. The test duration shall be a minimum of 2 hours. Activation of the load management system shall be permitted during this test.

An alarm sounded by excessive battery discharge, as detected by the warning system required in 13.3.4, or a system voltage of less than 11.8 V dc for a 12 V nominal system, 23.6 V dc for a 24 V nominal system, or 35.4 V dc for a 42 V nominal system for more than 120 seconds shall be considered a test failure.

3. LOW VOLTAGE ALARM TEST

The following test shall be started with the engine off and the battery voltage at or above 12 V for a 12 V nominal system, 24 V for a 24 V nominal system, or 36 V for a 42 V nominal system.

With the engine shut off, the total continuous electrical load shall be activated and shall continue to be applied until the excessive battery discharge alarm activates. The battery voltage shall be measured at the battery terminals.

The test shall be considered a failure if the alarm does not sound in less than 140 seconds after the voltage drops to 11.70 V for a 12 V nominal system, 23.4 V dc for a 24 V nominal system, or 35.1 V for a 42 V nominal system.

The battery system shall then be able to restart the engine. Failure to restart the engine shall be considered a test failure.

LOW VOLTAGE - ELECTRICAL SYSTEM PERFORMANCE TEST

DOCUMENTATION

The manufacturer shall deliver the following with the fire apparatus:

(1) Documentation of the electrical system performance tests
(2) A written electrical load analysis, including the following:
    (a) The nameplate rating of the alternator
    (b) The alternator rating
    (c) Each of the component loads specified that make up the minimum continuous electrical load
    (d) Additional electrical loads that, when added to the minimum continuous electrical load, determine the total continuous electrical load
    (e) Each individual intermittent electrical load.

UL 120/240 VAC CERTIFICATION

The 120/240 volt electrical system shall be tested and certified by Underwriters Laboratories, to perform as listed below;

The prime mover shall be started from a cold start condition, and the unloaded voltage and frequency shall be recorded.

The line voltage electrical system shall be loaded to at least 100 % of the continuous rated wattage stated on the power source specification label. Testing with a resistive load bank shall be permitted.

The power source shall be operated in the manner specified by the apparatus manufacturer as documented on instruction plates or in operation manuals. The power source shall be operated at a minimum of 100 % of the continuous rated wattage as stated on the power source specification label for a minimum of 2 hours.

The load shall be adjusted to maintain the output wattage at or above the continuous rated wattage during the entire 2-hour test.

The following conditions shall be recorded at least every 1/2 hour during the test:

(1) The power source output voltage, frequency, and amperes
(2) The prime mover's oil pressure, water temperature, and transmission temperature, if applicable
(3) The power source hydraulic fluid temperature, if applicable
(4) The ambient temperature and power source air inlet temperature

The following conditions shall be recorded once during the test for power sources driven by dedicated auxiliary internal combustion engines:

(1) Altitude
(2) Barometric pressure
(3) Relative humidity

If the generator is driven by the chassis engine and the generator allows for operation at variable speeds, the chassis engine speed shall be reduced to the lowest rpm allowed for generator operation and the voltage and frequency shall be recorded.

The load shall be removed, and the unloaded voltage and frequency shall be recorded.

Voltage shall be maintained within ±10 % of the voltage stated on the power source specification label during the entire test. Frequency shall be maintained within ±3 Hz of the frequency stated on the power source specification label during the entire test.

The total continuous electrical loads, excluding those loads associated with the equipment defined in NFPA 22.15.7.3.11.2, shall be applied during the testing unless an auxiliary engine drives the power source.

If the apparatus is equipped with a fire pump, the 2-hour certification test of the power source shall be completed with the fire pump pumping at 100 % capacity at 150 psi (1000 kPa) net pump pressure. The test shall be permitted to be run concurrently with the pump certification test.

DOCUMENTATION

The manufacturer shall deliver the following with the fire apparatus:

(1) The results of each test shall be recorded on an appropriate form and provided with the delivery of the fire apparatus.

DIELECTRIC VOLTAGE WITHSTAND TEST

The line voltage wiring and permanently connected devices and equipment shall be subjected to a dielectric voltage withstand test of 900 volts for 1 minute. The testing shall be performed after all body work has been completed.

The test shall be conducted as follows:

(1) Isolate the power source from the panel board and disconnect any solid state low voltage components.
(2) Connect one lead of the dielectric tester to all the hot and neutral buses tied together.
(3) Connect the other lead to the fire apparatus frame or body.
(4) Close any switches and circuit breakers in the circuit(s).
(5) Apply the dielectric voltage for 1 minute in accordance with the testing equipment manufacturer's instructions.

The electrical polarity of all permanently wired equipment, cord reels, and receptacles shall be tested to verify that wiring connections have been properly made.

Electrical continuity shall be verified from the chassis or body to all line voltage electrical enclosures, light housings, motor housings, light poles, switch boxes, and receptacle ground connections that are accessible to fire fighters in normal operations.

If the apparatus is equipped with a transfer switch, it shall be tested to verify operation and that all non grounded conductors are switched.

Electrical light towers, floodlights, motors, fixed appliances, and portable generators shall be operated at their full rating or capacity for 30 minutes to ensure proper operation.

WARRANTY

A full statement shall be provided of the warranties for the vehicle(s) being bid. Warranties should clearly describe the terms under which the vehicle manufacturer accepts responsibility for the cost to repair defects caused by faulty design, quality of work or material, and for the applicable period of time after delivery.

Cost of repairs refers to all costs related thereto including, but not limited to, the cost of materials, and the cost of labor.

The Body Manufacturer shall warrant all materials and accessories used on the vehicle(s), whether fabricated by manufacturer or purchased from an outside source, and will deal directly with the Customer on all warranty work.

GENERAL LIMITED WARRANTY - ONE (1) YEAR

The vehicle shall be free of defects in material and workmanship for a period of one (1) year or 12,000 miles, whichever occurs first starting thirty (30) days after the original invoice date.

The contractor must be the "single source" coordinator of all warranties on the vehicle.

LOW VOLTAGE ELECTRICAL WARRANTY - FIVE (5) YEARS

The vehicle low voltage electrical system shall be free of defects in material and workmanship for a period of five (5) years or 60,000 miles, whichever occurs first, starting thirty (30) days after the original invoice date.

STRUCTURAL WARRANTY - TEN (10) YEARS

The body shall be free of structural or design failure or workmanship for a period of ten (10) years, or 100,000 miles whichever occurs first, starting thirty (30) days after the original invoice date.

PAINT LIMITED WARRANTY - TEN (10) YEARS

The body shall be free of bubbling, or peeling as a result of a defect in the method of manufacture for a period of ten (10) years, or 100,000 miles whichever occurs first, starting thirty (30) days after the original invoice date.

CONSTRUCTION PERIOD

The completed vehicle shall be delivered within three hundred sixty (360) days after receipt of a purchase order, or contract.

Contractor shall not be held liable for delays of chassis delivery due to accidents, strikes, floods or other events not subject to their control. Contractor shall provide immediate written notice to Customer as to delays and to what extent these delays have in completing vehicle within the stated construction time period.

OVERALL HEIGHT

The overall height (OAH) of the vehicle shall be approximately 129" (10' - 9") from the ground. This measurement shall be taken on flat ground with the tires properly inflated, in the unloaded condition, at that highest point of the vehicle.

OVERALL LENGTH

The overall length (OAL) of the vehicle shall be approximately 420" (35' - 0").

DELIVERY AND DEMONSTRATION

The contractor shall be responsible for the delivery of the completed unit to the Customers location. On initial delivery of the apparatus, the contractor shall supply a qualified representative to demonstrate the apparatus and provide initial instruction to representatives of the Customer regarding the operation, care, and maintenance of the apparatus and equipment supplied at the Customers location.

The delivery engineer shall set delivery and instruction schedule with the person appointed by Customer.

After delivery of the apparatus, the Customer shall be responsible for ongoing training of its personnel to proficiency regarding the proper and safe use of the apparatus and associated equipment as defined in NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*, and NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*.

MODEL

The cab and chassis shall include design considerations for one hundred (100) percent on-road applications, a high horsepower engine, including high speed operations and a consideration for above normal starts and stops. This chassis shall be designed and manufactured for heavy duty service with adequate strength and capacity of all components for the intended load to be sustained. The chassis shall be designed for a duty rating of one hundred (100) percent loaded full time.

MODEL YEAR

The chassis shall have a vehicle identification number that reflects a 2008 model year.

COUNTRY OF SERVICE

The chassis shall be put in service in the country of United States of America (USA).

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APPARATUS TYPE

The apparatus shall be created for the Emergency Services Industry and include the functions of a Rescue which shall include the functions of a multipurpose vehicle which primarily provides support services at emergency scenes.

TRUCK TYPE

The chassis shall be manufactured as a truck style and designed to include permanently mounted compartments behind the cab, known as the body. The body of the truck shall be supplied and installed by the apparatus manufacturer.

AXLE CONFIGURATION

The chassis shall offer a single rear drive axle with a single front steer axle configuration (4 X 2).

GAWR FRONT

The gross apparatus weight rating and the gross capacity weight rating shall be adequate to carry the weight of equipment and the apparatus, with water tanks full and other tanks at full capacity, miscellaneous equipment and all personnel weights considered as recommended by the most current edition of NFPA 1901.

The chassis front gross axle weight rating (GAWR) shall be 20,000 pounds.

GAWR REAR

The chassis rear gross axle weight rating (GAWR) shall be 24,000 pounds.

CAB STYLE

The cab shall be a custom, enclosed model, built specifically for the fire service by a company specializing in cab and chassis design for all fire service applications.

The cab shall be manufactured for heavy-duty service utilizing adequate strength and capacity for the application of protecting firefighters. The cab shall be of a modular design offering improved strength, durability and reduced weight. The modular design shall allow for faster, less costly replacement of components. Per pound, sheet panel aluminum extrusions offer a higher tensile strength, 45,000 PSI, and yield strength, 40,000 PSI, than that of lower grade sheet such as 3003-H13. For this reason, the cab shall be of aluminum extrusion construction, which shall offer superior strength and the truest, flattest surface ensuring less expensive paint repairs if needed.

The method of cab construction shall use a process incorporating techniques outlined in accordance with the American Welding Society D1.1-96 requirements for structural steel welding. All aluminum welding shall be completed to the American Welding Society and ANSI D1.2-96 requirements for structural welding of aluminum.

To provide a superior finish by reducing welds that fatigue cab metal; the roof, the rear wall and side panels shall be assembled using proven industrial adhesives, designed specifically for aluminum fabrication, which exceed the strength of a weld, for construction.

All interior and exterior seams shall be sealed for optimum noise reduction in addition to the most favorable efficiency for heating and cooling retention.

The cab shall be constructed of 5052-H32 Marine Grade, one hundred percent primary aluminum plate. A single formed, one (1) piece extrusion, manufactured from 6061-T6 100 percent primary one- quarter inch thick aluminum shall be used for the “A” pillar adding strength and rigidity to the cab as well as additional roll-over protection. The cab side wall skins and shall be 0.125 inch thick, the rear wall and roof skin shall be 0.19 inch thick, the front skin shall be 0.125 inch thick.

The cab shall incorporate tongue and groove fitted 6061-T6 0.25 inch thick aluminum extrusions for extreme duty situations. The cab shall include multi-layer composite insulation for improved cab heating and cooling in addition to noise reduction.

The cab shall incorporate a fully enclosed design, allowing for a spacious cab area with no partition between the front and rear sections of the cab. The walls of the vehicle shall include roof supports allowing for an open design. The outside dimension of the cab shall be 96 inches wide with a minimum interior width of 90 inches.

The cab overall length shall be 143.88 inches in length with 67.50 inches from the centerline of the front of the axle to the back of the cab. The cab shall offer an interior height of 58.00 inches from the front floor to the headliner and a rear floor to headliner height of 75.00 inches in the crew area, at a minimum. All interior measurements shall include the area within the interior trimmed surfaces and not to any unfinished surface.

The cab shall include a driver and officer area with two (2) cab door openings. The front door opening shall offer a clear door opening of 43.00 inches wide X 56.00 inches high. The rear door opening shall offer a clear door opening of 34.00 inches wide X 85.00 inches high. This style of cab shall also include a crew area offering up to ten (10) seating positions.

The cab shall incorporate a (2) step configuration from the ground to the cab floor for each door opening. The lower step shall be constructed of heavy duty safety grating which meets or exceeds Federal Specification RRG-1602-latest revision and performs under dry, greasy, muddy, soapy and icy conditions and offers open drainage.

The first step for the driver and officer area shall measure 11.44 inches deep X 31.13 inches wide. The intermediate step shall measure 8.75 inches deep X 33.00 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 11.00 inches.

The first step for the crew area shall measure 12.13 inches deep X 20.44 inches wide. The intermediate step shall measure 10.50 inches deep X 23.00 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 12.50 inches.

CAB GRILLE EVOLUTION

The front cab fascia shall be constructed of lightweight, impact resistant fiberglass reinforced plastic which shall be attached to the front cab skin to offer an appealing exterior. The cab fascia will encompass the front of the aluminum cab structure at the bottom of the windshield to the lower section of the cab and include an Evolution style design.

The Evolution style cab fascia shall include module provisions for two (2) single Hi/Low beam headlight assemblies. The module shall offer an integrated side or turn marker light assembly and shall be hinged permitting easy maintenance of the headlight and turn and marker light assemblies. The hinged headlight module shall offer access to the ember separator, the electrical bulkhead connections, the transmission electronic communications module and the multiplex V-MUX control (if applicable).

The Evolution style fascia shall also offer four (4) additional blank modules below those specified for the head lights for the provision of up to four (4) warning lights.

FRONT GRILLE EVOLUTION

The fascia shall include a (2) piece hinged, stainless steel raised front grille 40.00 inches wide x 31.95 inches height X .88 inches deep. The grille shall include a minimum free air intake of 519.30 square inches shall be installed on the front of the cab fascia. The upper portion of the grille will be hinged and will have (2) flush push button latches that allow access to the front fluid fills of the cab.

CAB ENGINE TUNNEL

The cab interior shall include a fixed type engine tunnel cover sized to accommodate an engine with a small or medium block. The engine tunnel shall be an integral part of the cab constructed of 5052-H32 Marine Grade, .090 of an inch thick, one hundred percent primary aluminum plate. The tunnel shall be a maximum of 41.50 inches wide X 23.00 inches high.

The engine tunnel shall be insulated with multi-layer insulating material, consisting of foam, a sound barrier of 1.00 pounds per square foot with a facing which resists heat transfer. This insulation shall be held in place by adhesive, aluminum stick pins and retention caps. Any exposed insulation seams and edges shall be sealed reducing moisture and debris.

CAB ENTRY DOORS

The cab shall include a driver and officer area with two cab door openings which offer a clear door opening of 40.75 inches wide.

The doors shall be constructed of extruded aluminum with a nominal thickness of .125 inch. The exterior skins shall be constructed of .125 inch aluminum plate. The cab shall include four (4) entry doors as high as possible for ease of entering and egress when outfitted with an SCBA.

All cab and crew doors shall be of substantial weight for the optimum strength and rigidity for the best performance in all cab crash testing. Any cab with front and crew doors manufactured of less than the material thickness of .125 inch in both the extrusion and exterior skin shall not be considered.

The doors shall include a double rolled style automotive rubber seal around the perimeter of each door frame and door edge which ensures a weather tight fit.

All door hinges shall be hidden within flush mounted cab doors for a pleasing smooth appearance and perfect fit along each side of the cab. Each hinge shall be .375 inch piano style and be constructed of stainless steel.

The piano style hinge and hidden flush mounted door is the most favorable construction keeping dirt and debris out of the hinge allowing for optimum operation throughout the lifetime of the door.

CAB ENTRY DOOR TYPE

All entry doors shall be of a flush, full height design and shall be located on the sides of the cab.

LEFT HAND EXTERIOR REAR COMPARTMENT

The cab shall offer an exterior compartment on the left side of the cab behind the rear door. The compartment opening shall be 10.00 inches wide X 21.19 inches high. The compartment size shall be 11.34 inches wide X 21.19 inches high X 21.19 inches deep. The compartment shall have a 10.63 inch wide, 32.00 inch high and 1.50 inch thick hinged box pan style flush mount door with a locking bent D-ring slam latch. The interior of the compartment shall have a DA sanded finish. There shall be a switch to activate the open compartment warning light in the cab in the event the door is left ajar.

RIGHT HAND EXTERIOR REAR COMPARTMENT

The cab shall offer an exterior compartment on the right side of the cab behind the rear door. The compartment opening shall be 10.00 inches wide X 21.19 inches high. The compartment size shall be 11.34 inches wide X 21.19 inches high X 21.19 inches deep. The compartment shall have a 10.63 inch wide, 32.00 inch high and 1.50 inch thick hinged box pan style flush mount door with a locking bent D-ring slam latch. The interior of the compartment shall have a DA sanded finish. There shall be a switch to activate the open compartment warning light in the cab in the event the door is left ajar.

CAB STRUCTURAL WARRANTY

The cab structure shall be warranted for a period of ten (10) years. Warranty conditions may apply and shall be listed in the detailed warranty document that shall be provided upon request.

CAB CRASH TEST ECE-29

The cab shall have successfully achieved survival of the International crash test ECE-29, Addendum 28, Revision 1 as indicated below.

As part of the ECE regulation 29 test, the frontal area of the cab is struck by a 3,700 pound pendulum weight. The weight is brought back to a sixty degree angle and then the weight is released and allowed to swing forward, imparting some 32,600 pounds foot of force to the cab front face. The cab shall be so constructed that after the test, there will be minimal intrusion of the cab structure into the passenger area. The doors shall remain usable for both entry and exit. Also, as part of the test the cab roof must withstand a static load bearing test. The cab shall withstand a weight of over 60,000 pounds without permanent damage or collapse. The above tests shall be witnessed by and attested to by an independent third party. The test results shall be recorded on/by cameras, high speed imagers, accelerometers and strain gauges, with notarized copies of the letters verifying the test results and videos of said test shall be available upon request.

CAB PAINT EXTERIOR

The cab shall be painted prior to the installation of glass accessories and all other cab trim to ensure complete paint coverage and the maximum in corrosion protection of all metal surfaces.

All metal surfaces on the entire cab shall be ground by disc to remove any surface oxidation or surface debris which may hinder the paint adhesion. Once the surface is machine ground a high quality acid etching of base primer shall be applied. Upon the application of body fillers and their preparation, the cab shall be primed with a coating designed for corrosion resistance and surface paint adhesion. The maximum thickness of the primer coat shall be 2.00 mils.

The entire cab shall then be coated with an intermediate solid or epoxy surfacing agent that is designed to fill any minor surface defects, provide an adhesive bond between the primer and the paint and improve the color and gloss retention of the color. The finish to this procedure shall be a sanding of the cab with 360 grit paper, the seams shall be sealed with SEM brand seam sealer and painted with two (2) to four (4) coats of an acrylic urethane type system designed to retain color and resist acid rain and most atmospheric chemicals found on the fire ground or emergency scene.

The cab shall then be painted with the upper and lower colors specifically designated by the customer with a minimum thickness of two 2.00 mils of paint, followed by a clear top coat not to exceed 2.00 mils.

CAB PAINT MANUFACTURER

The cab shall be painted with PPG Industries paint.

CAB PAINT PRIMARY/ LOWER COLOR

The primary/lower paint color shall be PPG FBCH 911659 Red.

CAB PAINT SECONDARY/ UPPER COLOR

The upper paint color shall be PPG FBCH 2185 White.

CAB PAINT EXTERIOR BREAK LINE

The upper and lower paint shall meet at a break line on the cab which shall fall approximately 1.00 inch under the cab door windows and above the exterior door handles. The break line shall extend in a straight line and drop approximately 6.50 inches under the windshield, above the windshield wipers and below the windshield wipers on the front of the cab.

CAB PINSTRIPE

Where the upper and lower paint colors meet a temporary 0.50 inch black pinstripe shall be applied over this break line to offer a more finished look prior to the final pinstripe being installed by the OEM.

CAB PAINT WARRANTY

The cab and chassis shall be covered by a limited manufacturer paint warranty which shall be in effect for 10 years from the first owners date of purchase or in service or the first 100,000 actual miles, whichever occurs first.

LOW VOLTAGE 12VDC ELECTRICAL SYSTEM

The chassis shall include a single starting electrical system which shall include a 12 volt direct current Weldon brand of multiplexing system, suppressed per SAE J551. The wiring shall be appropriate gauge cross link with 311 degree Fahrenheit insulation. All SAE wires in the chassis shall be color coded and shall include the circuit number and function where possible. The wiring shall be protected by 275 degree Fahrenheit minimum high temperature flame retardant loom. All nodes and sealed Deutsch connectors shall be waterproof.

APPARATUS WIRING PANEL

An apparatus wiring panel shall be installed on the officer side bulkhead below the dash which shall include (8) each open circuits with three (3) each 20.00 amp, (1) each 30.00 amp, (3) each 10 amp and (1) each 15 amp relay and breaker with trigger wires which shall be connected to the rocker switch panel.

MULTIPLEXING DISPLAY

The multiplexing electrical system shall include a Weldon Vista III display which shall be located within the driver side instrument panel ahead of the engine tunnel. The Vista III shall feature a full color LED display screen which includes a message bar displaying the time of day, the current ambient outside temperature and important messages requiring acknowledgement by the user which shall all be displayed on the top of the screen in the order they are received. There shall be virtual controls for the auto climate control, on-board diagnostics, video ready for back- up cameras, thermal cameras and DVD.

The Vista III display shall measure approximately 10.38 inches wide X 7.50 inches overall. The display shall offer varying fonts and background colors. The display shall be fully programmable to the needs of the customer which offers an infinite amount of flexibility for viewable options.

POWER AND GROUND STUD

A 40 amp battery direct power and ground stud shall be provided and installed in the electrical distribution panel. The stud shall be size #10 and protected with a 40 amp circuit breaker.

EXTERIOR ELECTRICAL TERMINAL COATING

All terminals exposed to the elements will be sprayed with a yellow protective rubberized coating to prevent corrosion.

SVI Western Demo
Heavy Rescue
Build Specification

ENGINE

The power plant for the vehicle shall offer a high pressure performance, turbo charged engine which shall feature a high pressure common rail fuel system. This system shall be coupled with a proven Holset turbo which delivers outstanding performance at ratings up to 400 HP. The Cummins ISL engine shall include replaceable mid-stop cylinder liners plus heavy duty roller followers, targeted piston cooling and 30% more efficient oil cooling for improved durability and reliability. The heavy duty design shall also feature stronger braking capacity.

The engine shall be EPA certified to meet the very latest emissions standards without compromising performance, reliability or durability. The Cummins ISL 400 engine shall feature an air charge cooled engine which consists of an in line six (6) cylinder, four cycle diesel powered engine. The engine shall offer a rating of 400 horse power at 2100 RPM which shall be governed at 2200 RPM. The torque rating shall feature 1200 foot pounds of torque at 1300 RPM with 543 cubic inches of displacement. The Cummins ISL 400 engine shall feature an electronic governor.

A wiring harness shall be supplied ending at the back of the cab. The harness shall include a connector which shall allow an optional harness for the pump panel. The included circuits shall be provided for a tachometer, oil pressure, engine temperature, hand throttle, high idle and a PSG system. A circuit for J1939 data link shall also be provided at the back of the cab.

The engine shall include an engine mounted combination full flow/by-pass oil filter with replaceable spin on cartridge for use with the engine lubrication system. The engine shall include Citgo brand Citgard 500, or equivalent SAE 15W40 CJ4 low ash engine oil which shall be utilized for proper engine lubrication.

ENGINE HIGH IDLE SPEED

The engine high idle control shall maintain the engine idle at approximately 1250 RPM when engaged.

