LIABILITY INSURANCE

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

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

General Liability (each occurrence) of $1,000,000.00. General Aggregate coverage of $2,000,000.00. Products Completed / Operations Aggregate coverage of $2,000,000.00. Medical Expense coverage of $5,000 (any one person). Personal Injury of $1,000,000.00.

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 $4,000,000.00 each occurrence, Aggregate of $4,000,000.00.
Garage Keepers Liability coverage of $4,500,000.00 combined limit.

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 County of Hawaii, Civil Defense Agency 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.

CONSTRUCTION DOCUMENTATION

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

The manufacturers record of apparatus construction details, including the following information:

1) Owner's name and address
2) Apparatus manufacturer, model, and serial number
3) Chassis make, model, and serial number
   a) GAWR of front and rear axles and GVWR
   b) Front tire size and total rated capacity in pounds (kilograms)
   c) Rear tire size and total rated capacity in pounds (kilograms)
   d) Chassis weight distribution in pounds (kilograms) with water and manufacturer-mounted equipment (front and rear)
   e) 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
   f) Type of fuel and fuel tank capacity
   g) Electrical system voltage and alternator output in amps
   h) Battery make, model, and capacity in cold cranking amps (CCA)
   i) Chassis transmission make, model, and serial number; and if so equipped, chassis transmission PTO(s) make, model, and gear ratio
4) Paint manufacturer and paint number(s)
5) Company name and signature of responsible company representative
6) Certification of compliance of the optical warning system
7) Siren manufacturer's certification of the siren
8) Written load analysis and results of the electrical system performance tests
9) Certification of slip resistance of all stepping, standing, and walking surfaces
10) If the apparatus has a line voltage power source, the certification of the test for the power source
11) If the apparatus is equipped with an air system, air tank certificates, the SCBA fill station certification, and the results of the testing of the air system installation
12) 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 manufacturer's operations and service documents supplied with components and equipment that are installed or supplied by the Contractor.

NFPA REQUIRED DOCUMENTATION FORMAT - USB FLASH DRIVE

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

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 Body 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 its 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 ten (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 ten (10) minutes.