ENGINE HIGH IDLE CONTROL WITH V-MUX

The vehicle shall be equipped with an automatic high-idle speed control. It shall be pre-set so when activated, it will operate the engine at the appropriate RPM to increase alternator output. This device shall operate only when the master switch is activated and the transmission is in neutral with the parking brake set. The device shall disengage when the operator depresses the brake pedal, or the transmission is placed in gear, and shall be available to manually or automatically re-engage when the brake is released, or when the transmission is placed in neutral. There shall be an indication on the Vista screen for the high idle speed control.

ENGINE PROGRAMMING

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

AUXILIARY ENGINE BRAKE

A Jacobs engine compression brake, for the six (6) cylinder engine, with brake light actuation and cutout relay for when in pump mode or when an ABS event occurs shall be installed. The engine brake shall activate upon 0% accelerator when in operation mode.

AUXILIARY ENGINE BRAKE CONTROL

An engine compression brake control device shall be included. The control device shall be electronic and shall prevent the activation of the engine compression brake during operating wherein undesirable conditions will result if the engine brakes are active. The electronic control device shall monitor various conditions and shall activate the engine brake only if all of the following conditions are simultaneously detected: a valid gear ratio is detected; the driver has requested or enabled engine compression brake operation; the throttle is at a minimum engine speed position; and the electronic controller is not presently attempting to execute an electronically controlled final drive gear shift. The compression brake shall be controlled via an off/low/high virtual button through the VMUX display.

FORWARD FLUID FILLS

The front of the chassis shall accommodate fluid fills for the engine oil, the windshield washer fluid and the power steering fluid though the grille. This area shall also accommodate checks for the engine oil, and power steering fluid.

ELECTRONIC LOW ENGINE OIL INDICATOR

The engine oil shall be monitored electronically and shall send a signal to activate a light in the instrument panel when levels fall below normal. The light shall activate in a low oil situation upon turning on the master battery and ignition switches without the engine running.

ENGINE BLOCK HEATER

A Kim Hotstart 1000 watt, 120 volt engine coolant heater with automatic thermostat shall be installed. The block heater s connected to the electrical inlet.

ENGINE WARRANTY

The Cummins engine shall be warranted for a period of five (5) years or 100,000 miles, whichever occurs first.

ENGINE PROGRAMMING REMOTE THROTTLE

The engine ECM (Electronic Control Module) discreet wire remote throttle circuit shall be turned off for use with a J1939 based pump controller or when the discreet wire remote throttle controls are not required.

ENGINE PROGRAMMING IDLE SPEED

The engine low idle speed will be programmed at 700 rpm.

COOLING SYSTEM FAN

The engine cooling system fan shall be direct drive belt driven on the engine.

ENGINE COOLING SYSTEM

There shall be a heavy-duty aluminum cooling system designed to meet the demands of the fire industry. The cooling system shall have the capacity to keep the engine properly cooled under all conditions of road and pumping operations. The cooling system shall be designed and tested to meet or exceed the requirements specified by the engine and transmission manufacturer and all EPA requirements. The complete cooling system shall utilize heavy-duty welds and be mounted to isolate the entire system from any vibration or stress. The individual cores of the cooling system shall be mounted in a manner to allow expansion and contraction at various rates without inducing stress into the adjoining cores.

The cooling system shall be comprised of a stacked, single depth package that provides the maximum cooling capacity for the specified engine as well as offers excellent serviceability. The main components shall include a surge tank, charge air cooler, recirculation shield, radiator and transmission cooler. The system shall utilize a surge tank and shall include a coolant overflow tank as an option.

There shall be a single depth core that allows greater efficiency, enhanced serviceability, and lighter weight with a higher ambient capability. The individual cores shall be mounted to allow expansion and contraction at various rates without inducing stress into the adjoining core.

The cooling package core shall not protrude below the frame of the vehicle by more than 1.1 inch. This feature shall improve the angle of approach thereby reducing possible damage.

The radiator shall be a cross-flow design constructed completely of aluminum with welded side tanks. The radiator shall include a minimum of a 627 square inch core and shall be bolted to the bottom of the charge air cooler to allow a single depth core, thus allowing a more efficient and serviceable cooling system. The radiator shall be equipped with a drain cock to drain the coolant for serviceability.

The cooling system shall include a one piece injected molded Polymer fan blade designed to provide long life in harsh environments. Polymer fans provide a significant weight reduction over metal fans providing longer life for fan clutch linings and bearings along with increased fan belt life.

The cooling system shall be equipped with a surge tank that is capable of being filled and removing entrained air from the system. The surge tank shall be equipped with a low coolant probe and sight glass to monitor the level of the coolant. The surge tank shall have a cap that meets the engine manufactures pressure requirements as well as the system design requirements.

All radiator tubes shall be formed from aluminized steel tubing. Recirculation shields shall be installed where required to prevent heated air from reentering the cooling package and affecting performance. When a center hose well is installed an additional shield may be required to redirect the airflow into the coolers.

The charge air cooler shall be a cross-flow design constructed completely of aluminum with welded side tanks. The charge air cooler shall have a minimum of a 390 square inch core and be bolted to the top of the radiator to allow a single depth core, thus allowing a more efficient and serviceable cooling system.

All charge air cooler tubes shall be formed from aluminized steel tubing and installed with silicone hump hoses and stainless steel “constant torque” style clamps meeting the engine manufactures requirements.

ENGINE COOLANT

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

LOW COOLANT INDICATOR LIGHT AND TONE ALARM

The instrument panel shall feature a low engine coolant indicator light which shall be located in the center of the instrument panel. An audible tone alarm shall also be provided to warn of a low coolant incident.

COOLANT HOSES

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

ENGINE AIR INTAKE

The engine air intake system shall include an ember separator air intake filter which shall be located in the front of the cab behind the officer side fascia. This filter shall protect the downstream air filter from embers using a combination of unique flat and crimped metal screens constructed into a galvanized steel frame. This multilayered screen shall be designed to trap embers or allow them to burn out before passing through the pack, while creating only minimal air flow restriction through the system. Periodic cleaning or replacement of the screen shall be all that is required after installation.

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

The air flow distribution and dust loading shall be uniform throughout the high-performance filter cone pack, which shall result in increased capacity and lower pressure differential for improved horsepower and fuel economy. The air intake shall be mounted within easy access via a hinged panel behind the headlight module. The air intake system shall include a restriction indicator light in the warning light cluster which shall activate when the air cleaner element requires replacement.

The charge air cooler hose shall be formed from aluminized steel tubing and include silicone hump hose with stainless expansion rings and stainless steel “constant torque” style clamps meeting the engine manufactures requirements.

EXHAUST SYSTEM

The exhaust system shall include a diesel particulate filter and a diesel oxidation catalyst to meet current EPA standards. The system shall be designed and installed using 0.065 inch aluminized steel plumbing from the diesel particulate filter to the discharge which shall terminate horizontally on the officer side of the vehicle ahead of the rear tires. The exhaust system shall be mounted on the underside of the frame inboard, maximizing space for the body compartments. All joints along plumbing following the diesel particulate filter shall be connected with lapping band style clamps.

The system shall include a 5.00 inch diameter plumbing which shall be 0.065 inch thick stainless steel exhaust between the engine turbo and the diesel particulate filter. The tubing shall include a thermal cover in order to retain heat between the engine turbo and diesel particulate filter. The entire exhaust system shall be bolted to the frame and include system joints connected with zero leak clamps between the turbo and diesel particulate filter.

TRANSMISSION

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

The transmission shall include two (2) internal oil filters and Castrol TranSynd™ synthetic TES 295 transmission fluid which shall be utilized in the lubrication of the EVS transmission. An electronic oil level sensor shall be included with the readout located in the shift selector.

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

The transmission gear ratios shall be:
1st- 3.49:1; 2 nd- 1.86 to 1; 3rd- 1.41 to1; 4 th- 1.00 to 1; 5th- 0.75 to 1; 6 th-0.64 to 1 (if applicable); Rev- 5.03 to 1.

TRANSMISSION MODE PROGRAMMING

The transmission, upon start-up, will select five (5) speeds of operation. The sixth speed over drive shall be available with the activation of the mode button on the shifting pad.

TRANSMISSION FEATURE PROGRAMMING

The EVS group package number 127 shall contain the 199 vocational package in consideration of the duty of this apparatus for rescue. This package shall incorporate an automatic neutral with selector override. This feature commands the transmission to neutral when the park brake is applied, regardless of drive range requested on the shift selector. This requires re-selecting drive range to shift out of neutral for the override.
An 8 pin Delphi connector will be provided next to the steering column connector. This will contain the following input/output circuits to the transmission tcm.

Function ID	Description	Wire assignment
C	PTO Request	143
F	Aux. Function Range Inhibit (Special)	101/142
G	PTO Enable Output (See Input Function C)	130
S	Neutral Indicator for PTO	145
	Signal Return	103

TRANSMISSION SHIFT SELECTOR

An Allison pressure sensitive range selector touch pad shall be provided and located to the right of the driver within clear view and easy reach. The shift selector will provide a prognostic indicator (wrench symbol) between the selected and attained indicators.

ELECTRONIC LOW TRANSMISSION OIL LEVEL INDICATOR

The transmission fluid shall be monitored electronically and shall send a signal to activate a light in the instrument panel when levels fall below normal.

TRANSMISSION PRE-SELECT WITH AUXILLIARY BRAKE

When the auxiliary brake is engaged, the transmission shall automatically seek shifting to second gear to decrease the rate of speed assisting the secondary braking system and slowing the vehicle speed.

TRANSMISSION WARRANTY

The Allison EVS series transmission shall be warranted for a period of five (5) years with unlimited mileage. Parts and labor shall be included in the warranty.

TRANSMISSION COOLING SYSTEM

The transmission shall include an air to oil cooler integrated into the lower portion of cooling package. The transmission cooling system shall meet all transmission manufacturer requirements. The cooling system shall feature a circuit provision located within the hydraulic transmission oil which shall provide for rapid warm up to the optimum transmission operating temperature.

TRANSMISSION DRIVEN POWER TAKE OFF (PTO)

A Spartan supplied ten (10) bolt standard duty clutched drive PTO shall be installed on the transmission. Installation shall include mounting of the PTO and wiring the unit with a control switch.

POWER TAKE OFF

A ten (10) bolt Chelsea model 277-XMFJP-B5XD heavy duty transmission driven PTO shall be installed. The clutched shifted PTO is designed specifically for the Allison world transmission and provides torque ranges from 250 to 335 lb. ft.

TRANSMISSION DRIVEN PTO LOCATION

The transmission driven power take off (PTO) shall be mounted in the 9:00 oclock position.

TRANSMISSION DRIVEN PROGRAMMING CONTROL

The left hand power take off shall be controlled by the transmission. It will use a virtual switch on vista with text messages. Disable is displayed when switch is off. Enable is displayed when the switch is turned on. Active is displayed when the switch is on with positive engagement of the power take off.

Required operating conditions for enabling this function are:
- Throttle position is low
- Engine speed is within customer modifiable constant limits
- Output speed is within customer modifiable constant limits
- Park brake set

DRIVELINES

All drivelines shall be heavy duty metal tube and equipped with Spicer 1710 series universal joints. The shafts shall be dynamically balanced prior to installation to alleviate future vibration. A splined slip joint shall be provided in each driveshaft and shall be coated with Glide coat®.

FUEL FILTER/WATER SEPARATOR

The fuel system shall have a Fleetguard FS1003 fuel filter/water separator as a primary filter. The fuel filter shall have a see through cover to allow visual inspection of fuel and filter condition and a drain valve.

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

FUEL LINES

The fuel system lines shall be brown reinforced nylon tubing rated for diesel fuel with brass fittings installed from the tank to engine including the return.

FUEL TANK

The fuel tank shall have a minimum capacity of sixty-eight (68) gallons and measure 35.00 inches wide X 17.00 inches high X 29.00 long. The baffled tank shall be made of 14 gauge aluminized steel. The tank exterior is painted with a PRP Corsol™ black anti-corrosive exterior metal treatment finish. This results in a tank which offers the internal and external corrosion resistance.

The fuel tank shall be mounted 2.00 inch below the frame, behind the rear axle. The tank can be easily lowered and removed for service purposes.

The tank shall have a vent port to facilitate venting to the top of the fill neck for rapid filling without "blow-back" and a roll over ball check vent for temperature related fuel expansion and draw.

Dual draw tubes and dual sender ports shall be installed. A 2.00 inch NPT fill ports shall be available for right or left hand fill. A 0.5 inch NPT drain plug shall be centered in the bottom of the tank.

FUEL FILL PROVISIONS

The fuel tank fill ports shall be offset with the left fill port located in the forward position extending across to the middle of the tank and the right fill port also located in the middle position on the fuel tank.

FRONT AXLE

The front axle shall be a Meritor Easy Steer Non drive front axle, model number MFS-20. The axle shall include a 3.74 inch drop and a 71.00 inch king pin intersection (KPI). The axle shall include a conventional style hub with a standard knuckle.

FRONT WHEEL BEARING LUBRICATION

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

FRONT SHOCK ABSORBERS

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

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

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

FRONT SUSPENSION

The front suspension shall include nine (9), 54.00 inch long and 4.00 inches wide taper leaf springs with a military double wrapped front eye. Both spring eyes shall have a case hardened threaded bushing installed with lubrication counter bore and lubrication land off cross bore with grease fitting. The spring capacity shall be rated at 21,500 pounds.

STEERING COLUMN/ WHEEL

The cab shall include a Douglas Autotech steering column shall be a seven (7) position tilt and 2.25 inch telescopic type with an 18.00 inch steering wheel located on the left side of the cab designating the drivers position. The steering wheel shall be covered with black absorbite padding.

The steering column shall contain a horn button, self-canceling turn signal switch, four-way hazard switch and headlamp dimmer switch.

POWER STEERING PUMP

The hydraulic power steering pump shall be a TRW PS and shall be gear driven from the engine. The pump shall be a balanced, positive displacement, sliding vane type.

ELECTRONIC POWER STEERING FLUID LEVEL INDICATOR

The power steering fluid shall be monitored electronically and shall send a signal to activate a light in the instrument panel when levels fall below normal.

FRONT AXLE CRAMP ANGLE

The chassis shall have a front axle cramp angle of 48 degrees to the left and 44 degrees to the right.

CHASSIS ALIGNMENT

The chassis frame rails shall be cross checked to insure the length and to make sure each is square. The front and rear axles shall be laser aligned, additionally the tires and wheels shall be aligned and toe-in set on the front tires. The completed apparatus shall be rechecked for proper alignment once the chassis has been fully loaded.

REAR AXLE

The rear axle shall be a Meritor model number RS-24-160. The axle shall be built of superior construction and quality components to provide the rugged dependability needed to stand up to the fire industrys demands. The axle shall include rectangular shaped, hot-formed housings for extra strength and rigidity. The axles shall also include torsion flow axle shafts that feature a surface hardness which resists fatigue and a resilient core which absorbs shock. There shall be unitized pinion seals within the axle helping to prevent leakage and harmful road contaminants from entering the axle components. The axle shall include a rigid differential case for high axle strength and reduced maintenance.

The axle shall include single reduction gearing and shall have a rated capacity of 24,000 pounds.

REAR WHEEL BEARING LUBRICATION

The rear axle wheel bearings shall be lubricated with oil.

REAR AXLE DIFFERENTIAL LUBRICATION

The rear axle differential shall be lubricated with oil.

VEHICLE TOP SPEED

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

REAR SUSPENSION

The single rear axle shall feature a Reyco 102AR air suspension with a single air bag on each side attached to a tapered forged drop leaf spring with one adjustable and one fixed torque rods.

The suspension shall feature dual air height control valves which shall be installed to ensure equal frame height on both sides of the vehicle regardless of the load. The suspension shall also include two premium shock absorbers, one each side.

The rear suspension capacity shall be rated at 21,000 to 27,000 pounds to meet the rear axle rating selected.

REAR SHOCK ABSORBERS

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

FRONT TIRES

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

The front tire stamped load capacity shall be 19,840 pounds per axle with a speed capacity of 65 miles per hour when properly inflated to 130 pounds per square inch.

The front tire US Fire Service Intermittent Usage load capacity shall be 20,000 pounds per axle with a speed capacity of 75 miles per hour when properly inflated to 120 pounds per square inch.

REAR TIRES

The rear tires shall be Michelin 11R-22.5 16PR "H" tubeless radial XZE regional tread.

The rear tire stamped load capacity shall be 24,020 pounds per axle with a speed capacity of 75 miles per hour when properly inflated to 120 pounds per square inch.

The rear tire US Fire Service Intermittent Usage load capacity shall be 24,820 pounds per axle with a speed capacity of 75 miles per hour when properly inflated to 120 pounds per square inch.

FRONT WHEELS

The front wheels shall be Alcoa hub piloted, 12.25 inch X 22.50 inch aluminum wheels with the Alcoa Dura-Bright ® wheel treatment as an integral part of the wheel. Alcoa Dura-Bright® wheels keep their shine without polishing; the wheels shall come clean simply by spraying with soap and water. Brake dust, grime and dulling oxidation shall wash off with no scrubbing and no special chemicals required.

REAR WHEELS

The rear wheels shall be Alcoa hub piloted, 8.25 inch X 22.50 inch aluminum wheels with the Alcoa Dura-Bright ® wheel treatment as an integral part of the wheel. Alcoa Dura-Bright® wheels keep their shine without polishing; the wheels shall come clean simply by spraying with soap and water. Brake dust, grime and dulling oxidation shall wash off with no scrubbing and no special chemicals required.

BALANCE WHEELS AND TIRES

All of the wheels and tires, including any spare wheels and tire assemblies, shall be dynamically balanced.

WHEEL TRIM

The front wheels shall include stainless steel lug nut covers and stainless steel baby moons with cutouts for oil seal viewing (there shall be no cutout on front drive or IFS axles). The covers and baby moons shall feature a mirror shine finish and shall be shipped loose with the chassis for installation by the apparatus builder.

The rear wheels shall include stainless steel lug nut covers and band mounted spring clip stainless steel high hats, also in a mirror shine finish, which shall be shipped loose with the chassis for installation by the apparatus builder.

The lug nut covers, baby moons, and high hats shall be RealWheels® brand, and constructed of 304L grade, non-corrosive stainless steel meeting D.O.T. certification standards.

BRAKE SYSTEM

A rapid build-up air brake system shall be provided. The air brakes shall include a two (2) air tank, three (3) reservoir system with a total of 4152 cubic inch of air capacity. A floor mounted treadle valve shall be mounted inside the cab for graduated control of applying and releasing the brakes. An inversion valve shall be installed to provide a service brake application in the unlikely event of primary air supply loss.

The rear axle spring brakes shall automatically apply in any situation when the air pressure loss below 25 PSI with a mechanical means for releasing the spring brake chambers exists. An audible alarm shall designate when system air pressure is below 60 PSI.

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

Automatic traction control which shall be installed on the single rear axle. The automatic traction control system shall apply the anti-lock braking system when the drive wheels loose traction. The system shall scale the electronic engine throttle back to prevent wheel spin while accelerating on ice or wet surfaces.

Additional handling capabilities shall include roll stability control which shall monitor the vehicles rollover threshold based on the lateral acceleration. The system shall activate a computerized device which shall slow the vehicle when the threshold is exceeded in either direction. Normal vehicle operation shall resume once the problematic conditions cease. Roll stability control shall be integral with the ABS and ATC systems.

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

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

FRONT BRAKES

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

REAR BRAKES

The rear brakes shall be Meritor EX225 Disc Plus disc brakes with 17.00 inch vented rotors.

PARK BRAKE

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

In addition to the mechanical rear brake engagement, the front service brakes will also engage via air pressure, providing additional braking capability.

PARK BRAKE ACTUATION VALVE

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

The parking brake actuation valve shall be mounted on the drivers dash within easy access.

FRONT BRAKE SLACK ADJUSTERS

Front brake automatic slack adjusters shall be an integral part of the brake assembly and be supplied by the brake manufacturer.

REAR BRAKE SLACK ADJUSTERS

Rear brake automatic slack adjusters shall be an integral part of the brake assembly and be supplied by the brake manufacturer.

AIR DRYER

The brake system shall include a Wabco System Saver 1200 air dryer. The air dryer incorporates an internal turbo cutoff valve that closes the path between the air compressor and air dryer purge valve during the compressor "unload" cycle. The turbo cutoff valve allows purging of moisture and contaminants without the loss of turbo boost pressure. The air dryer shall be located on the right frame rail behind the officer step.

FRONT BRAKE CHAMBERS

The front brakes shall be provided with MGM type 24 long stroke brake chambers.

REAR BRAKE CHAMBERS

The rear axle shall include MGM 24/30 brake chambers shall convert the energy of compressed air into mechanical force and motion. This shall actuate the brake camshaft, which in turn shall operate the foundational brake mechanism forcing the brake pads against the brake rotor.

AIR COMPRESSOR

The air compressor provided for the engine shall be a two (2) cylinder reciprocating Wabco® SS318 pass-through drive type compressor which shall be capable of producing 18.7 CFM at 1200 engine RPMs. The air compressor shall feature a higher delivery efficiency translating to more air delivery per horsepower absorbed. The compressor shall include an aluminum cylinder head which shall improve cooling, reduce weight and decrease carbon formation. Superior piston and bore finishing technology shall reduce oil consumption and significantly increasing the system component life.

AIR GOVERNOR

An air governor which shall cut-in and cut-out pressures on the vehicle shall be provided and shall be adjusted so that the maximum pressure in the air system and the minimum cut-in pressure. The air governor shall be located on the air cleaner bracket on the right frame rail behind the officer step.

AIR SUPPLY MOISTURE EJECTORS

Automatic moisture ejectors with a manual drain provision shall be installed on all reservoirs of the air supply system.

AIR SUPPLY LINES

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

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

REAR AIR TANK MOUNTING

The air reservoir located towards the rear of the chassis shall be installed parallel to the frame.

WHEELBASE

The chassis wheelbase shall be 215.50 inches.

REAR OVERHANG

The chassis rear overhang shall be 94.00 inches.

SVI Western Demo
Heavy Rescue
Build Specification

FRAME

The frame shall consist of double channel side rails and cross members forming a ladder style frame. The sides of the rails shall be constructed of "C" channel, 10.25 inches high X 3.5 inches deep X .38 inches thick with an inner channel of 9.44 inches high X 3.13 inches deep and .38 inches thick, 110,000 psi minimum yield high strength low alloy steel. Each rail shall be considered on the following key items: Each rail shall be rated by a Resistance Bending Moment (RBM) minimum of 3,213,100 inch pounds and have a minimum section modulus of 29.21 cubic inches calculated by the radius method. The frame shall measure 35.00 inches in width.

RBM refers to the measure of stiffness of a cross section relative to the yield stress of the material the frame is manufactured from.

Every cross sectional profile of an object has a measure of its mechanical properties based on its shape. These properties of its shape can be broken down relative to the horizontal and vertical direction, represented as Ixx and Iyy. These act as a measure of the shapes resistance to bending.
The section modulus of mass of this profile takes into consideration the stresses imposed on this profile when a load is applied, by considering the maximum distance from the center of the profile to its outer most extremity. Section modulus is a method of measurement for the relative stiffness of a beam section and is based on the horizontal and vertical directional value plus the distance from the center of mass to the extremities of the cross section from the coordinate axis, such that Zyy = Iyy/Y and Zxx = Ixx/X.

A minimum of seven (7) fully gusseted 0.25 inch thick cross members shall be installed. The inclusion of the engine mounting, body mounting, pump mounting or bumpers shall not be considered as a cross member. The cross members shall be attached using grade 8 flanged head bolts and flanged lock nuts. Each cross member shall be mounted to the frame rails a minimum of utilizing 0.25 inch thick gusset reinforcement plates at all corners balancing the area of force throughout the entire frame.

All holes for bolts shall be drilled into the frame rails, preventing fracture or fatigue. Each hole shall be custom placed relative to its component preventing unnecessary holes that present fatigue along each frame rail.

The frames proposed shall be custom drilled for each component and shall not include any unnecessary holes.

All relief areas shall be cut in with a minimum 2.00 inch radius at intersection points with the edges ground to a smooth finish to prevent a stress concentration point.

The frame and cross members shall carry a lifetime warranty to the original purchaser. A copy of the frame warranty shall accompany the bid.

FRAME WARRANTY

The frame and cross members shall carry a lifetime warranty to the original purchaser.

FRAME PAINT

The frame shall be powder coated black prior to any attachment of components.

All powder coatings, primers and paint shall be compatible with all metals, pretreatments and primers used. The cross hatch adhesion test per ASTM D3359 shall not have a fail of more than ten (10) squares. The pencil hardness test per ASTM D3363 shall have a final post-curved pencil hardness of H-2H. The direct impact resistance, per ASTM D2794, shall have a direct impact resistance of 120.00 inches per pound at 2 mils. The salt spray resistance per ASTM B-117-97 shall pass 500 hours of salt spray test. The applied process shall allow the application of other products over it and still maintain or exceed the 500 hours salt spray test.

FRONT BUMPER

A one piece, two (2) rib wrap-around style, polished stainless steel front bumper shall be provided. The material shall be 10 gauge 304 stainless steel, 12" high and 101" wide.

FRONT BUMPER EXTENSION LENGTH

The front bumper shall be extended 21.00 inches ahead of the cab.

FRONT BUMPER EXTENSION WIDTH

The front bumper extension splayed frame rails shall include an overall width of 44.75 inches.

FRONT BUMPER APRON

The bumper extension shall include a bumper apron which consists of 0.19 inch thick aluminum tread plate constructed for an exact fit within the 21.00 inch bumper extension. The apron shall be installed between the bumper and the front face of the cab affixed using stainless steel bolts attaching the apron to the bumper flange.

FEDERAL Q2B SIREN

The front bumper shall include an electro mechanical Federal Q2B™ siren, which shall be streamlined, chrome-plated and shall produce 123.00 decibels of sound at 10.00 feet. The siren shall produce a long distance warning siren which shall include a unique heavy duty caster clutch design which provides a longer coast down sound while reducing the amp draw requirements to (100) amps. The Federal Q2B™ siren shall measure 10.50 inches wide X 10.00 inches high X 14.00 inches deep.

SIREN LOCATION

The siren shall be pedestal mounted on the bumper apron on the furthest outboard section of the bumper on the driver side.

AIR HORNS

The front bumper shall include two (2) Grover brand air horns which shall measure 21.00 inches long with a 6.00 inch round flare. The air horn shall be a trumpet style and shall include a chrome finish.

AIR HORN LOCATION

The air horns shall be recess mounted in the front bumper face, one (1) on the driver side of the bumper in the inboard position relative to the left hand frame rail and one (1) on the officer side of the bumper in the inboard position relative to the right hand frame rail.

AIR HORN AIR RESERVOIR

One (1) air tank, with a 2084 cubic inch reservoir, shall be installed on the chassis to act as a supply tank for operating air horns. The reservoir shall be isolated with a 90 PSI pressure protection valve on the reservoir supply side to prevent depletion of the air to the air brake system.

ELECTRONIC SPEAKER

The bumper shall include two (2) Cast Products Inc. model SA4301, 100 watt speaker which shall be recess mounted within the bumper fascia. The speaker shall include a flat mounting flange and be chrome in color.

ELECTRONIC SPEAKER LOCATION

The speakers shall be located one (1) on the drivers side and one (1) on the officers side of the bumper fascia, outboard of the frame rails.

FRONT BUMPER TOW HOOKS

Two (2) heavy duty tow hooks, painted black shall be installed below the front bumper, rearward position and bolted directly to the chassis frame with grade 8.00 bolts.

CAB TILT SYSTEM

The entire cab shall be capable of tilting 45.00 degrees to allow for easy maintenance of the engine and transmission. The lift system shall include an ignition interlock and red lock down indicator lamp, which shall illuminate when holding the “Down” switch to indicate safe road operation. It shall be necessary to activate the master battery switch with the park brake set in order to tilt the cab. Two cab tilt cylinders shall be provided with velocity fuses in each cylinder port. The cab pivots shall be 1.90" ball and be anchored to frame brackets with 1.25" diameter studs.

Two (2) spring loaded hydraulic hold down hooks located outboard of the frame which shall be installed designed for holding the cab securely to the frame. A steel safety assembly shall be installed on the right side cab lift cylinder to prevent accidental cab lowering. The safety assembly shall fall over the lift cylinder when the cab is in the "Up" position. A cable release system shall also be provided to clear the safety assembly from the lift cylinder when lowering the cab.

CAB TILT CONTROL RECEPTACLE

The cab tilt shall include a receptacle which shall be temporarily located on the right hand chassis rail rear of the cab to provide a place to plug in the cab tilt remote control pendant. The tilt pump shall include 8.00 feet of cable with a 6-pin Deutsch connector that includes a cap. The remote control pendant shall also include 20.00 feet of cable which also includes a mating connector.

CAB WINDSHIELD

The cab windshield shall have a maximum of 2808 sq. in. area and be of the wraparound design, 52.00 inches wide X 27.00 inches high for maximum visibility. The distance from the Driver or Officer to the front windshield shall be a minimum of 42.00 inches at the furthest seated position. This distance shall ensure the safety of the Driver and Officer from intruding objects in the unlikely event of a head on collision. All glass utilized for the windshield or windows shall include an automotive tint. The left and right windshield shall use the same interchangeable glass.

CAB GLASS FRONT DOOR

The cab glass within the front doors shall each include a window which is 26.00 inches wide X 31.00 inches high. Both the driver and officer windows shall have the capability to roll down into the door housing via electric actuation. The power windows shall be controlled via switching on the driver door and by a switch on each respective door. The front cab door windows shall be mounted in a black anodized aluminum frame with lower drain slots.

The glass utilized for these windows shall include a green automotive tint unless otherwise noted.

WINDOW TINT FRONT

The cab windshield shall have a standard green automotive tint which shall allow seventy-five (75) percent light transmittance.

The cab driver and officer door glass shall include a regular grey automotive tint film which shall allow forty-five (45) percent light transmittance. The dark tint shall aid in cab cooling and help protect passengers from radiant solar energy.

GLASS REAR DOOR RIGHT HAND

The rear right hand side crew door shall include a window which is 31.00 inches wide X 26.00 inches high. The window shall be a powered type and shall be controlled by a switch on the door frame. The glass utilized for this window shall include an automotive tint unless otherwise noted.

WINDOW TINT OFFICER SIDE

The officer side window shall include a regular grey automotive tint which shall allow forty-five (45) percent light transmittance.

GLASS REAR DOOR LEFT HAND

The rear left hand side crew door shall include a window which is 31.00 inches wide X 26.00 inches high. The window shall be a powered type and shall be controlled by a switch on the door frame. The glass utilized for this window shall include an automotive tint unless otherwise noted.

WINDOW TINT DRIVER SIDE

The driver side window shall include a regular grey automotive tint which shall allow forty-five (45) percent light transmittance.

CAB GLASS SIDE MID OFFICER SIDE

The cab shall include a window on the officers side behind the front and ahead of the crew doors which shall measure 16.00 inches wide X 26.00 inches high. This window shall be fixed within this space and shall be rectangular in shape. The window shall be mounted using self locking window rubber. The glass utilized for this window shall include a green automotive tint unless otherwise noted.

WINDOW TINT MIDDLE OFFICER SIDE

The window on the officer side of the cab located between the driver and officer doors shall include a regular grey automotive tint which shall allow forty-five (45) percent light transmittance.

CAB GLASS SIDE MID DRIVER SIDE

The cab shall include a window on the drivers side behind the front door and ahead of the crew door and above the wheel well which shall measure 16.00 inches wide X 26.00 inches high. This window shall be fixed within this space and shall be rectangular in shape. The window shall be mounted using self locking window rubber. The glass utilized for this window shall include a green automotive tint unless otherwise noted.

WINDOW TINT MIDDLE DRIVER SIDE

The window on the driver side of the cab located between the driver and officer doors shall include a regular grey automotive tint which shall allow forty-five (45) percent light transmittance.

CAB GLASS UPPER SIDE FRONT

The raised roof on the driver and officer sides of the cab shall include a window which is 6.00 inches wide X 14.00 inches high. These windows shall be fixed within this space. These windows shall be in the shape of a right angle and be mounted in a black rubberized frame.

WINDOW TINT UPPER SIDE FRONT

The window located in the upper section on the side towards the front of the cab shall include a regular grey automotive tint which shall allow forty-five (45) percent light transmittance.

CAB GLASS UPPER SIDE MIDDLE

The middle section of the raised roof on the driver and officer sides of the cab shall include a window in the middle of the cab which is 16.00 inches wide X 14.00 inches high. These windows shall be fixed within this space. These windows shall be in the shape of a right angle and be mounted in a black rubberized frame.

WINDOW TINT UPPER SIDE MIDDLE

The window located in the upper section on the side in the middle of the cab shall allow forty-five (45) percent light transmittance.

CAB GLASS UPPER SIDE REAR DOOR

The middle section of the raised roof on the driver and officer sides of the cab shall include a window which is 31.00 inches wide X 14.00 inches high. These windows shall be fixed within this space. These windows shall be rectangular in shape and be mounted in a black rubberized frame.

WINDOW TINT UPPER SIDE REAR

The window located in the upper section on the crew doors of the cab shall allow forty-five (45) percent light transmittance.

ENGINE TUNNEL AND UNDER CAB INSULATION

The exterior of the cab tunnel surrounding the engine shall include reinforced closed cell foam insulation. The insulation shall measure 1.00 inch thick and shall include a foil backing and grid reinforcement. The foam shall be cut precisely to fit each section and sealed for additional heat and sound deflection. The insulation under the tunnel shall act as a noise barrier absorbing noise from the engine as well as assisting in sustaining the desired climate within the cab interior.

Additionally, the entire underside of the cab shall include reinforced closed cell foam insulation. The insulation shall measure 1.00 inch thick and shall include a foil backing and grid reinforcement. The foam shall be cut precisely to fit each section and sealed for additional heat and sound deflection. The insulation under the cab floor shall act as a noise barrier absorbing noise from the road as well as assisting in sustaining the desired climate within the cab interior.

CLIMATE CONTROL

The cab shall be equipped with a ceiling mounted combination defrost / heating and air-conditioning system mounted above the engine tunnel in a central location.

The system shall offer sixteen (16) adjustable louvers. Six (6) of the louvers shall face forward towards the windshield, offering 45,000 BTU of heat at 320 CFM for defrosting. The system shall include six (6) rearward facing louvers to direct air for the crew area and four (4) for driver and officer comfort. When in "Cabin Mode" the system shall be designed to produce 60,000 BTU of heat and 32,000 BTU of cooling. The HVAC cover shall be made of ABS plastic.

All auxiliary heating units (if optionally equipped) shall be plumbed in series independent of the heater/defroster system with one (1) seasonal shut-off valve at the front corner on the officer side of the cab.

The air conditioning system shall be capable of lowering the cab interior temperature from 100 degrees to 70 degrees within thirty minutes, with a relative humidity of sixty percent.

The air conditioner lines shall be a mixture of custom bent zinc coated steel fittings and Aero-quip GH 134 flexible hose with Aero-Quip EZ-Clip fittings.

CLIMATE CONTROL ACTIVATION

The heating controls, and air conditioning if included, shall be located on the Vista screen.

A/C CONDENSER LOCATION

A roof mounted A/C condenser shall be installed centered on cab forward of raised roof against the slope rise.

A/C COMPRESSOR

The air-conditioning compressor shall be a belt driven, engine mounted, open type Seltec model TM-21. The compressor shall be compatible with R-134A refrigerant and PAG oil.

INTERIOR TRIM FLOOR MAT

The floor of the cab shall be covered with a multi-layer mat consisting of .25 inch sound absorbing closed cell foam and a .06 inch non-slip vinyl surface with a pebble grain finish. The covering shall be held in place by a pressure sensitive adhesive with aluminum cornering trim. All exposed seam shall be sealed to reduce moisture and debris.

INTERIOR TRIM VINYL

The cab interior shall include trim on the front and rear crew ceiling, the cab walls and the rear wall of the cab. The trim shall be constructed of insulated vinyl over a hard board backing. The material shall be securely fastened to the interior of the cab utilizing snap style fasteners with a decorative fastener for a more appealing appearance.

CAB INTERIOR TRIM HEADER ABS

The cab interior shall include a header over the driver and officer dash which shall be vacuum formed ABS composite panel with robust styling grooves providing structural integrity. The header shall include (2) vents within the header which are directed at the windshield. Also included will be a drop down panel for access behind the header for service of electronic components, if necessary. The header shall include (2) cut outs, (1) over the driver and (1) over the officer to accommodate speakers and molded areas to accommodate the sun visors.

INTERIOR TRIM SUNVISOR

The header shall include one (1) sun visor above the driver and officer seating positions and above the windshield. Each sun visor shall be constructed of masonite and covered with insulated gray vinyl trim.

CAB INTERIOR TRIM LH DASH ABS

The driver side dash shall be a (1) piece hinged panel which shall be constructed of durable vacuum formed ABS composite panel which shall be custom molded for a perfect fit surrounding the dash. The ABS shall be aesthetically pleasing in its gray coloring.

CAB INTERIOR CENTER DASH

The main center dash cover shall be constructed of 5052-H32 Marine Grade, .090 of an inch thick, one hundred percent primary aluminum plate. The cover shall include three (3) panels within the dash which shall accommodate any additional gauges and controls. All gauges and controls within the panels shall be backlit for night vision and clearly identified representative of their specific function. The center panel shall be within comfortable reach of both the driver and officer.

TRIM RIGHT HAND DASH

The right hand dash shall be constructed of 5052-H32 Marine Grade, 0.13 of an inch thick, one hundred percent primary aluminum plate and shall include a glove compartment with a hinged door and a Mobile Data Terminal (MDT) provision. The glove compartment size will measure 14.00 inches wide X 6.63 inches high X 5.88 inches deep. The MDT provision shall be provided above the glove compartment, recessed 3.00 inches below the surface of the dash and measure 16.00 inches wide X 14.00 inches deep.

ENGINE TUNNEL TRIM

The cab engine tunnel shall be covered with .44 of an inch thick multi-layer mat consisting of .25 inch closed cell foam, .13 of an inch thick rubber and .06 inch thick non-slip pebble grain.

ENGINE TUNNEL ACCESSORIES

The engine tunnel shall include a .090 thick aluminum console which shall include a large storage bin, a map compartment and two (2) cup holders and an additional bin for smaller items such as cell phones, and other miscellaneous equipment.

POWER POINT DASH MOUNT

The cab dash panel shall include two (2) 12 volt cigarette lighter type receptacles as a power source for additional portable or mobile items. The receptacles shall be wired to be hot when the battery master switch is on.

POWER POINT CONSOLE MOUNT

The cab interior shall include two (2) 12 volt cigarette lighter type receptacles. This receptacle shall be provided to act as a power source for additional portable or mobile items. The receptacles shall be connected to the master power switch.

STEP TRIM

The cab steps shall include a 14 gauge 304 perforated stainless steel construction on the first step, the step closest to the ground. The stainless steel finish shall be a number 7 mirror. The step shall include a frame which is integral with the construction of the cab for rigidity and strength. The perforation shall allow water and other debris to flow through rather than becoming packed under the step. The middle step shall be integral with the cab in construction and shall be trimmed in 3003-H22 embossed aluminum tread plate which is 0.084 inches thick.

INTERIOR DOOR TRIM

The doors of the cab shall include an aluminum plate the same weight and grade as the cab on the interior of the door. The aluminum shall be then painted.

DOOR PANEL CUSTOMER NAMEPLATE

The interior door trim on the front doors shall include a customer nameplate which states the vehicle was custom built for their Department.

CAB DOOR TRIM REFLECTIVE

In accordance with the current standards of NFPA, the body builder shall provide 96.00 square inches of reflective material on the interior of each cab door.

INTERIOR GRAB HANDLE

A rubber covered 11.00 inch grab handle shall be provided on the inside of the cab on the hinge post at the driver and officer doors. The handle shall assist personnel in exiting and entering the cab.

INTERIOR GRAB HANDLE FRONT DOOR

Each front door shall include one (1) ergonomically contoured 9.00 inch cast aluminum handle mounted horizontally on the interior door panels. The handles shall feature a textured black powder coat finish and provide ease of access and exiting the cab.

INTERIOR GRAB HANDLE REAR DOOR

A black powder coated cast aluminum assist handle shall be provided on the inside of each rear crew door the full width of the door below the window glass and shall measure 30 inches in length. The handle shall assist personnel in exiting and entering the cab.

CAB INTERIOR FLOOR MAT COLOR

The cab interior floor mat shall be black in color.

INTERIOR TRIM VINYL COLOR

The cab interior vinyl trim surfaces shall be black in color.

INTERIOR ABS TRIM COLOR

The cab interior vacuum formed ABS composite trim surfaces shall be black in color.

CAB PAINT INTERIOR

The interior metal surfaces shall be painted with a Zolatone #20-71 onyx black texture finish.

CAB PAINT INTERIOR DOOR TRIM

The inner door panel surfaces shall be painted with a Zolatone #20-71 black onyx finish.

CONTROL PANELS

The dash shall include three removable panels located one (1) to the right of the driver position, one (1) in the center of the dash and one (1) to the left of the officer position.

SWITCH PANEL CENTER

The center dash shall include a blank panel with no switches.

SWITCH PANEL DRIVER

The interior shall include a durable vacuum formed ABS composite switch panel which shall include one (1) switch which shall be located in the left of the dash. This panel shall be appropriately labeled as to its specific function.

SWITCH PANEL OFFICER

The interior shall include a durable vacuum formed ABS composite switch panel which shall be located on the officer side of the dash and shall not include any switches.

SWITCH PANEL IGNITION

The vehicle shall be equipped with a keyless ignition and master, with an “Off/ On” and a two switch for “Off/ Start” .

SEATBELT WARNING SYSTEM

A seatbelt warning system shall be installed for each seat within the chassis. The system shall provide visual and audible warning when any seat is occupied (sixty pounds minimum), the corresponding seat belt remains unfastened, and the park brake is released.

Once activated, the visual and audible indicators shall remain active until all occupied seats have the seat belts fastened.

SEAT MATERIAL

The seats shall include a covering of high strength, wear resistant fabric made of durable ballistic polyester. A PVC coating shall be bonded to the back side of the material to help protect the seats from UV rays and from being saturated or contaminated by fluids.

SEAT COLOR

All seats supplied on the chassis shall be black in color. This material shall be semi- resistant to UV rays and from being saturated or contaminated by fluids.

SEAT BACK LOGO

The seat back shall include a customer specific logo. The logo shall be centered on the standard headrest of the seat back and on the left side of a split headrest.

DRIVER SEAT

The driver's seat shall be an H.O. Bostrom Firefighter Sierra model seat. The seat shall feature eight (8) way electric positioning. The eight (8) positions shall include up and down, fore and aft and front and rear tilt. The seat shall also feature integral springs to isolate shock.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a red, three-point shoulder harness with the lap belt, automatic retractor and buckle as an integral part of the seat assembly.

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall be 37.00 inches measured with the height adjustment in its lowest position and the suspension inflated and/ or raised to the upper limit of its travel.

This model of seat shall have successfully completed the static load tests by FMVSS 207, 209, 210 and 302 in effect at the time of manufacture. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

DRIVER SEAT BACK

The drivers seat shall include a standard seat back incorporating the all belts to seat feature (ABTS) as described above. The seat back shall feature a contoured, adjustable head rest.

OFFICER SEAT

The officer's seat shall be an H.O. Bostrom Firefighter model seat. The seat shall feature two (2) way manual adjustment and shall include a tapered and padded seat cushion. The seat shall also feature integral springs to isolate shock.

There shall be a red, three-point shoulder harness with lap belt and an automatic retractor attached to the cab and available to the seat. The buckle portion of the seat belt shall be mounted on a rigid or semi-rigid stalk such that the buckle remains positioned in an accessible location. The seat belt assembly anchorages shall conform to the Federal Safety Standard (FMVSS) No. 210, “Seat belt assembly anchorages”.

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall be 37.00 inches measured with the height adjustment in its lowest position and the suspension inflated and/ or raised to the upper limit of its travel.

This model of seat shall have successfully completed the static load tests by FMVSS 207, 209, 210 and 302 in effect at the time of manufacture. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

OFFICER SEAT BACK

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

The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the taken in place for a safe and comfortable fit in the seat back cavity. The SCBA unit simply needs to be pushed against the pivot arm to engage the patented auto- locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions.

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

POWER SEAT WIRING

The power seat or seats installed in the cab shall be wired directly to battery power.

REAR FACING OUTER SEAT QUANTITY

The crew area shall include two (2) rear facing crew seats, which include one (1) located directly behind the driver seat and one (1) located directly behind the officer seat.

REAR FACING OUTBOARD SEAT

The crew area shall include a seat in the rear facing outboard position which shall be a H.O. Bostrom Firefighter series. The seat shall feature a tapered and padded seat, and cushion. The seat shall be mounted in a fixed position.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a red, three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant.

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall measure at minimum 37.00 inches, from the height adjustment in its lowest position and the suspension inflated and/ or raised to the upper limit of its travel to the cab ceiling.

This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

REAR FACING OUTBOARD SEAT BACK

The rear facing outboard seat shall feature a SecureAll™ SCBA locking system which shall be one bracket model and store all U.S. and International SCBA brands and sizes while in transit or for storage within the seat back. The bracket shall be easily adjustable with all adjustment points using similar hardware and adjustments with one tool.

The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the taken in place for a safe and comfortable fit in the seat back cavity. The SCBA unit simply needs to be pushed against the pivot arm to engage the patented auto- locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions.

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

SEAT BELT ORIENTATION

The crew position seat belts shall follow the standard orientation which extends from the outboard shoulder extending to the inboard hip.

FORWARD FACING CENTER SEAT QUANTITY

The crew area shall include two (2) forward facing center crew seats with both located at the center of the rear wall.

FORWARD FACING CENTER SEAT

The crew area shall include a seat in the forward facing center position which shall be a H.O. Bostrom Firefighter series. The seat shall feature a tapered and padded seat, and cushion. The seat shall be mounted in a fixed position.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a red, three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant.

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall measure at minimum 37.00 inches, from the height adjustment in its lowest position and the suspension inflated and/ or raised to the upper limit of its travel to the cab ceiling.

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FORWARD FACING CENTER SEAT BACK

The forward facing center seat shall feature a SecureAll™ SCBA locking system which shall be one bracket model and store all U.S. and International SCBA brands and sizes while in transit or for storage within the seat back. The bracket shall be easily adjustable with all adjustment points using similar hardware and adjustments with one tool.

The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the taken in place for a safe and comfortable fit in the seat back cavity. The SCBA unit simply needs to be pushed against the pivot arm to engage the patented auto- locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions.

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

FORWARD FACING SEAT FRAME

The forward facing center seating positions shall include an enclosed seat frame which is located and installed on the rear wall. The seat frame shall measure 42.38 inches wide X 12.38 inches high X 22.00 inches deep and shall be fully open offering storage within this area. There shall be (2) access points to this storage area, (1) via the driver side of the seat frame and (1) via the officer side of the seat frame. The seat frame shall be constructed of 5052-H32 Marine Grade, .190 inch thick, 100 percent primary smooth aluminum plate. The seat box shall be painted with the same color as the remaining interior.

SEAT FRAME STORAGE ACCESS

There shall be two (2) access points to the storage area one (1) each side of the seat frame. Each access point shall be covered by a hinged door which measures 18.00 inches wide X 8.63 inches high to allow access for storage in the seat box. The seat box doors shall be painted with the same interior coating as the cab.

CAB FRONT UNDERSEAT STORAGE ACCESS DOOR

The driver and officer under seat storage area shall have a solid aluminum painted, hinged door with latch.

WINDSHIELD WIPER SYSTEM

The cab shall include a parallel arm wiper system which shall clear the windshield of water, ice and debris. There shall be two (2) windshield wipers, one (1) for the driver and one (1) for the officer, which shall be affixed to a rod style arm. The system shall include a single motor which shall initiate the arm in which both the driver and officer windshield wipers are attached, initiating a back and forth motion for each wiper. The wiper motor shall be activated by an intermittent wiper control located within easy reach of the drivers position.

ELECTRONIC WINDSHIELD FLUID LEVEL INDICATOR

The windshield washer fluid level shall be monitored electronically and shall send a signal to activate a light in the instrument panel when levels fall below normal.

CAB DOOR HARDWARE

The cab entry doors shall be equipped with exterior pull handles, suitable for use while wearing firefighter gloves. The handles shall be aluminum with a polished chrome plated finish. The exterior pull handles shall include a scuff plate behind the handle constructed of polished stainless steel. All doors shall be keyed alike and designed to prevent accidental lockout.

The interior latches shall be black flush paddle type, which are incorporated into an upper door panel.

DOOR LOCKS

The doors shall include a CAN based electronic door lock system which shall include two (2) keypads, one (1) located on the drivers side next to the front grab handle and one (1) on the officers side next to the front grab handle. The electronic door locks shall feature Four (4) key fobs for activation with buttons for entry door lock and unlock, compartment door lock and unlock shall be provided. There shall be two (2) rocker switches provided, one (1) located on the inside of the drivers side front door and one (1) located on the officers side front door. The power door locks shall control all four (4) entry doors of the cab.

POWER DOOR LOCK COMPARTMENT PROVISION

The power door lock feature shall include up to eight (8) compartment doors featuring controls through the key fob and through a virtual switch on the multiplex display.

DOOR LOCK DRIVER SIDE REAR COMPARTMENT

The driver side rear compartment shall feature a power door lock actuator.

DOOR LOCK OFFICER SIDE REAR COMPARTMENT

The officer side rear compartment shall feature a power door lock actuator.

CAB EXTERIOR GRAB HANDLES

The cab shall include one (1) each 18.00 inch knurled, anti-slip, one-piece exterior assist handle behind each cab door. The assist handle shall be made of 14 gauge 304- stainless steel and be 1.25 inch diameter to enable non-slip assistance with a gloved hand.

REARVIEW MIRRORS

Retrac West Coast style single vision mirrors, model 1171H 980-4 shall be provided and installed on each side of the cab. The mirrors shall measure 7.00 inches wide X 16.00 inches high. The mirrors shall be mounted to the cab doors with tubular stainless steel, swing away arms. The mirror glass shall be held in a plastic housing with a stainless steel back. The mirrors shall be heated, and remotely adjustable vertically and horizontally via four way actuation switches. The switches shall be mounted in the cab with in easy reach of the driver. A manually adjusted 8" convex mirror is provided below the main mirror head for wider field of vision.

REARVIEW MIRROR HEAT SWITCH

The heated rearview mirrors shall be controlled through a virtual button on the multiplex display.

CAB FENDERS

Full width wheel well liners shall be installed on the extruded cab to limit road splash and enable easier cleaning. The two-piece liners shall consist of an inner liner 16.00 inches wide made of vacuum formed ABS composite and an outer fenderette 3.50 inches wide made of 14 gauge 304 polished stainless steel.

MUD FLAPS FRONT

The front wheel wells shall have mud flaps installed on them.

CAB MODEL IDENTIFICATION

The cab shall include custom “Gladiator” nameplates on the front driver and officer side doors.

EXTERIOR EMBLEM

Each cab side shall include one (1) Spartan emblem installed on the outside of the cab above each front wheel well.

IGNITION

The master battery system and a keyless start ignition system shall each be controlled by a ¼ turn Cole Hersee thumb switches which shall be mounted to the left of the steering wheel on the dash.

Each switch shall illuminate a green LED indicator light on the dash when the respective switch is placed in the “ON” position.

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

A hidden toggle switch with protective cover shall be provided. It shall be located so it can be activated at the drivers discretion, so if the parking brake is released and the transmission is placed in gear, electrical power will be cut to disable the engine to prevent unauthorized personnel from commandeering the vehicle.

BATTERIES

The single start electrical system shall include (6) Harris BCI 31 950 CCA batteries with a 210 minute reserve capacity and 4/0 welding type dual path starter cables per SAE J541. The cables shall have encapsulated ends with heat shrink and sealant.

BATTERY BOXES

The batteries shall be contained within two (2) black powder coated steel battery boxes which shall be located on the driver and officer side of the chassis, securely bolted to the frame rails. The boxes shall include drain holes in the bottom for sufficient drainage of water and shall include phenolic board battery hold downs and a durable, Dry-Deck in the bottom of the tray under each battery to allow for air flow and drainage.

BATTERY CABLES

The starting system shall include cables which shall be protected by 275 degree F. minimum high temperature flame retardant loom, sealed and encapsulated at the ends with heat shrink and sealant.

BATTERY JUMPER STUDS

The starting system shall include battery jumper studs. These studs shall be located in the forward most portion of the driver's side lower step. The studs shall allow the vehicle to be jump started, charged, or the cab to be raised in an emergency in the event of battery failure.

ALTERNATOR

The starting system shall include a 320 amp Leece-Neville 12 volt alternator, model number A001496PA. The alternator shall include a self-exciting integral regulator.

BATTERY CONDITIONER

A Kussmaul 35/10 battery conditioner shall be supplied. The battery conditioner shall provide a 35 amp output for the chassis batteries and a 10 amp battery saver output. The battery conditioner shall be mounted in the cab behind the driver's seat.

BATTERY CONDITIONER DISPLAY

A Kussmaul battery conditioner display shall be supplied. The battery conditioner display shall be mounted in the cab, viewable through the cab mid side window behind the drivers door.

AUXILIARY AIR COMPRESSOR

A Kussmaul Auto Pump 120V air compressor shall be supplied. The air compressor shall be installed behind the officer's seat. The air compressor shall be plumbed to the air brake system to maintain air pressure.

AUTO- EJECT ELECTRICAL INLET COVER

The Kussmaul Auto- Eject electrical inlet connection shall include a red cover.

HEADLIGHTS

A hinged headlamp and combination side marker/turn lamp module shall be part of the front cab fascia. This combination shall include (2) rectangular halogen High/Low beam headlamps with integrated side marker/turn signal lamps. The headlamps shall be equipped with a "Daytime Running" light feature, which will illuminate the headlights to 80% brilliance when the ignition switch is in the "On" position and the parking brake is released.

The headlights shall be controlled via a virtual button on the Vista display.

HEADLIGHT LOCATION

The headlights shall be located on the front fascia of the cab directly above the front warning lights.

TURN SIGNALS

The headlamp assembly shall include a turn signal and side marker lamp combination within the same module. This light assembly shall be amber in color and shall have a visibility radius of 125 degrees.

SIDE MARKER/ TURN SIGNALS

The headlight module shall include two (2) side turn and marker lights which shall be integral with the headlights.

MARKER AND ICC LIGHTS

In accordance with FMVSS, there shall be five (5) cab LED marker lamps designating identification, center and clearance provided. These lights shall be installed on the face of the cab within full view of other vehicles from ground level.

GROUND LIGHTS

Each door shall include incandescent NFPA compliant ground lights mounted to the underside of the cab. The lights shall include a polycarbonate lens, a housing which is vibration welded and a bulb which shall be shock mounted for extended life. The ground lighting shall be activated through the multiplex system by the opening of the respective door as well as being activated when the parking brake is set.

ENGINE COMPARTMENT LIGHT

There shall be an incandescent NFPA compliant light mounted under the engine tunnel for area work lighting on the engine. The light shall include a polycarbonate lens, a housing which is vibration welded and a bulb which shall be shock mounted for extended life.

SIDE MOUNTED SCENE LIGHTING

The side of the cab shall include two (2) Whelen model 810 scene lights, one (1) each side which shall be surface mounted. The Whelen lights shall offer halogen lighting with 8 to 32 degree internal optics.

SIDE SCENE LIGHT LOCATION

The scene lighting located on the driver and officer sides of the cab shall be mounted in the upper forward portion of the 20.00 inch raised roof of the cab between the front and rear crew doors.

SIDE SCENE LIGHT ACTIVATION

The scene lighting shall be activated via the lights respective door and two (2) virtual buttons on the MUX display located inside the cab, one per side.

INTERIOR CAB LIGHTING

The cab shall include an incandescent dome lamp with a red and white lens located over each door. The dome lamps shall be rectangular in shape and shall measure 9.50 inches in length and approximately 5.00 inches wide including a black colored bezel. The white lamp shall be activated by its respective door when opened and via the multiplex display and both the red and white lamp shall be activated by an individual switch on the light.

A fifth red and clear lamp shall be located in the headliner, over the engine tunnel.

INTERIOR AUXILLIARY CAB LIGHTING REAR CREW

The cab headliner above the forward facing crew seats shall include two (2) 7.00 inch clear dome lamps. These lamps shall be activated by the rear doors as well as an individual switch located on the side of each lamp.

DO NOT MOVE APPARATUS WARNING

The front headliner of the cab shall include a Whelen 500 series red LED flashing light, located in the center for the greatest visibility. The light shall be 5.40 inches long X 1.70 inches wide X 0.90 inches high and shall be clearly labeled "Do Not Move Apparatus". In addition to the flashing red light, a n audible alarm shall be programmed into the MUX system which shall sound when a door is open, the air brake is released and the vehicle is shifted into gear.

MASTER WARNING

The optical warning system shall be controlled by a master switch which shall include all “ON” and all “OFF” capability via a virtual button within the MUX display. All warning lights which are “ON” when the master switch is activated shall also activate. This switch shall be clearly labeled for identification.

INBOARD FRONT WARNING LIGHTS MODEL

The cab front fascia shall include dual Whelen series 600 Super LED warning lights which shall offer multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be surface mounted to the front fascia of the cab within a chrome bezel in the inboard position.

INBOARD FRONT WARNING LIGHTS- COLOR

The front warning lights mounted on the fascia for the inboard position shall be red.

OUTBOARD FRONT WARNING LIGHTS

The cab front fascia shall include dual Whelen series 600 Super LED warning lights which shall offer 14 flash patterns plus a steady burn for solid colors and 20 flash patters plus a steady burn for split colors. The lights shall be surface mounted to the front fascia of the cab within a chrome bezel in the outboard position.

OUTBOARD FRONT WARNING LIGHTS- COLOR

The front warning lights mounted on the fascia for the outboard position shall be red.

FRONT WARNING CONTROL

The front warning lights shall be controlled through a virtual control on the MUX display. This switch shall be clearly labeled for identification.

INTERSECTION WARNING LIGHTS MODEL

The chassis shall include two (2) Whelen series 600 Super LED intersection warning lights, one (1) each side, which shall offer multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors.

INTERSECTOR FRONT WARNING LIGHTS- COLOR

The intersection lights shall be red.

INTERSECTOR FRONT WARNING LIGHTS- POSITION

The intersection lights shall be mounted in the rear position on the side of the bumper.

SIDE WARNING LIGHTS MODEL

The cab sides shall include a Whelen series 600 Super LED 4”x6” warning light, one (1) each side, which shall offer multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors.

SIDE WARNING LIGHTS- COLOR

The warning lights located on the side of the chassis shall be red.

SIDE WARNING LIGHTS- POSITION

The warning lights on the side of the cab shall be mounted over the front wheel well directly over the center of the front axle.

SIDE WARNING CONTROL

The side warning lights shall be controlled through a virtual control on the MUX display. This switch shall be clearly labeled for identification.

SIREN HEAD

A Whelen 295HFS2 200 watt “hands free” remote siren amplifier control head shall be provided and flush mounted in the switch panel with a location specific to the customers needs. The siren shall feature hands free mode and will be in “standby” mode awaiting instruction. The siren shall offer radio broadcast, public address, wail, yelp or pierer tones and hands free operation which shall allow the operator to turn the siren on and off from the horn ring.

AIR HORN SELECTOR SWITCH

A virtual button on the MUX display shall allow control to the electric siren, the electric horn or the air horn from the steering wheel horn button. The electric horn shall sound by default when the selector switch is in either position which shall meet the FMVSS requirement.

AIR HORN ACTUATION

The air horn actuation shall be accomplished by the steering wheel horn button and a black push button on the switch panel. An air horn activation circuit shall be provided to the chassis harness pump panel harness connector.

MECHANICAL SIREN ACTUATION

The mechanical siren shall be actuated by a driver and officer mounted Linemaster model SP491-S81 foot switch and shall include a red momentary siren brake through the multiplex display. The siren shall only be active when master warning switch is on.

ELECTRONIC SIREN AUXILIARY ACTUATION

The electronic siren actuation shall be also be accomplished by the steering wheel horn button and a chrome push button on the switch panel.

BACKUP ALARM

An ECCO model 575 backup alarm shall be installed at the rear of the chassis with an output level of not less than 107 dB. The alarm will automatically activate when the transmission is placed in reverse. A virtual switch shall be provided on the MUX display to disable of the backup alarm.

INSTRUMENTATION

An ergonomically designed instrument panel shall be provided. The gauges shall be backlit with red LED lamps. All gauges shall be driven by stepper motor movements. The instrumentation system shall be multiplexed and shall receive engine and transmission information over the J1939 data bus to reduce redundant sensors.

The instrument panel shall contain the following gauges:

One (1) electronic tachometer shall be included. The scale on the tachometer shall read from 0 to 3000 RPM.

One (1) electronic speedometer with an integral LCD odometer/ trip odometer and hour meter shall be included. The speedometer shall have a dual scale with miles per hour (MPH) as the dominant scale and kilometers per hour (KPH) on the minor scale. The speedometer scale shall read from 0 to 90 MPH (0 to 140 KPH). The odometer shall display up to 9,999,999.9 miles. The trip odometer shall display up to 9,999.9 miles. The LCD screen shall also be capable of displaying certain diagnostic functions. The hour meter shall display engine hours of operation.

One (1) three function gauge with primary system, secondary system and fuel level shall be included. The scale on the air pressure gauges shall read from 0 to 140 pounds per square inch (PSI). The air pressure scales shall be non-linear to expand the scales in the region of normal operation. A red indictor light in the gauge shall indicate a low air pressure. The scale on the fuel level gauge shall read from empty to full. A yellow indicator light shall indicate low fuel at the quarter tank level.

One (1) four function gauge with engine oil pressure, coolant temperature, transmission oil temperature and a voltmeter shall be i
The scale on the engine oil pressure gauge shall read from 0 to 140 pounds per square inch (PSI). The engine oil pressure scale
non-linear to expand the scale in the region of normal operation. A red indicator light in the gauge shall indicate low engine oil p
The scale on the coolant temperature gauge shall read from 160 to 250 degrees Fahrenheit (F). A red indicator light in the gau
indicate high coolant temperature. The scale on the transmission oil temperature gauge shall read from 100 to 300 degrees Fa
(F). A red indicator light in the gauge shall indicate high transmission oil temperature. The scale on the voltmeter shall read from
volts. A red indicator light shall indicate high or low system voltage.

The instrument panel shall contain an Enunciator Module that contains the following indicator lights. All indicator lights shall contain LED lamps.

RED LAMPS
Stop Engine - indicates critical engine fault. *(5)*
Park Brake - indicates park brake is set.
Volts - indicates high or low system voltage. *(4)*
Low Oil Press - indicates low engine oil pressure. *(4)*
High Coolant Temp - indicates excessive engine coolant temperature. *(4)*
High Trans Temp - indicates excessive transmission oil temperature. *(4)*
Low Air - indicates low air pressure in either system one or system two. *(4)*
Low Coolant Level - indicates low engine coolant level. *(1) (5)*
Air Filter - indicates excessive engine air intake restriction. *(5)*
Brake System Fault indicates a failure in the brake system (hydraulic brake systems only). *(5)*
Seat Belt Indicator indicates when a seat is occupied and corresponding seat belt remains unfastened.

YELLOW LAMPS
Check Engine - indicates engine fault. *(5)*
Check Trans - indicates transmission fault. *(5)*
Wait to Start - indicates active engine air preheat cycle. *(2) (5)*
ABS - indicates anti-lock brake system fault. *(5)*
Water in Fuel - indicates presence of water in fuel filter. *(1) (5)*
Check Message Center indicates there is a fault message present in the LCD digital display.
SRS indicates a problem in the RollTek supplemental restraint system. *(1) (5)*
DPF indicates a restriction of the diesel particulate filter. *(3) (5)*
HEST indicates a high exhaust system temperature. *(3) (5)*
MIL indicates an engine emission control system fault. *(3) (5)*
Low Fuel indicates low fuel. *(4)*

GREEN LAMPS
Left and Right turn signal indicators.
Aux Brake Active - indicates secondary braking device is active. *(1)*
High Idle - indicates engine high idle is active. *(1)*
ATC indicates low wheel traction for automatic tractions control equipped vehicles, also indicates mud/snow mode is active for ATC system. *(1) (5)*
OK to Pump indicates the pump engage conditions have been met. *(1)*
Pump Engaged indicates the pump is currently in use. *(1)*

BLUE LAMPS
High beam indicator.

The instrumentation system shall provide a constant audible alarm for the following situations:
Low air pressure.
Low engine oil pressure.
High engine coolant temperature.
High transmission oil temperature.
Low coolant level. *(1)*
High or low system voltage
Critical engine fault (Stop Engine).

The Check Message Center icon will illuminate and a message will be displayed in the LCD screen for the following situations:

Cab Ajar
Low Oil Level
Door Ajar
Engine Communication Error
Transmission Communication Error
ABS Communication Error
High Coolant Temp
Turn Signal Reminder
Low Fuel
Low Oil Pressure
Low Coolant Level
Low Battery Voltage
High Battery Voltage
Low Primary Air Pressure
Low Secondary Air Pressure
High Trans Temp

The instrumentation system will provide a continuous alarm for the following situations:

Stop Engine
Low Coolant Level *(1)*
Brake System Fault
Check Trans
Check Engine
ABS
Engine Communications Error
Transmission Communications Error
ABS Communications Error
Low Fuel
Low Primary Air Pressure
Low Secondary Air Pressure
Low or High Battery Voltage
High Trans Temp
Low Oil Pressure
High Coolant Temp

The instrumentation system will provide a 160mSec second alarm every 880mSec for the following situations:

Seat Belt
Air Filter
Water in Fuel *(1)*
Cab Ajar
Low Oil Level
Door Ajar

The instrumentation system will provide a 160mSec second alarm every 5Sec for the following situations:

Turn Signal Reminder

(1) Feature only available when optionally equipped.
(2) Feature only available on engines with pre-heat capability.
(3) Feature only on vehicles with diesel particulate filter (DPF).
(4) Warning light is present in gauge.
(5) A message in the LCD screen will also be displayed.

COMPACT DISC RECEIVER

A Panasonic compact disc player with AM/FM stereo receiver, weather band and four (4) speakers shall be installed in the cab. The receiver shall be installed above the driver position. The speakers shall also be installed inside the cab with two (2) speakers recessed within the headliner of the front of the cab just behind the windshield and two (2) speakers in the upper rear corners of the cab.

ANTENNAS AM/FM RADIO

A small antenna shall be located on the driver side of the cab roof for AM/FM and weather band reception.

REARVIEW CAMERA SYSTEM

An Audiovox Voyager heavy duty rearview camera system shall be supplied. One (1) camera shall be shipped loose for OEM installation in the body to afford the driver a clear view of the rear of the vehicle and one (1) camera shall be mounted on the officer side of the cab above the front door. The cameras shall be wired to a single Weldon Vista display located on the drivers side dash. The rear camera display shall activate when the vehicles transmission is placed in reverse. The side camera display shall activate when the respective side turn signal is activated. The camera system display can also be activated through the Vista display panel.

CAB EXTERIOR PROTECTION

The cab face shall have a removable plastic film installed over the painted surfaces to protect the paint finish during transport to the body manufacturer.

FIRE EXTINGUISHER

A 2.50 pound BC D.O.T approved fire extinguisher shall be shipped loose with the cab.

DOOR KEYS

The cab and chassis shall include a total of four (4) door keys for the manual door locks.

SVI Western Demo
Heavy Rescue
Build Specification

CHASSIS WARRANTY

The chassis manufacturer shall warrant to the original purchaser the custom fire truck chassis for a period of twelve (12) months. The warranty period shall commence on the date the vehicle is delivered to the original purchaser and continue for twelve (12) months thereafter. The warranty shall include conditional items listed in the detailed warranty document which may be provided upon request.

OPERATORS MANUAL AND PARTS LIST

There shall be one (1) chassis operator's manual which includes a parts list including wiring and air plumbing diagrams provided and shipped loose with the vehicle. All standard wiring and plumbing diagrams shall be created specifically to the chassis model.

ENGINE AND TRANSMISSION OPERATION MANUALS

There shall be one (1) set of engine operation and maintenance manuals and one (1) set of transmission operation manuals specific to the models ordered included with the final vehicle in the ship loose items.

SPARTAN CAB/CHASSIS

Since the Spartan Motors cab/chassis is available to all manufacturers, there will be No Exceptions to the previous Spartan Motors specification.

CHASSIS MODIFICATIONS

LUBRICATION AND TIRE DATA PLATE

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

- Engine oil
- Engine coolant
- Chassis transmission fluid
- Pump transmission lubrication fluid . . (if applicable)
- Pump priming system fluid, if applicable . . (if applicable)
- Drive axle(s) lubrication fluid
- Air conditioning refrigerant . . (if applicable)
- Air conditioning lubrication oil . . (if applicable)
- Power steering fluid
- Cab tilt mechanism fluid . . (if applicable)
- Transfer case fluid . . (if applicable)
- Equipment rack fluid (if applicable)
- CAFS air compressor system lubricant . . (if applicable)
- Generator system lubricant . . (if applicable)
- Front tire cold pressure
- Rear tire cold pressure
- Maximum tire speed ratings

VEHICLE DATA PLATE

A permanent label in the driving compartment which indicates the following:

- Filter part numbers for the
  - Engine
  - Transmission
  - Air
  - Fuel
- Serial numbers for the
  - Engine
  - Transmission
- Delivered Weights of the Front and Rear Axles
- Paint Brand and Code(s)
- Sales Order Number

OVERALL HEIGHT, LENGTH DATA PLATE (US)

The fire apparatus manufacturer shall permanently affix a high-visibility label in a location visible to the driver while seated.

The label shall show the height of the completed fire apparatus in feet and inches, the length of the completed fire apparatus in feet and inches, and the GVWR in pounds.

Wording on the label shall indicate that the information shown was current when the apparatus was manufactured and that, if the overall height changes while the vehicle is in service, the fire department must revise that dimension on the plate.

ACCIDENT PREVENTION

There shall be a placard in the cab seating area which reads, "ALL OCCUPANTS MUST BE SEATED AND BELTED WHEN THE APPARATUS IS IN MOTION".

PERSONNEL CAPACITY

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

ACCIDENT PREVENTION

If the rear bumper is 8" deep or more, there shall be a placard on the rear face of the body, in clear sight from the ground, which reads, "WARNING - DO NOT RIDE ON STEPS OR DECK AREAS WHILE THE APPARATUS IS IN MOTION. DEATH OR SERIOUS INJURY MAY RESULT".

WEARING HELMET WARNING

A label stating “DO NOT WEAR HELMET WHILE SEATED” shall be visible from each seating location.

FRONT BUMPER

The front bumper shall be as provided by the cab/chassis manufacturer. No other alternation or modifications are required.

BUMPER GRAVELSHIELD

The bumper extension gravel shield shall be provided by the cab/chassis manufacturer.

AIR HORN(S)

The air horn(s) shall be supplied and installed by the cab/chassis manufacturer.

FRONT TOW PROVISIONS

The front tow provisions shall be supplied and installed by the cab/chassis manufacturer.

EXHAUST

The exhaust system shall be as provided by cab/chassis manufacturer. No other alternation or modifications are required.

The exhaust piping and discharge outlet shall be located or shielded so as not to expose any portion of the apparatus or equipment to excessive heating.

Exhaust pipe discharge shall be directed away from any operator's position.

Where parts of the exhaust system are exposed so that they are likely to cause injury to operating personnel, protective guards shall be provided.

THREE (3) ANTENNAS - RAIL MOUNTED CAB ROOF

There shall be one (1), radio antenna rail(s) provided and installed on the roof of the cab/chassis. The rails shall be constructed of aluminum, forming a two piece box design. The top section shall be removable for easy access to the individual antenna wiring. Total of three (3), antenna bases shall be provided and installed in each rail. The bases shall include a minimum of 20' of LMR195 cable. The antenna wiring shall enter the cab roof at a single point under the end of the rail. The end of each radio antenna shall be routed to a location determined by the Customer.

Due to multiple configurations of antenna whips, the Manufacturer shall provide the antenna base, and Customer shall provide the whip.

SEAT BELT COLOR

Section 14.1.3.4 of the NFPA 1901 Standards, 2009 edition, requires all seat belt webbing in cab to be bright red or bright orange in color, and the buckle portion of the seat belt shall be mounted on a rigid or semi rigid stalk such that the buckle remains positioned in an accessible location.

SEAT BELT WEB LENGTH - CUSTOM CAB

Sections 14.1.3.2 and 14.1.3.3 of the NFPA 1901 standards, 2009 edition, require the effective seat belt web length for a Type 1 lap belt for pelvic restraint to be a minimum of 60", and a Type 2 pelvic and upper torso restraint-style seat belt assembly to be a minimum of 110".

The chassis seat belt web length as supplied by the custom chassis manufacturer shall be compliant to NFPA Standards 14.1.3.2 and 14.1.3.3.

SEAT BELT / VDR SYSTEM - CUSTOM CAB

The seat belt warning and vehicle data recorder systems shall be provided by the cab/chassis manufacturer.

HELMET STORAGE

Four (4) OnScene Solutions Talon model helmet storage bracket(s) shall be provided and installed in the cab driving or crew area. The helmet mounting will comply with the 9G NFPA requirements. Helmet brackets shall be mounted on the completed unit, locations as per the Customer.

CAB CRASH TEST CERTIFICATION

A cab crash test certification from the fire apparatus manufacturer shall be provided with the equipment. A copy of this certification shall be included with the bid.

NOTE: There shall be no exception to any portion of the cab integrity certification requirements. Nonconformance shall lead to immediate rejection of bid.

The certification shall state that the cab does meet or exceed the requirements below:

1) European Occupant Protection Standard ECE Regulation No. 29.
2) SAE J2422 Cab Roof Strength Evaluation - Quasi-Static Loading Heavy Trucks.

CAB MIRRORS, DRIVER ADJUSTABLE

Section 14.3.5 of the NFPA 1901 Standards, 2009 edition, requires all primary rear view mirrors used by the driver to be adjustable from the driver's position.

MUDFLAPS

There shall be rubber mudflaps furnished and installed behind each set of tires.

AIR BRAKE SYSTEM QUICK BUILD-UP

There shall be one (1) cab/chassis supplied Milton male quick connector type air shoreline inlet to provide air to the chassis air tanks from an external source compressed air shoreline hookup in order to maintain full operating air pressure while the vehicle is not running. Air inlet shall be located near driver's door. The female end of the connector shall be supplied by the Customer.

The quick buildup system shall provide sufficient air pressure so that the apparatus has no brake drag and is able to stop under the intended operating conditions following the 60-second buildup time.

ROAD EMERGENCY SAFETY KIT

One (1) set of three dual faced triangular warning flares with fold away base complete with storage case per DOT requirements shall be provided with the completed apparatus.

One (1) 2.5 lb. ABC type vehicle fire extinguisher with bracket shall be provided and mounted in the cab or the front streetside compartment.

FUEL FILL

There shall be one (1) Cast Products fuel fill door located in the streetside exterior wheel well panel, behind the rear axle. The fill door shall have a spring-loaded hinged door and a permanent label with the text "DIESEL FUEL ONLY".

BODY DESIGN

The importance of public safety associated with emergency vehicles requires that the construction of this vehicle meet the following specifications. These specifications are written to establish the minimum level of quality and design. All Bidders shall be required to meet these minimum requirements.

It is the intent of these specifications to fully describe the requirements for a custom built emergency type vehicle. In order to extend the expected service life of this vehicle, the body module shall be removable from the chassis frame and be capable of being installed on a new chassis.

The sheet metal material requirements, including alloy and material thickness, throughout the specifications are considered to be a minimum. Since such materials are available to all Manufacturers, the material specifications shall be strictly adhered to.

The fabrication of the body shall be formed sheet metal. Formed components shall allow the Customer to have the body repaired locally in the case where any object has struck the body and caused damage. The use of proprietary extrusions will prevent the Customer from such repair and shall NOT be used.

Following construction of the subframe, which supports the apparatus body, the sheet metal portion of the body shall be built directly on the subframe. The joining of the subframe and body shall be of a welded integral construction.

The sheet metal fabrication of the body shall be performed using inert gas continuous feed welders only. The entire body shall be welded construction. The use of pop rivets in any portion of structural construction may allow premature failure of the body structure. Therefore, pop rivets shall NOT be used in the construction of the structural portions of the body. This includes side body sheets, inner panels of compartment doors, and any other structural portions of the body.

EXTERIOR ALUMINUM BODY

The fabrication of the body shall be constructed from aluminum 3003H-14 alloy smooth plate. This shall include compartment front panel, vertical side sheets, side upper rollover panels, rear panels and compartment door frames.

The body compartment floors and exterior panels shall be constructed with not less than 3/16" (.187) aluminum 3003H-14 smooth plate. Interior compartment dividing walls shall be constructed with not less than 1/8" (.125) aluminum 3003H-14 smooth plate. Lighter gauge sheet metal will not be acceptable in these areas.

The door side frame openings shall be formed "C" channel design. An electrical wiring conduit raceway running the full length of exterior compartments shall be provided. This raceway shall contain all 12 volt wiring running to the rear of the apparatus, permitting easy accessibility to wiring.

Individual compartment modules, with dead air space voids between compartments, will not be an acceptable method of compartment construction.

The compartments shall be an integral part of the body construction. Compartment floors from front of body to ahead of rear axle, also from rear axle to rear of body shall be single one-piece sections. Compartment floors shall be preformed, then positioned in body and welded into final position.

Compartment floors shall have a "sweep-out" design with door opening threshold positioned lower than compartment floor, permitting easy cleaning of compartments. Angles, lips, or door moldings are not acceptable in the base of compartment door opening. One-way rubber drain valves shall be provided in compartment floors so that a water hose may be used to flush-out compartment area.

All exterior seams in sheet metal below frame, and around the rear wheel well area shall be welded continuous to prevent moisture from entering compartments. All other interior seams and corners shall be sealed with silicone based caulk prior to painting.

Only stainless steel bolts, nuts, and sheet metal screws shall be used in mounting exterior trim, hardware and equipment.

Exterior compartments shall have louvers in lower back wall of compartment for ventilation.

ROOF CONSTRUCTION

The roof shall be integral with the body and shall be all welded construction. The roof shall be reinforced with 2" x 2" tubing running the full width of the body. All seams in the roof area shall be welded prior to paint to prevent entry of moisture.

BODY SUBFRAME

To assure proper body alignment and clearance, the body subframe shall be constructed directly on the chassis.

The chassis frame rails shall be fitted with 1/4" custom extruded UHMW polyethylene rail cap to isolate the body frame members from direct contact with chassis frame rails.

The body subframe shall be constructed from 6061T6 aluminum alloy tubing. Subframe shall consist of two (2) 2" x 6" x 1/4" aluminum tubes, the same width as the chassis frame rails, NO EXCEPTION. Welded to this tubing shall be crossmembers of 2" x 6" x 1/4" aluminum. These crossmembers shall extend the full width of the body to support the compartments. Crossmembers shall be located at front and rear of the body, below compartment divider walls, and in front and rear of wheel well opening. Additional aluminum crossmembers shall be located as necessary to support walkway or heavy equipment.

To form the frame, the tubing shall be beveled and welded at each joint using 5356 aluminum alloy welding wire.

BODY MOUNTING

The body subframe shall be fastened to the chassis frame with a minimum of six (6) spring loaded body mounts. Each mount shall be configured using a two-piece encapsulated slide bracket. The two (2) brackets shall be fabricated of heavy duty 1/4" thick steel and shall have a powder coat finish to prevent any corrosion. Each mounting assembly shall utilizing two (2) 3/4" diameter x 6" long grade 8 bolts and two (2) heavy duty springs. The assembly design shall allow the body and subframe to act as one (1) component, separate from the chassis. As the chassis frame twists under driving conditions, the spring mounting system shall eliminate any stress from being transferred into the body. The spring loaded body mounts shall also prevent frame side rail or body damage caused by unevenly distributed stress and strains due to load and chassis movement.

Body mountings that do not allow relief from chassis movement will not be acceptable.

10" REAR STEP BUMPER

The full width rear bumper shall be constructed from 2" x 2" x 1/4" aluminum tubing frame and covered with 3/16" NFPA compliant aluminum tread plate. The bumper shall extend from the rear vertical body panel 10" and provide a rear step with a minimum of 1/2" space at body for water drainage.

REAR TOW EYES

There shall be two (2) heavy duty rear mounted tow eyes securely attached to the body subframe, below the apparatus body. The tow eyes shall be fabricated from 3/4" thick steel plate and shall have a black powder coat finish.

TRAILER HITCH

A Class 5, 14,000 lbs. weight carrying capacity (gross trailer weight) rear hitch receiver shall be provided below the rear bumper. The receiver shall be attached to chassis frame with heavy duty steel frame work.

The hitch shall be complete with a 2-1/2" square receiver. Without the use of a "weight distribution" ball hitch the Class 5 receiver shall have a capacity of 8,000 lbs. gross trailer weight.

For hydraulic brake equipped or electric brake equipped trailer towing capability, a primary electrical receptacle shall be provided near the hitch point and shall match the umbilical cable specified.

An auxiliary electrical receptacle shall be provided near the hitch point and shall match the umbilical cable specified for optical warning lights.

A label shall be provided in a location in which it is visible to an operator making trailer connections. The label shall state the maximum GVWR and tongue weight of the trailer that can be safely towed with the hitch system.

Two (2) safety chain attachment points shall be provided near the hitch point for hitches designed to use safety chains, each designed with an ultimate strength of not less than the maximum GVWR specified on label.

GROUND LIGHTS

Two (2) OnScene Solutions 9" LED Nightstik ground lights shall be mounted below the rear bumper.

WHEEL WELL EXTERIOR PANEL

The exterior panel of the body wheel well enclosure shall be constructed from 3/16" smooth aluminum panels.

STAINLESS STEEL BODY FENDERS

The body wheel well openings shall be provided with round radius, polished stainless steel fenderettes. The fenderettes shall be bolted and easily replaceable if damaged. The fenderettes shall be installed using a rubber gasket to reduce buildup of moisture and/or debris.

WHEEL WELL LINERS

The wheel wells shall be provided with an easily removable polymer, circular inner fender liner. The inner liner shall be bolted to the wheel well with stainless steel bolts and spaced away from the wheel well so the liner will not accumulate dirt or water.

SCBA BOTTLE COMPARTMENTS

There shall be three (3) SCBA compartments located adjacent to the rear wheels. There shall be two (2) on the curbside and one (1) on the streetside of the apparatus body. Each compartment shall have a Cast Products aluminum door assembly with a positive catch latch. The compartment shall allow the storage of SCBA bottles up to 7-3/4" in diameter. The door shall activate the "Hazard Warning Light" in the cab when not in the closed position.

PAINT FINISH - SINGLE COLOR

The body shall be painted with a single color of PPG Delfleet® Evolution paint as described above.

Prior to the assembly and reinstallation of exterior components; i.e. warning and DOT lights, handrails, steps, door hardware, and miscellaneous items, an isolation tape, or gasket shall be used to prevent damage to the finish painted surfaces. These components shall be fastened to body using either a plastic insert into body metal with stainless steel screws or zinc coated nutserts into body surface using stainless steel bolts to prevent corrosion from dissimilar metals.

Touch-up paint shall be provided with completed vehicle.

- Paint Color: Match cab/chassis supplied paint color.

BODY UNDERCOATING

The entire underside of apparatus body shall be sprayed with black automotive undercoating. Undercoating shall cover all areas to retard corrosion under the apparatus.

UNDERCOAT WARRANTY

The undercoating shall be provided with a warranty by its manufacturer for the lifetime of the vehicle. The re-spray warranty shall be transferable between vehicle owners. Should the coating applied to the underside of the body and wheel wells of the vehicle ever flake off, peel, chip or crack due to drying out, the damaged area shall be re-sprayed without charge to the vehicle owner.

PAINT WARRANTY

The vehicle shall be provided with a ten (10) year non-prorated warranty to the original owner. Warranty is provided by PPG Inc. A warranty sheet with all conditions and maintenance procedures shall be provided with the delivered vehicle.

COMPARTMENT INTERIOR FINISH

The compartment interiors shall be treated with phosphoric acid and then sprayed with an epoxy primer applied 1.0 mil thick. All body seams will be caulked with urethane seam sealer and painted with two (2) coats of textured Zolatone paint. Zolatone catalysts will be added to the Zolatone to help in resisting moisture and provide a more durable finish. Paint color shall be gray.

ROOF COMPARTMENT INTERIOR FINISH

The roof compartments shall be treated with phosphoric acid and then sprayed with an epoxy primer will be applied 1.0 mil thick. All body seams will be caulked with urethane seam sealer and painted with two (2) coats of textured Zolatone paint. Zolatone catalysts will be added to the Zolatone to help in resisting moisture and provide a more durable finish. Paint color shall be gray.

REFLECTIVE STRIPE

All retroreflective materials shall conform to the requirements of ASTM D 4956, *Standard Specification for Retroreflective Sheeting for Traffic Control*, Section 6.1.1 for Type I Sheeting.

All retroreflective materials used that are colors not listed in ASTM D 4956, Section 6.1.1, shall have a minimum coefficient of retroreflection of 10 with observation angle of 0.2 degrees and entrance angle of -4 degrees.

Any printed or processed retroreflective film construction used shall conform to the standards required of an integral colored film as specified in ASTM D 4956, Section 6.1.1.

REFLECTIVE STRIPE - CAB SIDE

A retroreflective stripe(s) shall be affixed to at least 50 percent of the cab and body length on each side.

The stripe or combination of stripes shall be a minimum of 4 in. (100 mm) in total width.

The 6 in. (152 mm) wide stripe or combination of stripes shall be permitted to be interrupted by objects (i.e., receptacles, cracks between slats in roll up doors) provided the full stripe is seen as conspicuous when approaching the apparatus.

- The stripe material shall be 3M Scotchcal 680.
- This reflective stripe shall be white in color.

REFLECTIVE STRIPE - CAB FRONT

A reflective stripe shall be affixed to the front of cab. The stripe or combination of stripes shall be a minimum of 4 in. (100 mm) in total width.

The 6 in. (152 mm) wide retroreflective stripe(s) shall be affixed to at least 25 percent of the width of the front of the apparatus.

- The stripe material shall be 3M Scotchcal 680.
- This reflective stripe shall be white in color.

REFLECTIVE STRIPE - BODY SIDES

A 6" minimum reflective stripe shall be affixed to the sides of the body.

- The stripe material shall be 3M Scotchcal 680.
- This reflective stripe shall be white in color.

The stripe shall extend straight back from the chassis and then, ahead of the rear wheels, it shall form an "S" and then extend straight back to the rear of the body. The "S" portion of the stripe shall be shaded in the corners..

MURAL - US FLAG

A mural of the US flag shall be provided on each side of the upper body, full length and from drip rail above top of compartment doors to bottom of roof radius. The image shall be reversed on each side, always having the stars of flag to the front of body. Flag shall be printed in full color on white 3M Scotchcal 680CR retroreflective material.

Mural shall have a 3M UV over laminate to protect from UV rays, scene damage, and everyday use, and shall have a minimum 7 year warranty for material failure, and colorfastness.

CHEVRON REFLECTIVE STRIPE - REAR SIDES PANELS

At least 50 percent of the rear-facing vertical surfaces, visible from the rear of the apparatus, excluding any pump panel areas not covered by a door, shall be equipped with retroreflective striping in a chevron pattern sloping downward and away from the centerline of the vehicle at an angle of 45 degrees. Each stripe shall be 6" width.

The rear side panels only of the body shall have a Chevron style reflective stripe layout, and cover as much of the rear side panels as possible. Chevron panels shall have a 3M UV over laminate to protect from UV rays, scene damage, and everyday use. Chevron panels shall have a minimum 10 year warranty for material failure, and colorfastness.

- The stripe material shall be 3M Diamond Grade.

All retroreflective materials required shall conform to the requirements of ASTM D 4956, *Standard Specification for Retroreflective Sheeting for Traffic Control*, Section 6.1.1 for Type I Sheeting.

- This reflective Chevron stripe shall alternate red and yellow in color.

LETTERING

The following lettering shall be furnished and installed on the completed unit:

UPPER BODY SIDE LETTERING

There shall be twenty two (22) 11" high SuperGold letters stating 'FIRE/RESCUE' furnished and installed on the vehicle. Lettering shall have a clear 3M UV protective over-laminate applied before installation.

EXTERIOR COMPARTMENT DOORS

ROLL-UP DOOR CONSTRUCTION - ROBINSON (ROM)

The apparatus shall be equipped with Robinson Series III roll-up exterior compartment doors. Robinson roll-up doors shall be complete with the following features;

- Doors shall be front roll with drum positioned at upper front portion of compartment to afford maximum clearances and head room for mounting equipment to ceiling of compartment
- There shall be a non-abrasive side brush seals
- Magnetic door ajar system must be integrated in lift bar handle and the retainer block to signal open door. No mechanical switches or switches interior to the compartment shall be used
- Every slat must have interlocking end shoes to prevent slat from moving side-to-side and binding the door
- Between each slat must be a co-extruded PVC inner seal to prevent metal-to-metal contact and to repel moisture. This inner seal is not visible to detract from appearance of door
- Slats are to have interlocking joints with a folding locking flange to provide security and prevent penetration by sharp objects
- Slats to be double-wall extrusion 1.366" high by .315" thick. Exterior surface to be flat and interior surface to be concave to prevent loose equipment from interfering with door operation
- Latch system to be a full width one piece lift bar operable by one (1) hand
- A 2" wide finger pull integrated into the bottom rail extrusion for easy one (1) hand opening and closing
- Clip system that connects the curtain slats to the operator drum which allows for easy tension adjustment without tools
- Each roll-up door shall have a 4" diameter counterbalance operator drum to assist in lifting the door.
- Track shall be one-piece aluminum that has an attaching flange and finishing flange incorporated into its design
- Drip rail will have specially designed seal that prevents the seal from scratching the door
- Bottom rail extrusion must have smooth back to prevent loose equipment from jamming the door
- Bottom rail to have "V" shaped double seal to prevent water and debris from entering the compartment
- Standard replacement parts to be shipped from the United States and available in as little as 48 hours

Each shutter door shall decrease the compartment door frame opening approximately 2.00" in width and approximately 4.50" in height for the bottom section of door assembly.

EXTERIOR ROLL-UP DOOR FINISH - SATIN

The roll-up doors shall have a satin aluminum finish on the door slats and the door trim components.

The specified retroreflective stripe material shall be applied on the roll-up compartment doors. The stripe shall be precision machine cut for each door slat of the roll-up doors. Under no circumstance will the stripe material be cut on roll-up door surface.

BODY HEIGHT MEASUREMENTS

The vertical body dimensions shall be as follows:

AHEAD OF REAR AXLE

	Description	Dimension
A	Bottom of Subframe to Top of Body	84.0"
B	Bottom of Subframe to Bottom of Body	25.0"
C	Vertical Door Opening	
	-with roll-up door	67.5"
	-with hinged door	71.5"

ABOVE REAR AXLE

	Description	Dimension
D	Vertical Door Opening - Above Rear Wheel	
	-with roll-up door	34.0"
	-with hinged door	37.0"

BEHIND REAR AXLE

	Description	Dimension
E	Bottom of Subframe to Bottom of Body	20.0"
F	Vertical Door Opening	
	-with roll-up door	62.0"
	-with hinged door	66.0"

GENERAL

	Description	Dimension
G	Bottom of Drip Rail to Top of Body	33.5"

(Dimensions are generic and subject to change during the actual design process)

(5) UPPER BODY COMPARTMENTS

The forward transverse compartment shall be 90.0" wide x 26.0" long x 18.5" deep. There shall be four (4) compartments parallel to the sides of the body, two (2) on each side. Each of these compartments shall be 74.0" wide x 26.0" long x 18.5" deep. The compartments shall be separated by stationary vertical partitions located under each door sill. Each compartment shall be integral with the body construction, and will not be bolted or add-on modules. The outside walls of each compartment will be double walled to prevent equipment from denting the outside painted surface.

Each compartment shall have a lift-up type compartment door hinged on the outboard side. Each door shall be fabricated from 3/16" aluminum tread plate. Each door shall have two (2) pneumatic type cylinders, one (1) at each end, attached to cast aluminum brackets mounted to the interior surface of the door to hold the door in both the opened and closed positions. Each door shall be mounted using 16" long, equally spaced, 14 gauge stainless steel hinges, with 1/4" stainless steel pin. The gravity-driven, sealed, ball-style tilt switch shall be mounted to one of the cast aluminum mounting brackets to activate the door open indicator system and the interior compartment light. A polyester barrier film gasket shall be placed between stainless steel hinge and the body mounting surface as necessary to prevent corrosion caused by dissimilar metals.

Each compartment door shall overlap a 2" vertical lip on the body roof to prevent entry of moisture and sealed with automotive type rubber molding to provide a weather resistant seal.

Each compartment shall have a horizontally mounted OnScene Solutions LED Night Stik on the underside of the door that will be automatically activated when the door is opened and wired to the NFPA required hazard warning light provided in cab.

UPPER BODY WALKWAY

A recessed walkway shall be provided recessed at the center of the roof area. The walkway shall be finished with NFPA compliant 3/16" aluminum tread plate with continuously welded seams to prevent moisture penetration into apparatus body. Drains shall be installed in the walkway to allow moisture to drain to the ground through flexible drain hose.

ROOF ACCESS STAIRWAY

The rear of the body shall be provided with a recessed center stairway approximately 34" wide. Stairs treads shall be formed 3/16" NFPA compliant aluminum tread plate with reinforcement as necessary.

STAIRWAY HANDRAILS

There shall be two (2) handrails provided, one (1) on each side wall of recessed center stairway. The handrails shall be angled for optimum use during ingress or egress of the upper walkway area.

Handrails shall be NFPA compliant 1-1/4" extruded aluminum tubing with chrome plated end stanchions.

STEP COMPARTMENT(S) - LOWER

There shall be two (2) compartment(s) located in the roof access stairway area. Each compartment shall have a horizontally hinged door with a D-ring handle. Each compartment shall be manufactured to prevent road debris, dirt and moisture from entering the enclosure. The compartment(s) shall be 26" wide x 8" high x the maximum appropriate dimensions based upon requirements for structural integrity of the body.

Each Compartment shall have an OnScene Solutions LED Night Stik that will be automatically activated when the door is opened and wired to the NFPA required hazard warning light provided in the cab.

STEP COMPARTMENT - UPPER

There shall be one (1) upper compartment located in the roof access stairway area. The compartment shall have a horizontally hinged door with a D-ring handle. The compartment shall be manufactured to prevent road debris, dirt and moisture from entering the enclosure. The compartment shall be approximately 26" wide x 8" high x depth of equipment.

Each Compartment shall have an OnScene Solutions LED Night Stik that will be automatically activated when the door is opened and wired to the NFPA required hazard warning light provided in the cab.

Devices to secure equipment, compartment dividers, or UHMW plastic angles, or sheeting will be used for storage of specified equipment as required to prevent damage to equipment.

The compartment will be designed to store the following equipment:

- One (1) 24' 2-section ladder(s). Manufacturer, model number and size of the ladder(s) shall be provided during the pre-construction meeting.
- One (1) 14' roof ladder(s). Manufacturer, model number and size of the ladder(s) shall be provided during the pre-construction meeting.
- One (1) 10' folding ladder(s). Manufacturer, model number and size of the ladder(s) shall be provided during the pre-construction meeting.
- One (1) pike pole(s). Manufacturer, model number and length of pike pole(s) to be provided during the pre-construction meeting.

FOLD-DOWN STEP

There shall be one (1) fold-down step located at the bottom of the roof access stairway to reduce the distance from the ground to the first step. The step shall manually fold up into the stairway during travel. The step shall activate the "Hazard Warning Light" in the cab when not in the stowed position.

REAR BODY HANDRAILS

There shall be two (2) vertical handrails on the rear of the body. Handrails shall be NFPA compliant 1-1/4" extruded aluminum tubing with chrome plated end stanchions.

BODY WIDTH DIMENSIONS

The body shall be 100.0" wide, not including drip rail or non-permanent fixtures. Interior compartment depth dimensions shall be:

Area Description	Dimension
Transverse Area:	95.5"
- Above Top of Subframe	
Compartment Depth:	24.5"
- Below Top of Subframe	
- Ahead of Rear Axle	
Compartment Depth:	23.5"
- Below Top of Subframe	(Eng. Note)
- Behind the Rear Axle	

(Dimensions are generic and subject to change during the actual design process)

STREETSIDE COMPARTMENT - FRONT (S1)

The interior useable compartment width shall be approximately 56.0" wide.

The compartment door opening shall be approximately 49.0" wide.

This compartment shall have a Robinson roll-up door with an exterior satin aluminum finish.

- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.
- One (1) nylon strap shall be provided to assist in closing the door. The strap shall be fastened to the left side of the lower inside door sill. The strap shall extend from the left side of the lower inside door sill to a footman loop attached to the center of the left side of the door frame.
- One (1) aluminum drip pan / splash guard shall be provided with the rollup door.

Compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT COMPONENTS

- There shall be vertically mounted shelf trac for shelving installation.
- There shall be one (1) 1,000 lbs. slide-out tray(s) with an OnScene Solutions base approximately 94" deep and as wide as the compartment layout or door opening permits, capable of extending out either side of the body located above the level of the chassis frame rails.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front and side faces of the tray. The striping shall be 2" wide and red/white in color.
- There shall be one (1) 150 lbs. slide out and down tray(s) with an OnScene Solutions base approximately 46" deep and as wide as the compartment layout or door opening permits. It shall be located above the level of the chassis frame rails and shall be vertically adjustable in height.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front and side faces of the tray. The striping shall be 2" wide and red/white in color.
- The floor of the compartment above the frame rails shall be extended to the interior edge of the door. The floor shall have a 2" vertical lip and a 1" return to increase strength.

- One (1) Hannay ECR1616-17-18 cable reel(s) capable of storing 150' of 10/3 electric cable. The rewind switch for each reel shall be located adjacent to the reel it controls.
  - The cable reel shall equipped with 150' of 10/3 SEOOW black cable, a molded plastic ball clamp, and a single heavy duty L5-30 twist-lock female plug at the end.
  - One (1) Akron model EJB, cast aluminum electrical power distribution box with yellow powder coat painted finish shall be provided. The power distribution box shall include:
    - A 12" pigtail that terminates in an L5-30 configuration to match the cable on the cord reel. The outlet configuration shall include:
      - One (1) L5-15 single twist lock receptacle
      - One (1) L5-15 single twist lock receptacle
      - One (1) L5-15 single twist lock receptacle
      - One (1) L5-15 single twist lock receptacle
  - One (1) EJB vertical apparatus mounting bracket - treadplate
- Two (2) vertically mounted OnScene Solutions LED Nightstiks.
- The controls for the specified light tower(s).
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in lower compartment.
- The 12 volt electrical distribution panel shall be located in the streetside front lower compartment.

STREETSIDE COMPARTMENT - AHEAD OF REAR WHEELS (S2)

The interior useable compartment width shall be approximately 56.0" wide.

The compartment door opening shall be approximately 49.0" wide.

This compartment shall have a Robinson roll-up door with an exterior satin aluminum finish.

- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.
- One (1) nylon strap shall be provided to assist in closing the door. The strap shall be fastened to the left side of the lower inside door sill. The strap shall extend from the left side of the lower inside door sill to a footman loop attached to the center of the left side of the door frame.
- One (1) aluminum drip pan / splash guard shall be provided with the rollup door.

Compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT COMPONENTS

- There shall be vertically mounted shelf trac for shelving installation.
- There shall be one (1) 1,000 lbs. slide-out tray(s) with an OnScene Solutions base approximately 94" deep and as wide as the compartment layout or door opening permits, capable of extending out either side of the body located above the level of the chassis frame rails.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front and side faces of the tray. The striping shall be 2" wide and red/white in color.
- There shall be one (1) 150 lbs. slide out and down tray(s) with an OnScene Solutions base approximately 46" deep and as wide as the compartment layout or door opening permits. It shall be located above the level of the chassis frame rails and shall be vertically adjustable in height.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front and side faces of the tray. The striping shall be 2" wide and red/white in color.
- The floor of the compartment above the frame rails shall be extended to the interior edge of the door. The floor shall have a 2" vertical lip and a 1" return to increase strength.
- Two (2) vertically mounted OnScene Solutions LED Nightstiks.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in lower compartment.

STREETSIDE COMPARTMENT - ABOVE REAR WHEELS (S3)

The interior useable compartment width shall be approximately 59.0" wide.

The compartment door opening shall be approximately 52.0" wide.

This compartment shall have a Robinson roll-up door with an exterior satin aluminum finish.

- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.
- One (1) nylon strap shall be provided to assist in closing the door. The strap shall be fastened to the left side of the lower inside door sill. The strap shall extend from the left side of the lower inside door sill to a footman loop attached to the center of the left side of the door frame.
- One (1) aluminum drip pan / splash guard shall be provided with the rollup door.

Compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT COMPONENTS

- There shall be vertically mounted shelf trac for shelving installation.
- There shall be one (1) 1,000 lbs. slide-out tray(s) with an OnScene Solutions base approximately 94" deep and as wide as the compartment layout or door opening permits, capable of extending out either side of the body located above the level of the chassis frame rails.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front and side faces of the tray. The striping shall be 2" wide and red/white in color.
- There shall be one (1) 150 lbs. slide out and down tray(s) with an OnScene Solutions base approximately 46" deep and as wide as the compartment layout or door opening permits. It shall be located above the level of the chassis frame rails and shall be vertically adjustable in height.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front and side faces of the tray. The striping shall be 2" wide and red/white in color.
- Two (2) vertically mounted OnScene Solutions LED Nightstiks.

STREETSIDE COMPARTMENT - REAR (S4)

The interior useable compartment width shall be approximately 64.0" wide.

The compartment door opening shall be approximately 57.0" wide.

This compartment shall have a Robinson roll-up door with an exterior satin aluminum finish.

- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.
- One (1) nylon strap shall be provided to assist in closing the door. The strap shall be fastened to the left side of the lower inside door sill. The strap shall extend from the left side of the lower inside door sill to a footman loop attached to the center of the left side of the door frame.
- One (1) aluminum drip pan / splash guard shall be provided with the rollup door.

Compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT COMPONENTS

- There shall be vertically mounted shelf trac for shelving installation.
- There shall be two (2) slide-out smooth aluminum vertical tool board(s) approximately 24" deep.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on both sides of the tool board. The striping shall be 2" wide and red/white in color.
- The floor of the compartment above the frame rails shall cover the area directly above the frame rails ONLY (non-extended floor).
- Two (2) vertically mounted OnScene Solutions LED Nightstiks.
- Traffic flow board control on aft wall.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in lower compartment.

CURBSIDE COMPARTMENT - FRONT (C1)

The interior useable compartment width shall be approximately 56.0" wide.

The compartment door opening shall be approximately 49.0" wide.

This compartment shall have a Robinson roll-up door with an exterior satin aluminum finish.

- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.

- One (1) nylon strap shall be provided to assist in closing the door. The strap shall be fastened to the left side of the lower inside door sill. The strap shall extend from the left side of the lower inside door sill to a footman loop attached to the center of the left side of the door frame.

- One (1) aluminum drip pan / splash guard shall be provided with the rollup door.

Compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT COMPONENTS

- There shall be vertically mounted shelf trac for shelving installation.

- There shall be one (1) 1,000 lbs. slide-out tray(s) with an OnScene Solutions base approximately 94" deep, capable of extending out either side of the body located above the level of the chassis frame rails. (Specified in opposite side compartment.)

- There shall be one (1) 150 lbs. slide out and down tray(s) with an OnScene Solutions base approximately 46" deep and as wide as the compartment layout or door opening permits. It shall be located above the level of the chassis frame rails and shall be vertically adjustable in height.

  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front and side faces of the tray. The striping shall be 2" wide and red/white in color.

- The floor of the compartment above the frame rails shall be extended to the interior edge of the door. The floor shall have a 2" vertical lip and a 1" return to increase strength.

- One (1) Hannay ECR1616-17-18 cable reel(s) capable of storing 150' of 10/3 electric cable. The rewind switch for each reel shall be located adjacent to the reel it controls.
  - The cable reel shall equipped with 150' of 10/3 SEOOW black cable, a molded plastic ball clamp, and a single heavy duty L5-30 twist-lock female plug at the end.
  - One (1) Akron model EJB, cast aluminum electrical power distribution box with yellow powder coat painted finish shall be provided. The power distribution box shall include:
    - A 12" pigtail that terminates in an L5-30 configuration to match the cable on the cord reel. The outlet configuration shall include:
      - One (1) L5-15 single twist lock receptacle
      - One (1) L5-15 single twist lock receptacle
      - One (1) L5-15 single twist lock receptacle
      - One (1) L5-15 single twist lock receptacle
  - One (1) EJB vertical apparatus mounting bracket - treadplate
- Two (2) vertically mounted OnScene Solutions LED Nightstiks.
- One (1) 120/240 VAC load center.
- The FRC FROG-D generator gauge panel.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in lower compartment.

CURBSIDE COMPARTMENT - AHEAD OF REAR WHEEL (C2)

The interior useable compartment width shall be approximately 56.0" wide.

The compartment door opening shall be approximately 49.0" wide.

This compartment shall have a Robinson roll-up door with an exterior satin aluminum finish.

- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.
- One (1) nylon strap shall be provided to assist in closing the door. The strap shall be fastened to the left side of the lower inside door sill. The strap shall extend from the left side of the lower inside door sill to a footman loop attached to the center of the left side of the door frame.
- One (1) aluminum drip pan / splash guard shall be provided with the rollup door.

Compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT COMPONENTS

- There shall be vertically mounted shelf trac for shelving installation.
- There shall be one (1) 1,000 lbs. slide-out tray(s) with an OnScene Solutions base approximately 94" deep, capable of extending out either side of the body located above the level of the chassis frame rails. (Specified in opposite side compartment.)
- There shall be one (1) 150 lbs. slide out and down tray(s) with an OnScene Solutions base approximately 46" deep and as wide as the compartment layout or door opening permits. It shall be located above the level of the chassis frame rails and shall be vertically adjustable in height.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front and side faces of the tray. The striping shall be 2" wide and red/white in color.
- The floor of the compartment above the frame rails shall be extended to the interior edge of the door. The floor shall have a 2" vertical lip and a 1" return to increase strength.
- Two (2) vertically mounted OnScene Solutions LED Nightstiks.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in lower compartment.

CURBSIDE COMPARTMENT - ABOVE REAR WHEEL (C3)

The interior useable compartment width shall be approximately 59.0" wide.

The compartment door opening shall be approximately 52.0" wide.

This compartment shall have a Robinson roll-up door with an exterior satin aluminum finish.

- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.
- One (1) nylon strap shall be provided to assist in closing the door. The strap shall be fastened to the left side of the lower inside door sill. The strap shall extend from the left side of the lower inside door sill to a footman loop attached to the center of the left side of the door frame.
- One (1) aluminum drip pan / splash guard shall be provided with the rollup door.

Compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT COMPONENTS

- There shall be vertically mounted shelf trac for shelving installation.
- There shall be one (1) 1,000 lbs. slide-out tray(s) with an OnScene Solutions base approximately 94" deep, capable of extending out either side of the body located above the level of the chassis frame rails. (Specified in opposite side compartment.)
- There shall be one (1) 150 lbs. slide out and down tray(s) with an OnScene Solutions base approximately 46" deep and as wide as the compartment layout or door opening permits. It shall be located above the level of the chassis frame rails and shall be vertically adjustable in height.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front and side faces of the tray. The striping shall be 2" wide and red/white in color.
- Two (2) vertically mounted OnScene Solutions LED Nightstiks.

CURBSIDE COMPARTMENT - REAR (C4)

The interior useable compartment width shall be approximately 64.0" wide.

The compartment door opening shall be approximately 57.0" wide.

This compartment shall have a Robinson roll-up door with an exterior satin aluminum finish.

- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.
- One (1) nylon strap shall be provided to assist in closing the door. The strap shall be fastened to the left side of the lower inside door sill. The strap shall extend from the left side of the lower inside door sill to a footman loop attached to the center of the left side of the door frame.
- One (1) aluminum drip pan / splash guard shall be provided with the rollup door.

Compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT COMPONENTS

- There shall be vertically mounted shelf trac for shelving installation.
- There shall be one (1) 1,000 lbs. slide-out tray(s) with an OnScene Solutions base approximately 24" deep and as wide as the compartment layout or door opening permits located below the level of the chassis frame rails.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front and side faces of the tray. The striping shall be 2" wide and red/white in color.
- There shall be one (1) 750 lbs. slide-out tray(s) with an OnScene Solutions base approximately 70" deep and as wide as the compartment layout or door opening permits located above the level of the chassis frame rails.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front and side faces of the tray. The striping shall be 2" wide and red/white in color.
- The floor of the compartment above the frame rails shall be extended to the interior edge of the door. The floor shall have a 2" vertical lip and a 1" return to increase strength.
- Two (2) vertically mounted OnScene Solutions LED Nightstiks.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in lower compartment.

ROOF ACCESS STAIRWAY

The rear of the body shall be provided with a recessed center stairway approximately 34" wide.

UPPER BODY COMPARTMENT - STREETSIDE

Above the exterior streetside compartments shall be an upper body compartment for storage of long equipment. The compartment shall be integral with the body construction, and will not be bolted or added on modules. The outside walls of compartment will be double walled to prevent equipment from denting the outside painted surface. The compartment shall be approximately (insert actual dimensions).

Access to the compartment shall be from a rear facing lift-up compartment door. Door shall be fabricated from 3/16" smooth aluminum with full length 14 gauge stainless steel hinge, with 1/4" stainless steel pin, 6" non-locking stainless steel "D" ring handle, and a gas cylinder door holder. A polyester barrier film gasket shall be placed between stainless steel hinge and any dissimilar metals as necessary to prevent corrosion. Door shall overlap body surface to prevent entry of moisture and sealed with automotive type rubber molding to provide a weather resistant seal.

Compartment shall have a flush mounted light near door opening that will be automatically activated when door is opened, and wired to compartment door ajar warning light provided in cab.

Devices to secure equipment, compartment dividers, or UHMW plastic angles, or sheeting will be used for storage of specified equipment as required to prevent damage to equipment.

The compartment will be designed to store the following equipment:

- One (1) pieces of wood lumber. Size of lumber to be provided during the pre-construction meeting.

UPPER BODY COMPARTMENT - CURBSIDE

Above the exterior curbside compartments shall be an upper body compartment for storage of long equipment. The compartment shall be integral with the body construction, and will not be bolted or added on modules. The outside walls of compartment will be double walled to prevent equipment from denting the outside painted surface. The compartment shall be approximately (insert actual dimensions).

Access to the compartment shall be from a rear facing lift-up compartment door. Door shall be fabricated from 3/16" smooth aluminum with full length 14 gauge stainless steel hinge, with 1/4" stainless steel pin, 6" non-locking stainless steel "D" ring handle, and a gas cylinder door holder. A polyester barrier film gasket shall be placed between stainless steel hinge and any dissimilar metals as necessary to prevent corrosion. Door shall overlap body surface to prevent entry of moisture and sealed with automotive type rubber molding to provide a weather resistant seal.

Compartment shall have a flush mounted light near door opening that will be automatically activated when door is opened, and wired to compartment door ajar warning light provided in cab.

Devices to secure equipment, compartment dividers, or UHMW plastic angles, or sheeting will be used for storage of specified equipment as required to prevent damage to equipment.

The compartment will be designed to store the following equipment:

- One (1) pieces of wood lumber. Size of lumber to be provided during the pre-construction meeting.

PLASTIC FLOOR AND SHELF TILE

All compartment floors, shelves, and trays shall be covered with Dri-Dek plastic interlocking grating.

- The plastic floor tile shall be red.
- The plastic edge trim shall be red.

SIDE BODY PROTECTION - RUB RAIL

There shall be side rub rails provided below the compartment door openings on both the streetside and curbside. The rub rail shall be fabricated from 6063 extruded aluminum, measuring approximately 2-3/4" high x 1-3/8" thick with tapered aluminum end caps. The rub rail shall be bolted to the body using stainless steel bolts and 1-1/2" diameter x 5/8" thick rubber mount isolators to prevent damage to the body. The rails shall incorporate LED clearance marker lighting recessed into the rail fascia to avoid damage to the light in case of impact. The rub rail shall have an accessory mounting track integrated into the backside of the rail to allow mounting of accessories such as ground lighting.

- 3M™ Diamond Grade™ Conspicuity striping shall be provided in the rub rail. The striping shall be red/white in color.

COMPARTMENT COMPONENTS DESCRIPTIONS

All interior compartment components shall be fabricated as follows:

ADJUSTABLE SHELVING HARDWARE

Adjustable shelving hardware shall be provided indicated in the numbered compartment list.

The shelving hardware shall include a minimum of four (4) aluminum shelf tracs mounted vertically on compartment side walls or vertical partitions. There shall be one (1) cast aluminum shelf bracket per vertical shelf trac to mount each shelf, tray, or adjustable storage module. Shelving hardware shall be of heavy duty quality with unlimited vertical adjustment settings.

HEAVY DUTY 100% EXTENSION EQUIPMENT SLIDE - (1,000 LB. CAPACITY)

Heavy duty slide-out equipment tray(s) shall be provided in exterior compartment as indicated in the numbered compartment list.

Trays shall be fabricated from 3/16" (.188) aluminum 3003H-14 alloy smooth plate. Trays shall be built with a 4" high vertical lip with welded corners to form a box type tray surface. The tray shall be mounted on a OnScene Solutions slide frame constructed of anodized aluminum extrusion(s). The frame shall be assembled using stainless steel fasteners (no welds). Each slide shall use a three extrusion rail design utilizing twelve to sixteen (12 - 16) urethane rollers. Each roller shall contain two (2) precision roller bearings mounted in an aluminum hub with a molded on urethane cover. The rollers shall not lose contact with the rail extrusion during operation of the slide unit.

Each slide shall have a cable operated, spring loaded latch complimented by a large hand opening and red pull handle (Pull to Release). The slide shall lock in the closed and full extension positions. The slide shall be rated for a maximum evenly distributed load of 1,000 lbs.

HEAVY DUTY 100% EXTENSION EQUIPMENT SLIDE - (750 LB. CAPACITY)

Heavy duty slide-out equipment tray(s) shall be provided in exterior compartment as indicated in the numbered compartment list.

Trays shall be fabricated from 3/16" (.188) aluminum 3003H-14 alloy smooth plate. Trays shall be built with a 4" high vertical lip with welded corners to form a box type tray surface. The tray shall be mounted on a OnScene Solutions slide frame constructed of anodized aluminum extrusion(s). The frame shall be assembled using stainless steel fasteners (no welds). Each slide shall use a three extrusion rail design utilizing twelve to sixteen (12 - 16) urethane rollers. Each roller shall contain two (2) precision roller bearings mounted in an aluminum hub with a molded on urethane cover. The rollers shall not lose contact with the rail extrusion during operation of the slide unit.

Each slide shall have a cable operated, spring loaded latch complimented by a large hand opening and red pull handle (Pull to Release). The slide shall lock in the closed and full extension positions. The slide shall be rated for a maximum evenly distributed load of 750 lbs.

HEAVY DUTY 70% EXTENSION EQUIPMENT SLIDE TRANSVERSE (1,000 LBS. CAPACITY)

Heavy duty slide-out equipment tray(s) shall be provided in exterior compartment as indicated in the numbered compartment list.

Trays shall be fabricated from 3/16" (.188) aluminum 3003H-14 alloy smooth plate. Each tray shall be built with a 4" high vertical lip with welded corners to form a box type tray surface. The tray shall be mounted on a OnScene Solutions slide frame constructed of anodized aluminum extrusion(s). The frame shall be assembled using stainless steel fasteners (no welds). Each slide shall use a two extrusion rail design utilizing twenty (20) urethane rollers. Each roller shall contain two (2) precision roller bearings mounted in an aluminum hub with a molded on urethane cover.

Each slide shall have two (2) cable operated, spring loaded latches operated by two (2) large hand openings with red pull handles (Pull to Release). The slide shall lock in the closed and full extension position in two (2) directions. The slide shall be rated for a maximum distributed load of 1,000 lbs.

HEAVY DUTY EQUIPMENT TRAYS - SLIDE OUT AND DOWN (150 LBS. CAPACITY)

Heavy duty slide-out equipment tray(s) shall be provided in exterior compartment as indicated in the numbered compartment list.

Trays shall be fabricated from 3/16" (.188) aluminum 3003H-14 alloy smooth plate. Each tray shall be built with a 4" high vertical lip with welded corners to form a box type tray surface. The tray shall be mounted on a OnScene Solutions slide frame constructed of anodized aluminum extrusion(s). The frame shall be assembled using stainless steel fasteners (no welds). Each slide shall use a two extrusion rail design utilizing four (4) urethane rollers. Each roller shall contain two (2) precision roller bearings mounted in an aluminum hub with molded on urethane cover. The roller shall not lose contact with the rail extrusion during operation of the slide unit.

Each slide shall have a cable operated, spring loaded latch complimented by a large hand opening and red pull handle (Pull to Release). The slide shall lock in the closed position. The slide shall be rated for a maximum evenly distributed load of 150 lbs.

SLIDE-OUT TOOL BOARD (SMOOTH ALUMINUM)

Slide-out tool board(s) shall be provided in the exterior compartment as indicated in the numbered compartment list.

Tool boards shall be fabricated of 3/16" (.188) aluminum 3003H-14 alloy smooth plate with double flange at the outer edge to provide an easy grip handle. The top and bottom of tool board shall be provided with Accuride 502 series slide tracks. The length shall be per numbered compartment list and the extension shall be 100% of the slide length. Slide tracks shall be constructed from formed steel with ball bearings in triple track rails. The board shall be rated for a maximum 200 lbs. evenly distributed load.

Tool board(s) shall utilize a pneumatic cylinder to hold the tool board in both the opened and closed positions.

COMPARTMENT LIGHTING

Each enclosed equipment compartment greater than 4 ft3 (0.1 m3) in volume and having an opening greater than 144 in.2 (92,900 mm2) shall have sufficient compartment lighting to provide a minimum of 2 fc (20 lx) at any location on the floor of the compartment without any shelves, dividers, or equipment in the compartment.

Compartments such as ladder tunnels, pike pole storage tubes, or underbody compartments designed around the volumetric requirements of specific equipment that can be removed without the use of article illumination shall not be required to have compartment lighting.

All compartments shall be equipped with OnScene Nightstik LED lights with the following minimum light requirements;

- Full Height Compartments, 63” Section (42 LED's)
- Wheel well Compartments, 36” Section (24 LED's)
- Rear Rescue Compartment, 63” Section (42 LED's)
- Low Compartments, 18" Section (12 LED's), Vertical
- Low Compartments, 36" Section (24 LED's), Horizontal

The OnScene Nightstik lights shall be rated at 100,000 hours of service and shall be provided with a 5 year free replacement warranty.

ELECTRIC CORD REEL

Electric cord reel(s) shall be provided in exterior compartment as indicated in the numbered compartment list.

The 120 volt cord reel(s) shall be Hannay with electric rewind, equipped with fully enclosed 45 amp, three (3) conductor collector rings.

The 12 volt reel rewind system shall be directly wired to the chassis battery system with heavy duty stranded copper wire, with guarded finger type rewind button located within easy reach of the operator.

Each reel shall have a Hannay 4-way roller assembly to permit cable to feed directly off the reel and away from compartment. Plastic roller assemblies are not acceptable.

The wiring from the generator system shall be through Carflex electrical weatherproof conduit, with stranded copper wiring. The wiring shall terminate in a sealed conduit box at the reel with mechanical type connectors for quick removal of wiring.

Cord Reel General Requirements

All permanently mounted cord reels shall be rated for continuous duty and installed to be accessible for removal, cord access, maintenance, and servicing.

The power rewind cord reel spool area shall be visible to the operator during the rewind operation, or the reel spool shall be encapsulated to prevent cord from spooling off the reel.

Rollers or guides shall be provided, where required, to prevent damage to the cord at reel spools or compartment openings.

Rewind Provision

Power rewind type reels shall have the control in a position where the operator can observe the rewinding operation. If a reel is in an enclosure or out of direct view, the cord entry point to the enclosure shall be visible to the operator of the reel control.

The rewind control or crank shall not be more than 72 in. (1830 mm) above the operator's standing position. The rewind control shall be marked with a label indicating its function and shall be guarded to prevent accidental operation.

Cord

The reel shall be designed to hold 110 percent of the capacity needed for the intended cord length.

The wire size shall be in accordance with *NFPA 70*, Table 400.5(A), but in no case shall it be smaller than 12AWG. Electrical cord shall be Type SEOOW, Type SOOW, or Type STOOW.

A label that indicates the following information shall be provided in a visible location adjacent to any permanently connected reel:

(1) Current rating
(2) Current type
(3) Phase
(4) Voltage
(5) Total cord length

POWER DISTRIBUTION BOX

Where a power distribution box is hardwired to the end of a cord that is stored on a fixed cord reel or other fixed storage means, the following requirements shall apply;

The remote power distribution box shall be listed for use in a wet location.

The distribution box shall be as follows:

(1) Protected from corrosion
(2) capable of being carried with a gloved hand
(3) Designed to keep the exterior electrical components above 2 in. (51 mm) of standing water

Inlets, receptacles, circuit breakers, or GFCI devices shall not be mounted on the top surface of the horizontal plane.

Branch circuit breakers shall be installed in the remote power distribution box if the overcurrent device protecting the feed cord to the box is too large to protect the wiring supplying the devices plugged onto the distribution box.

Remote power distribution boxes shall have a light on the box to indicate the power is on. The light shall be visible in a 360 degree plane from a minimum of 200 ft (60 m) in complete darkness. The light shall be mechanically protected to prevent damage.

The hardwired portable cord connection to the box shall have strain relief and meet the intended usage requirements.

STEP / GROUND LIGHTS

Step and ground lights shall be OnScene Solutions 9" LED Nightstik and be placed at any entry door and step where personnel climb on or descend from the apparatus to ground level. OnScene LED lights shall have 6 LED lights per 9" light, and shall be rated at 100,000 hours of service. On Scene Solutions LED lights shall be have a 5 year free replacement warranty.

All of the required step and ground lights shall be activated when the parking brake is set.

LOW VOLTAGE ELECTRICAL SYSTEM- 12 VDC

General

Any low voltage electrical systems or warning devices installed on the fire apparatus shall be appropriate for the mounting location and intended electrical load.

Where wire passes through sheet metal, grommets shall be used to protect wire and wire looms. Electrical connections shall be with double crimp water-tight heat shrink connectors.

All 12 VDC wiring running from front to back of vehicle body shall be run in full length electrical wiring raceway down each side of body.

Wiring

All electrical circuit feeder wiring supplied and installed by the fire apparatus manufacturer shall meet the requirements of NFPA Chapter 13.

The circuit feeder wire shall be stranded copper or copper alloy conductors of a gauge rated to carry 125 % of the maximum current for which the circuit is protected. Voltage drops in all wiring from the power source to the using device shall not exceed 10 %. The use of star washers for circuit ground connections shall not be permitted.

All circuits shall otherwise be wired in conformance with SAE J1292, *Automobile, Truck, Truck-Tractor, Trailer, and Motor Coach Wiring.*

Wiring and Wire Harness Construction

All insulated wire and cable shall conform to SAE J1127, *Low Voltage Battery Cable,* or SAE J1128, *Low Voltage Primary Cable,* type SXL, GXL, or TXL.

All conductors shall be constructed in accordance with SAE J1127 or SAE J1128, except where good engineering practice dictates special strand construction. Conductor materials and stranding, other than copper, shall be permitted if all applicable requirements for physical, electrical, and environmental conditions are met as dictated by the end application. Physical and dimensional values of conductor insulation shall be in conformance with the requirements of SAE J1127 or SAE J1128, except where good engineering practice dictates special conductor insulation. The overall covering of conductors shall be moisture-resistant loom or braid that has a minimum continuous rating of 194°F (90°C) except where good engineering practice dictates special consideration for loom installations exposed to higher temperatures. The overall covering of jacketed cables shall be moisture resistant and have a minimum continuous temperature rating of 194°F (90°C), except where good engineering practice dictates special consideration for cable installations exposed to higher temperatures.

All wiring connections and terminations shall use a method that provides a positive mechanical and electrical connection. The wiring connections and terminations shall be installed in accordance with the device manufacturer's instructions. All ungrounded electrical terminals shall have protective covers or be in enclosures. Wire nut, insulation displacement, and insulation piercing connections shall not be used.

Wiring shall be restrained to prevent damage caused by chafing or ice buildup and protected against heat, liquid contaminants, or other environmental factors.

Wiring shall be uniquely identified at least every 2 ft (0.6 m) by color coding or permanent marking with a circuit function code. The identification shall reference a wiring diagram.

Circuits shall be provided with properly rated low voltage overcurrent protective devices. Such devices shall be readily accessible and protected against heat in excess of the overcurrent device's design range, mechanical damage, and water spray. Circuit protection shall be accomplished by utilizing fuses, circuit breakers, fusible links, or solid state equivalent devices.

If a mechanical-type device is used, it shall conform to one of the following SAE standards:
(1) SAE J156, *Fusible Links*
(2) SAE J553, *Circuit Breakers*
(3) SAE J554, *Electric Fuses (Cartridge Type)*
(4) SAE J1888, *High Current Time Lag Electric Fuses*
(5) SAE J2077, *Miniature Blade Type Electrical Fuses*

Switches, relays, terminals, and connectors shall have a direct current (dc) rating of 125 % of maximum current for which the circuit is protected.

Power Supply

A 12 V or greater electrical alternator shall be provided. The alternator shall have a minimum output at idle to meet the minimum continuous electrical load of the vehicle, at 200°F (93°C) ambient temperature within the engine compartment, and shall be provided with full automatic regulation.

Minimum Continuous Electrical Load

The minimum continuous electrical load shall consist of the total amperage required to simultaneously operate the following in a stationary mode during emergency operations:

(1) The propulsion engine and transmission
(2) All legally required clearance and marker lights, headlights, and other electrical devices except windshield wipers and four-way hazard flashers
(3) The radio(s) at a duty cycle of 10 percent transmit and 90 % receive (for calculation and testing purposes, a default value of 5 A continuous)
(4) The lighting necessary to produce 2 fc (20 lx) of illumination on all walking surfaces on the apparatus and on the ground at all egress points onto and off the apparatus, 5 fc (50 lx) of illumination on all control and instrument panels, and 50 percent of the total compartment lighting loads
(5) The minimum optical warning system, where the apparatus is blocking the right-of way
(6) The continuous electrical current required to simultaneously operate any fire pumps, aerial devices, and hydraulic pumps
(7) Other warning devices and electrical loads defined by the purchaser as critical to the mission of the apparatus

If the apparatus is equipped to tow a trailer, an additional 45 A shall be added to the minimum continuous electrical load to provide electrical power for the federally required clearance and marker lighting and the optical warning devices mounted on the trailer.

The condition of the low voltage electrical system shall be monitored by a warning system that provides both an audible and a visual signal to persons on, in, or near the apparatus of an impending electrical system failure caused by the excessive discharge of the battery set.

The charge status of the battery shall be determined either by direct measurement of the battery charge or indirectly by monitoring the electrical system voltage.

If electrical system voltage is monitored, the alarm shall sound if the system voltage at the battery or at the master load disconnect switch drops below 11.8 V for 12 V nominal systems, 23.6 V for 24 V nominal systems, or 35.4 V for 42 V nominal systems for more than 120 seconds.

A voltmeter shall be mounted on the driver's instrument panel to allow direct observation of the system voltage.

Electromagnetic Interference

Electromagnetic interference suppression shall be provided, as required, to satisfy the radiation limits specified in SAE J551/1, *Performance Levels and Methods of Measurement of Electromagnetic Compatibility of Vehicles, Boats (up to 15 m), and Machines (16.6 Hz to 18 GHz)*.

Wiring Diagram

A complete electrical wiring schematic of actual system shall be provided with finished apparatus. Similar or generic type electrical schematics shall NOT BE ACCEPTABLE.

Low Voltage Electrical System Performance Test

A low voltage electrical system test certification shall be provided with delivered apparatus.

12 VOLT MULTIPLEX CONTROL CENTER

The apparatus shall have a multiplexed 12 volt electrical system that will provide complete diagnostic capability. The system shall have the capability of delivering multiple signals via a CAN bus, utilizing specifications set forth by SAE J1939. The system shall be node based to maximize stability so that failure of one node does not affect the operation of the other nodes. The system shall use shielded twisted-pair wire for transmission of system function signals. The shielded wire shall provide protection against EMI and RFI noise interruptions.

The multiplex system shall be responsible for providing power management functions as well as load shedding. The warning light system shall be controlled by the multiplex system. The system shall be capable of displaying text and/or graphic messages on a display module. The system shall be based on solid-state technology and shall include self-contained diagnostic indicators.

MULTIPLEX SYSTEM COLOR DISPLAY

The Weldon multiplex system display(s) shall be provided by the cab/chassis manufacturer. The display panel(s) shall be the point of interaction with the entire 12 volt electrical system. The display(s) shall respond with text and graphic images to provide fault and condition messages to the operator.

BATTERY SYSTEM

The battery connectors shall be heavy duty type with cables terminating in heat shrink loom. Heavy duty battery cables shall provide maximum power to the electrical system. Where required, the cables shall be shielded from exhaust tubing and the muffler. Large rubber grommets shall be provided where cables enter the battery compartment.

Batteries shall be of the high-cycle type. With the engine off, the battery system shall be able to provide the minimum continuous electrical load for 10 minutes without discharging more than 50 percent of the reserve capacity and then to restart the engine. The battery system cold cranking amps (CCA) rating shall meet or exceed the minimum CCA recommendations of the engine manufacturer. The batteries shall be mounted to prevent movement during fire apparatus operation and shall be protected against accumulations of road spray, snow, and road debris. The batteries shall be readily accessible for examination, testing, and maintenance.

A means shall be provided for jump-starting the engine if the batteries are not accessible without lifting the cab of a tilt-cab apparatus.

Where an enclosed battery compartment is provided, it shall be ventilated to the exterior to prevent the buildup of heat and explosive fumes. The batteries shall be protected against vibration and temperatures that exceed the battery manufacturer's recommendation.

A master load disconnect switch shall be provided between the starter solenoid(s) and the remainder of the electrical loads on the apparatus. The starter solenoids shall be connected directly to the batteries.

Electronic control systems and similar devices shall be permitted to be otherwise connected if so specified by their manufacturer.

The alternator shall be wired directly to the batteries through the ammeter shunt(s), if one is provided, and not through the master load disconnect switch.

A green "battery on" pilot light that is visible from the driver's position shall be provided.

A sequential switching device shall be permitted to energize the optical warning devices and other high current devices required in minimum continuous electrical load, provided the switching device shall first energize the electrical devices required in minimum continuous electrical load within five (5) seconds.

BATTERY SWITCH

One (1) battery "On/Off" switch in cab located within easy reach of Driver with green "BATTERY ON" pilot light that is visible from the driver's position shall be provided. The switch and pilot light shall be supplied and installed by the cab/chassis manufacturer.

BATTERY SOLENOID

Battery switch shall consist of a minimum 200 ampere, constant duty solenoid to feed from positive side of battery.

BATTERY CONDITIONER

The battery conditioner shall be supplied and installed by the cab chassis manufacturer.

ENGINE COMPARTMENT LIGHT

Engine compartment light(s) shall be supplied and installed by the cab chassis manufacturer.

CAB HAZARD WARNING LIGHT

A red "HAZARD" warning light shall be supplied and installed by the cab/chassis manufacturer. Light shall illuminate automatically to warn the Driver of the following when the apparatus parking brake is not fully engaged:

- Any passenger or compartment door is open
- Equipment rack is not in stowed position
- Light tower is extended

The light shall be labeled "DO NOT MOVE APPARATUS WHEN LIGHT IS ON".

BACK-UP ALARM

An electronic back-up alarm shall be supplied and installed by the cab/chassis manufacturer. The back-up alarm shall actuate automatically when the transmission gear selector is placed in reverse.

REAR VIEW CAMERA

The cab chassis provided rear view camera shall be installed on the rear of the body.

TAIL LIGHTS

Rear body tail lights shall be vertically mounted per Federal Motor Vehicle Safety Standards. The following lights shall be furnished:

- Two (2) Whelen amber LED 600 Series 60A00TAR turn signal lights
- Two (2) Whelen red LED 600 Series 60R00XRR stop/tail lights
- Two (2) Whelen halogen 600 Series 60J000CR back-up lights with clear lens
- Two (2) Whelen warning lights as detailed in the warning light section

Two (2) Whelen CAST-4V, 4-light polished aluminum bezels shall be provided, one (1) each side vertically mounted on the rear of the apparatus body for the above tail lights.

MIDSHIP MARKER/TURN SIGNAL

Two (2) Whelen LED midship body clearance marker/turn signal lights (T0A00MAR) shall be installed. There shall be one (1) light on each side of the body, in the wheel well, ahead of the rear axle. Both lights shall have an amber lens and operate with the chassis clearance marker and turn signals.

MARKER LIGHTS

The apparatus body shall be equipped with all necessary clearance lights and reflectors in accordance with Federal Motor Vehicle Safety Standards (FMVSS) regulations. All body clearance lights shall be LED to reduce the need for maintenance and lower the amp draw. Clearance lights shall be wired to the headlight circuit of the chassis.

LICENSE PLATE MOUNTING BRACKET

There shall be one (1) Cast Products aluminum license plate mounting with chrome shielded license plate light mounted on the rear of the body.

ELECTRONIC SIREN

The siren control head shall be supplied and installed by the cab/chassis manufacturer.

SIREN SPEAKER

The siren speaker(s) shall be supplied and installed by the cab/chassis manufacturer.

SIDE SCENE LIGHTS

There shall be four (4) Whelen 900 series (9" x 7") recess mounted Opti-Scene halogen lights (90E000ZR) provided on the upper body. Each light will have a 8-32 degree gradient lens and chrome flange. They will be equally divided between the curbside and streetside.

Two (2) switches shall be provided, one (1) for the streetside scene lights, and one (1) for the curbside scene lights.

The lights shall be switched at the Vista display in the cab.

REAR SCENE LIGHTS

Two (2) Whelen 900 series (9" x 7") recess mounted Opti-Scene halogen lights (90E000ZR) shall be provided on the upper rear body to light the work area immediately behind the vehicle to a level of at least 3 fc (30 lx) within a 10 ft × 10 ft (3 m × 3 m) square. Each light will have a 8-32 degree gradient lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

The rear scene lights shall also be activated when the apparatus is in reverse.

TRAFFIC FLOWBOARD

The vehicle shall be equipped with one (1) Command Light, Traffic Flow Board (TFB), model V5. The V5 mounting shall allow the traffic arrows to be positioned to directly face traffic for maximum effectiveness while using the vehicle in various blocking modes, and shall elevate via electric actuation for quick positioning that does not require anyone to climb up on the vehicle.

The unit shall be all-electric, and capable of lifting the TFB 15" in less than 10 seconds. The lift shall be capable of rotating a minimum of 45 degrees in less than 15 seconds in either direction. Further the lift shall have stops to prevent the board from rotating too far or completely around. Hydraulic or pneumatic type lifts are not acceptable. An all-electric lift is required.

The traffic board lift shall be controlled with a hand-held umbilical line remote control. The controls on the remote box shall be:

- One (1) 4-way switch for elevating and traffic board rotation.
- One (1) switch for controlling warning lights.
- One (1) button for Auto Park.

The TFB shall be 44” wide x 15” high with an eight (8) amber LED light arrow pattern. It shall be constructed with aluminum panels.

The patterns available on the board shall include: left and right arrows, in sequential and flashing patterns. These patterns shall be easily switchable from the remote control location.

A warning light shall be provide to indicate when the Traffic Flow Board is not in its nested position. The lift shall be all aluminum construction, with stainless steel shafts and bronze bushings for long life and low maintenance. The unit shall be capable of being used in the upright position when the vehicle is in motion at speeds under 20 mph. The unit shall withstand a 75 mph wind load as a minimum when the vehicle is parked.

The lift will be designed for a useful life of at least 10 years when properly cared for and maintained. The unit shall be electro statically powder coated black to match the color of the board.

The traffic board lift shall be covered by a 5-year warranty. An operation, maintenance and parts manual shall be provided with the installed unit.

The weight of the unit with standard Traffic Flow Board shall be 96 lbs. The overall size of nested unit with standard traffic board shall be approximately 44" wide x 28" high x 13" wide.

Stowed Dimension:	44” wide x 28” high x 13" deep
Extended Dimension:	44” wide x 43” high x 13" deep
Power Draw, 12 VDC:	5 Amp max
Elevation Time:	10 seconds
Rotation Time to 45° :	3 seconds
Weight:	96 lbs.

WARNING LIGHT PACKAGE

Each apparatus shall have a system of optical warning devices that meets or exceeds the requirements of this section.

The optical warning system shall consist of an upper and a lower warning level. The requirements for each level shall be met by the warning devices in that particular level without consideration of the warning devices in the other level.

For the purposes of defining and measuring the required optical performance, the upper and lower warning levels shall be divided into four warning zones. The four zones shall be determined by lines drawn through the geometric center of the apparatus at 45 degrees to a line drawn lengthwise through the geometric center of the apparatus. 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 optical warning device shall be installed on the apparatus and connected to the apparatus's electrical system in accordance with the requirements of this standard and the requirements of the manufacturer of the device.

A master optical warning system switch that energizes all the optical warning devices shall be provided.

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. One mode shall signal that the apparatus is stopped and is blocking the right-of-way. The use of some or all of the same warning lights shall be permitted for both modes provided the other requirements of this chapter are met.

A switching system shall be provided that senses the position of the parking brake or the park position of an automatic transmission. When the master optical warning system switch is closed and the parking brake is released or the automatic transmission is not in park, the warning devices signaling the call for the right-of-way shall be energized. When the master optical warning system switch is closed and the parking brake is on or the automatic transmission is in park, the warning devices signaling the blockage of the right-of-way shall be energized. The system shall be permitted to have a method of modifying the two signaling modes.

The optical warning devices shall be constructed or arranged so as to avoid the projection of light, either directly or through mirrors, into any driving or crew compartment(s). The front optical warning devices shall be placed so as to maintain the maximum possible separation from the headlights.

UPPER LEVEL OPTICAL WARNING DEVICES

The upper-level optical warning devices shall be mounted as high and as close to the corner points of the apparatus as is practical to define the clearance lines of the apparatus. The upper-level optical warning devices shall not be mounted above the maximum height, specified by the device manufacturer.

ZONE A - FRONT WARNING LIGHTS

There shall be one (1) Whelen Edge FN72VLED LED 72" lightbar permanently mounted to the cab roof.

The lightbar configuration (streetside to curbside) shall be:

SECTION	INTERNAL COMPONENTS	LENS COLOR
1	Red Corner LED	Clear
2	Red Corner LED	Clear
3	Blank	Clear
4	Clear Linear LED	Clear
5	Blank	Clear
6	Red Linear LED	Clear
7	Blank	Clear
8	Blank	Clear
9	Red Linear LED	Clear
10	Blank	Clear
11	Clear Linear LED	Clear
12	Blank	Clear
13	Red Corner LED	Clear
14	Red Corner LED	Clear

All clear lights shall shut down when the parking brake is set to comply with "Blocking" mode requirements as outlined in NFPA 1901.

The lightbar shall be separately switched at the vista display in the cab.

The lightbar shall be supplied with one (1) steady burn red light to comply with California DOT requirements.

ZONES B AND D - SIDE WARNING LIGHTS

UPPER REAR CORNER WARNING LIGHTS

There shall be two (2) Whelen 900 series (9" x 7") red Linear Super-LED lights (90RR5FRR) provided, one (1) each side. Each light shall have a red lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

UPPER FORWARD CORNER WARNING LIGHTS

There shall be two (2) Whelen 900 series (9" x 7") red Linear Super-LED lights (90RR5FRR) provided, one (1) each side. Each light shall have a red lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

ZONE C - REAR WARNING LIGHTS

There shall be two (2) Whelen 900 series (9" x 7") red Linear Super-LED lights (90RR5FRR) provided, one (1) each side. Each light shall have a red lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

LOWER LEVEL OPTICAL WARNING DEVICES

To define the clearance lines of the apparatus, the optical center of the lower-level optical warning devices in the front of the vehicle shall be mounted on or forward of the front axle centerline and as close to the front corner points of the apparatus as is practical.

The optical center of the lower-level optical warning devices at the rear of the vehicle shall be mounted on or behind the rear axle centerline and as close to the rear corners of the apparatus as is practical. The optical center of any lower-level device shall be between 18 in. and 62 in. (460 mm and 1600 mm) above level ground for large apparatus, and 18 in. and 48 in. (460 mm and 1220 mm) above level ground for small apparatus.

A midship optical warning device shall be mounted right and the left sides of the apparatus if the distance between the front and rear lower-level optical devices exceeds 25 ft (7.6 m) at the optical center. Additional midship optical warning devices shall be required, where necessary, to maintain a horizontal distance between the centers of adjacent lower-level optical warning devices of 25 ft (7.6 m) or less. The optical center of any midship mounted optical warning device shall be between 18 in. and 62 in. (460 mm and 1600 mm) above level ground.

ZONE A - FRONT WARNING LIGHTS

The warning lights shall be supplied and installed by the cab/chassis manufacturer. They shall be Whelen lights to complete an NFPA compliant lower level warning light system.

The lights shall be switched at the Vista display in the cab.

ZONES B AND D - CAB INTERSECTOR LIGHT (CAB FRONT CORNERS)

The warning lights shall be supplied and installed by the cab/chassis manufacturer. They shall be Whelen lights to complete an NFPA compliant lower level warning light system.

The lights shall be switched at the Vista display in the cab.

ZONES B AND D - BODY INTERSECTOR LIGHT (BODY WHEELWELL AREA)

There shall be two (2) Whelen 500 series (5" x 2") TIR6 Super-LED lights (50R03ZRR) provided, one (1) each side. Each light shall have a red lens and chrome finished flange.

The lights shall be switched at the Vista display in the cab.

ZONES B AND D - BODY INTERSECTOR LIGHT (BODY REAR CORNERS)

There shall be two (2) Whelen 600 series (6" x 4") red Linear Super-LED lights (60R02FRR) provided, one (1) each side. Each light shall have a red lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

ZONE C - REAR WARNING LIGHTS (LOWER REAR CORNERS)

There shall be two (2) Whelen 600 series (6" x 4") red Linear Super-LED lights (60R02FRR) provided, one (1) each side. Each light shall have a red lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

LINE VOLTAGE ELECTRICAL SYSTEM

ONAN PTO GENERATOR

The apparatus shall be equipped with an Onan Protec PTO generator system with a capacity of 25,000 watts at 120/240 VAC, 208/104 amps, single phase. Current frequency shall be stable at 60 hertz.

The transmission's PTO port and PTO, or the split shaft PTO, and all associated drive shaft components shall be rated to support the continuous duty torque requirements of the generator's continuous duty rating as stated on the power source nameplate.

Where the generator is driven by the chassis engine and transmission through a split shaft PTO, the driving compartment speedometer shall register when the generator drive system is engaged.

Where the generator is driven by the chassis engine and transmission through a split shaft PTO and a chassis transmission retarder is furnished, it shall be automatically disengaged for generator operations.

The direct drive generator shall be mounted so that it does not change the ramp break over angle, angle of departure, or angle of approach as defined by other components, and it shall not extend into the ground clearance area.

The direct drive generator shall be mounted away from exhaust and muffler areas or provided with a heat shield to reduce operating temperatures in the generator area.

GENERATOR ENGAGEMENT

A "Generator Engaged" indicator shall be provided in the driving compartment to indicate that the generator shift has been successfully completed.

An "OK to Operate Generator" indicator shall be provided in the driving compartment to indicate that the generator is engaged (if not always engaged), the transmission is in the proper gear (if required, automatic transmissions only), and the parking brake is engaged (if applicable).

An interlock system shall be provided to prevent advancement of the engine speed in the driving compartment or at any operator's panel unless the parking brake is engaged, and the transmission is in neutral or the output of the transmission is correctly connected to a pump or generator instead of the drive wheels.

WARRANTY PERIOD

Provided such goods are operated and maintained in accordance with Onan's written instructions, Onan warrants that the Protec YDCR series PTO generators shall be free from defects in material and workmanship for a period of five (5) years or one thousand (1,000) hours, whichever comes first, from the date of delivery to the first purchaser.

GENERATOR SPLASH GUARD

A powder coat painted splash cover shall be installed to reduce the amount of road spray on the frame mounted PTO generator. A V-ring seal shall also be installed in the cover to provide additional protection against contaminates reaching the generator front seals.

GENERATOR MOUNTING

The generator shall be mounted between the chassis frame rails. The generator mounting brackets shall be fabricated using heavy duty steel tubing, or structural channel. The generator mounting shall be bolted and removable so that the generator can be lowered from under apparatus for service, if necessary. The generator case shall not extend below the bottom edge of the apparatus body.

MANUALS AND SCHEMATICS

Two (2) complete manuals on parts list, maintenance, wiring schematics, hydraulic schematics, circuit boards, voltage regulator board and other components shall be provided on delivery.

POWER-TAKE-OFF GENERATOR DRIVE

There shall be a "Hot Shift" power-take-off (PTO) installed on the transmission PTO by the cab chassis manufacturer. The "Hot Shift" PTO is provided to allow the engagement of the PTO at higher engine RPM speeds. The PTO output shall be connected to the generator through hollow tube type driveline with heavy duty universals.

The engagement of the PTO shall be in the chassis cab with a rocker switch and red pilot light to note engagement of the PTO.

The power supply to the PTO engagement control shall be wired to the parking brake and a neutral position transmission switch to prevent engagement unless the vehicle is stopped and transmission has been placed in neutral.

ENGINE SPEED CONTROL

An engine speed auxiliary control device (high idle switch or throttle) shall be installed to maintain a stable cycle output from generator when the apparatus is parked.

An interlock shall prevent the operation of the engine speed auxiliary control device unless the parking brake is engaged and the transmission is in neutral or park, or the parking brake is engaged and the engine is disengaged from the drive wheels.

The engine shall be prevented from regulating its own engine speed during times when engine rpm control is critical for consistent apparatus functions such as generator, water pump, or aerial operation.

GENERATOR MONITORING PANEL

To properly monitor the generator performance and load demand during operation, the generator installation shall be equipped with a full instrument monitor panel.

This unit shall be manufactured by FRC model FROG-D and mounted next to the circuit breaker panel. This generator output display shall consolidate five (5) generator monitoring instruments into one device. The display case shall be waterproof and have dimensions not to exceed 4 1/4" high by 4 1/4" wide by 3 1/4" deep.

The following continuous displays shall be provided with super bright LED digits more than 1/2" high:

- Generator frequency in hertz
- Line 1 current in amperes
- Line 2 current in amperes
- Generator voltage in volts

The program shall support the accumulation of elapsed generator hours. Generator hours shall be displayed at the push of a button.

LOADCENTER

The loadcenter shall be a Cutler Hammer, BR Series, specifically designed for protection and distribution of 120/240 volt AC, such as lighting and small motor branch circuits. The loadcenter enclosure shall be made of 16 gauge galvanized sheet steel. The galvanized coating provides corrosion protection and as such does not require paint. All trims used on the BR Loadcenter shall be chromate sealed and finished with electro disposition epoxy paint (ASA61) which exceeds requirements for outdoor and indoor applications. A combination surface/flush cover with integral door shall be supplied.

The loadcenter shall be UL / CSA listed, **NO EXCEPTIONS** will be allowed.

SHORE POWER INLET - BATTERY CHARGER

The above mentioned shore power inlet, and battery conditioner shall be specified in the 12 volt section.

OUTLETS AND CIRCUITS

The generator shall supply the electrical equipment and outlets outlined below. Proper circuit protection shall be installed as noted:

- Two (2) 120 volt exterior outlets, one (1) each side near rear wheel well area.
  - The receptacle shall be 20 amp, straight-blade (NEMA 5-20R).
- Two (2) 120 volt exterior outlets, one (1) each side rear of body.
  - The receptacle shall be 20 amp, straight-blade (NEMA 5-20R).

GENERAL REQUIREMENTS

Stability

Any fixed line voltage power source producing alternating current (ac) shall produce electric power at 60 Hz ±3 Hz when producing power at all levels between no load and full rated power. Any fixed line voltage power source shall produce electric power at the rated voltage ±10 percent when producing power at all levels between no load and full rated power.

The maximum voltage supplied to portable equipment shall not exceed 275 volts to ground. Higher voltage shall be permitted only when used to operate fixed wired, permanently mounted equipment on the apparatus.

Conformance with National Electrical Code

All components, equipment, and installation procedures shall conform to *NFPA 70*, *National Electrical Code*, except where superseded by the requirements of this chapter. Where the requirements of this chapter differ from those in *NFPA 70*, the requirements in this chapter shall apply.

Where available, line voltage electrical system equipment and materials included on the apparatus shall be listed and used only in the manner for which they have been listed. All equipment and materials shall be installed in accordance with the manufacturer's instructions.

Location Ratings

Any equipment used in a dry location shall be listed for dry locations. Any equipment used in a wet location shall be listed for wet locations.

Any equipment, except a PTO-driven generator, used in an underbody or under chassis location that is subject to road spray shall be either listed as Type 4 or mounted in an enclosure that is listed as Type 4.

If a PTO-driven generator is located in an underbody or under chassis location, the installation shall include a shield to prevent road spray from splashing directly on the generator.

Grounding

Grounding shall be in accordance with 250.34(A) and 250.34(B) of *NFPA 70*. Ungrounded systems shall not be used.

Only stranded or braided copper conductors shall be used for grounding and bonding.

The grounded current-carrying conductor (neutral) shall be insulated from the equipment-grounding conductors and from the equipment enclosures and other grounded parts.

The neutral conductor shall be colored white or gray in accordance with 200.6, “Means of Identifying Grounded Conductors,” of *NFPA 70*.

Any bonding screws, straps, or buses in the distribution panelboard or in other system components between the neutral and equipment-grounding conductor shall be removed and discarded.

Bonding

The neutral conductor of the power source shall be bonded to the vehicle frame. The neutral bonding connection shall occur only at the power source. In addition to the bonding required for the low voltage return current, each body and each driving or crew compartment enclosure shall be bonded to the vehicle frame by a copper conductor.

The conductor shall have a minimum amperage rating, as defined in 310.15, “Ampacities for Conductors Rated 0–2000 Volts,” of *NFPA 70*, of 115 percent of the rated amperage on the power source specification label.

A single conductor that is sized to meet the low voltage and line voltage requirements shall be permitted to be used.

Ground Fault Circuit Interrupters

In special service vehicles incorporating a lavatory, sink, toilet, shower, or tub, 120 V, 15 or 20 A receptacles within 6 ft (1.8 m) of these fixtures shall have ground fault circuit interrupter (GFCI) protection. GFCIs integrated into outlets or circuit breakers or as stand-alone devices shall be permitted to be used in situations.

Power Source General Requirements

All power source system mechanical and electrical components shall be sized to support the continuous duty nameplate rating of the power source.

The power source shall be shielded from contamination that would prevent the power source from operating within its design specifications.

Power Source Rating

For power sources of 8 kW or larger, the power source manufacturer shall declare the continuous duty rating that the power source can provide when installed on fire apparatus according to the manufacturer’s instructions and run at 120°F (49°C) air intake temperature at 2000 ft (600 m) above sea level.

The rating on the power source specification label shall not exceed the declared rating from the power source manufacturer.

Access shall be provided to permit both routine maintenance and removal of the power source for major servicing. The power source shall be located such that neither it nor its mounting brackets interfere with the routine maintenance of the fire apparatus.

Instrumentation

If the power source is rated at less than 3 kW, a “Power On” indicator shall be provided. If the power source is rated at 3 kW or more but less than 8 kW, a voltmeter shall be provided.

If the power source is rated at 8 kW or more, the following instrumentation shall be provided at an operator’s panel:

(1) Voltmeter
(2) Current meters for each ungrounded leg
(3) Frequency (Hz) meter
(4) Power source hour meter

The instrumentation shall be permanently mounted at an operator’s panel. The instruments shall be located in a plane facing the operator. Gauges, switches, or other instruments on this panel shall each have a label to indicate their function.

The instruments and other line voltage equipment and controls shall be protected from mechanical damage and not obstructed by tool mounting or equipment storage.

An instruction plate(s) that provides the operator with the essential power source operating instructions, including the power-up and power-down sequence, shall be permanently attached to the apparatus at any point where such operations can take place.

Operation

Provisions shall be made for placing the generator drive system in operation using controls and switches that are identified and within convenient reach of the operator.

Where the generator is driven by the chassis engine and engine compression brakes or engine exhaust brakes are furnished, they shall be automatically disengaged for generator operations.

Any control device used in the generator system power train between the engine and the generator shall be equipped with a means to prevent unintentional movement of the control device from its set position in the power generation mode.

If there is permanent wiring on the apparatus that is designed to be connected to the power source, a power source specification label that is permanently attached to the apparatus at the operator’s control station shall provide the operator with the information required.

The power source, at any load, shall not produce a noise level that exceeds 90 dBA in any driving compartment, crew compartment, or onboard command area with windows and doors closed or at any operator’s station on the apparatus.

Power Supply Assembly

The conductors used in the power supply assembly between the output terminals of the power source and the main overcurrent protection device shall not exceed 12 ft (4 m) in length.

All power supply assembly conductors, including neutral and grounding conductors, shall have an equivalent amperage rating and shall be sized to carry not less than 115 percent of the amperage of the nameplate current rating of the power source.

If the power supply assembly connects to the vibrating part of a generator (not a connection on the base), the conductors shall be flexible cord or other fine-stranded conductors enclosed in metallic or nonmetallic liquid tight flexible conduit rated for wet locations and temperatures not less than 194°F (90°C).

Overcurrent Protection

Manually resettable overcurrent devices shall be installed to protect the line voltage electrical system components.

Power Source Protection

A main overcurrent protection device shall be provided that is either incorporated in the power source or connected to the power source by a power supply assembly.

The size of the main overcurrent protection device shall not exceed 100 percent of the rated amperage stated on the power source specification label or the rating of the next larger available size overcurrent protection device, where so recommended by the power source manufacturer.

If the main overcurrent protection device is subject to road spray, the unit shall be housed in a Type 4–rated enclosure.

Branch Circuit Overcurrent Protection

Overcurrent protection devices shall be provided for each individual circuit and shall be sized at not less than 15 amps in accordance with 240.4, “Protection of Conductors,” of *NFPA 70*.

Any panelboard shall have a main breaker where the panel has six or more individual branch circuits or the power source is rated 8 kW or larger.

Each overcurrent protection device shall be marked with a label to identify the function of the circuit it protects.

Dedicated circuits shall be provided for any large appliance or device (air conditioning units, large motors, etc.) that requires 60 percent or more of the rated capacity of the circuit to which it is connected, and that circuit shall serve no other purpose.

Panelboards

All fixed power sources shall be hardwired to a permanently mounted panelboard unless one of the following conditions exists:

(1) All line voltage power connections are made through receptacles on the power source and the receptacles are protected by integrated overcurrent devices.
(2) Only one circuit is hardwired to the power source, which is protected by an integrated overcurrent device.

The panel shall be visible and located so that there is unimpeded access to the panelboard controls. All panelboards shall be designed for use in their intended location. The panel(s) shall be protected from mechanical damage, tool mounting, and equipment storage.

Where the power source is 120/240 V and 120 V loads are connected, the apparatus manufacturer or line voltage system installer shall consider load balancing to the extent that it is possible.

Wiring Methods

Fixed wiring systems shall be limited to the following:

(1) Metallic or nonmetallic liquid tight flexible conduit rated at temperatures not less than 194°F (90°C) with stranded copper wire rated for wet locations and temperatures not less than 194°F (90°C)
(2) Type SOW, SOOW, SEOW, or SEOOW flexible cord rated at 600 V and at temperatures not less than 194°F (90°C)

Electrical cord or conduit shall not be attached to chassis suspension components, water or fuel lines, air or air brake lines, fire pump piping, hydraulic lines, exhaust system components, or low voltage wiring and shall be arranged as follows:

(1) Separated by a minimum distance of 12 in. (300 mm) from exhaust piping or shielded from such piping
(2) Separated from fuel lines by a minimum distance of 6 in. (150 mm)

A means shall be provided to allow “flexing” between the driving and crew compartment, the body, and other areas or equipment whose movement would stress the wiring.

Electrical cord or conduit shall be supported within 6 in. (150 mm) of any junction box and at a minimum of every 24 in. (600 mm) of run.

Supports shall be made of nonmetallic materials or of corrosion-resistant or corrosion-protected metal. All supports shall be of a design that does not cut or abrade the conduit or cord and shall be mechanically fastened to the apparatus.

Only fittings and components listed for the type of cord or conduit being installed shall be used.

Splices shall be made only in a listed junction box.

Additional Requirements for Flexible Cord Installations

Where flexible cord is used in any location where it could be damaged, it shall be protected by installation in conduit, enclosures, or guards.

Where flexible cord penetrates a metal surface, rubber or plastic grommets or bushings shall be installed.

Wiring Identification

Each line voltage circuit originating from the main panelboard shall be identified.

The wire or circuit identification either shall reference a wiring diagram or wire list or shall indicate the final termination point of the circuit.

Where pre-wiring for future power sources or devices exists, the un-terminated ends shall be marked with a label showing their wire size and intended function.

Wiring System Components

Only stranded copper conductors with an insulation rated for temperatures of at least 194°F (90°C) and wet locations shall be used. Conductors in flexible cord shall be sized in accordance with Table 400.5(A) of *NFPA 70*. Conductors used in conduit shall be sized in accordance with 310.15, "Ampacities for Conductors Rated 0–2000 Volts," of *NFPA 70*. Aluminum or copper-clad aluminum conductors shall not be used.

All boxes shall conform to and be mounted in accordance with Article 314, "Outlet, Device, Pull, and Junction Boxes; Conduit Bodies; Fittings; and Manholes," of *NFPA 70*. All boxes shall be accessible using ordinary hand tools. Boxes shall not be permitted behind welded or pop-riveted panels.

The maximum number of conductors permitted in any box shall be in accordance with 314.16, "Number of Conductors in Outlet, Device, and Junction Boxes, and Conduit Bodies," of *NFPA 70*.

All wiring connections and terminations shall provide a positive mechanical and electrical connection. Connectors shall be installed in accordance with the manufacturer's instructions. Wire nuts or insulation displacement and insulation piercing connectors shall not be used.

Each switch shall indicate the position of its contact points (i.e., open or closed) and shall be rated for the continuous operation of the load being controlled. All switches shall be marked with a label indicating the function of the switch. Circuit breakers used as switches shall be "switch rated" (SWD) or better. Switches shall simultaneously open all associated line voltage conductors. Switching of the neutral conductor alone shall not be permitted.

Line voltage circuits controlled by low voltage circuits shall be wired through properly rated relays in listed enclosures that control all non-grounded current-carrying conductors.

Receptacles and Inlet Devices

Wet and Dry Locations

All wet location receptacle outlets and inlet devices, including those on hardwired, remote power distribution boxes, shall be of the grounding type, provided with a wet location cover, and installed in accordance with Section 406.8, "Receptacles in Damp or Wet Locations," of *NFPA 70*.

All receptacles located in a wet location shall be not less than 24 in. (600 mm) from the ground. Receptacles on off road fire apparatus shall be a minimum of 30 in. (750 mm) from the ground. All receptacles located in a dry location shall be of the grounding type and shall be at least 12 in. (300 mm) above the interior floor height. No receptacle shall be installed in a face-up position.

The face of any wet location receptacle shall be installed in a plane from vertical to not more than 45 degrees off vertical.

Receptacle Label

Each receptacle shall be marked with a label indicating the nominal line voltage (120 volts or 240 volts) and the current rating in amps of the circuit. If the receptacle is DC or other than single phase, that information shall also be marked on the label.

All receptacles and electrical inlet devices shall be listed to UL 498, *Standard for Safety Attachment Plugs and Receptacles*, or other recognized performance standards.

Receptacles used for DC voltages shall be rated for DC service.

Wiring Schematics

An "As-Built" Wiring diagrams for line voltage systems shall be provided to include the following information;

(a) Pictorial representations of circuit logic for all electrical components and wiring
(b) Circuit identification
(c) Connector pin identification
(d) Zone location of electrical components
(e) Safety interlocks
(f) Alternator–battery power distribution circuits
(g) Input/output assignment sheets or equivalent circuit logic implemented in multiplexing systems

120/240 VAC SCENE LIGHTING

SIDE UPPER RECESSED SCENE LIGHTS

Four (4) Fire Research Focus, model FCA200-S50, recessed light(s) shall be installed. They shall be equally divided between the curbside and streetside. The housing shall incorporate internal heat-dissipating fins and have cutout dimensions not to exceed 2" deep by 4 1/4" high by 9 3/4" wide. The lamphead shall protrude no more than 1 1/2" from the housing flange. Wiring shall extend from the bottom of the recessed housing.

The lamp head shall have one (1) quartz halogen 500 watt 120 volt bulb. The bulb shall draw 4.2 amps and generate 10,500 lumens. The bulb shall be accessible through the front. The lamphead shall direct 50 percent of the light onto the action area while providing 50 percent to illuminate the working area. Lamphead and housing shall be powder coated white. The floodlight shall be UL listed as a scene light for fire service use.

Scene lights shall be provided with a lens or a means for preventing damage from water spray and shall be listed for wet location usage.

- There above lights shall be controlled by two (2) switch(es). The switch(es) shall be located in the cab within reach of the Driver and/or Officer.

REAR UPPER RECESSED SCENE LIGHTS

Two (2) Fire Research Focus, model FCA200-S50, recessed light(s) shall be installed. They shall be equally divided between the curbside and streetside. The housing shall incorporate internal heat-dissipating fins and have cutout dimensions not to exceed 2" deep by 4 1/4" high by 9 3/4" wide. The lamphead shall protrude no more than 1 1/2" from the housing flange. Wiring shall extend from the bottom of the recessed housing.

The lamp head shall have one (1) quartz halogen 500 watt 120 volt bulb. The bulb shall draw 4.2 amps and generate 10,500 lumens. The bulb shall be accessible through the front. The lamphead shall direct 50 percent of the light onto the action area while providing 50 percent to illuminate the working area. Lamphead and housing shall be powder coated white. The floodlight shall be UL listed as a scene light for fire service use.

Scene lights shall be provided with a lens or a means for preventing damage from water spray and shall be listed for wet location usage.

- There above lights shall be controlled by one (1) switch(es). The switch(es) shall be located in the cab within reach of the Driver and/or Officer.

COMMAND LIGHT TOWER WITH METAL HALIDE BULB OPTION AND LOWER BANK BACKLIGHT

The apparatus shall be equipped with one (1) all-electric Command Light(s). The unit shall not require tapping into vehicle braking system to be operated, eliminating the chance for vehicle brake problems. Hydraulic or pneumatic type floodlights are not acceptable alternatives to the all-electric light tower specified.

The light bank shall have four (4) weatherproof, 1,500 watt, 240-volt quartz halogen lights and (2) two 1,000 watt metal halide lights. Light heads shall be mounted in three (3) pairs, giving two (2) vertical lines of three (3) when the lights are in the upright position. Power for light bank shall be transmitted through power collecting rings thus allowing 360+ degree continuous rotation in either direction

The lower pair of light heads shall be capable of being rotated about a horizontal axis to provide light down on the vehicle or to the opposite side of the vehicle.

Positioning of the light bank shall be accomplished with maintenance free, heavy-duty 12-volt linear actuators.

The Command Light assembly shall be all aluminum construction, with stainless steel shafts and bronze bushings for long life and low maintenance.

Light tower shall be controlled with a hand-held umbilical line remote control. Command Light to be equipped with "Auto-Park" automatic nesting feature.

Command Light controls shall feature:

- Three (3) switches, one (1) for each light bank
- One (1) light bank rotation switch
- One (1) switch for elevating lower stage
- One (1) switch for elevating upper stage
- One (1) light to indicate when light bank is out of roof nest position
- One (1) light to indicate when light bank is rotated to proper nest position

Command Light controls shall be located per itemized compartment list.

The light tower shall have a full extension of 10' - 6" from mounted position and shall extend from nested position to full upright in 20 seconds.

The overall size of the nested light tower shall be approximately 48" wide x 73" long x 15.1/4" high, and weigh approximately 350 lbs.

A flashing warning light signal shall be provided indicating when a light tower is not in nested position as required by NFPA 1901.

The operational envelope of the mast shall be automatically illuminated whenever the mast assembly is being raised, lowered, or rotated as required by NFPA 1901.

The Command Light shall be covered by a One Year limited warranty from defects in materials and workmanship.

The specified light tower(s) shall be recessed into the roof of the apparatus body so that no part of the light tower extends above the roof line. The recessed area shall have two (2) water drain holes (in opposite corners) with flexible 1" diameter hose routed to the area below the body.

EQUIPMENT

The following equipment shall be furnished with the completed Special Service vehicle;

- One (1) container of assorted stainless steel nuts, bolts, screws and washers used in the construction of the apparatus shall be provided with the completed apparatus.

- There shall be two (2) NFPA approved aluminum wheel chocks provided for 44" diameter tires that together will hold the vehicle when loaded to its GVWR or GCWR, on a hard surface with a 20 % grade, with the transmission in neutral, and the parking brake released.

-The wheel chock(s) shall be mounted behind rear wheels, below body on streetside.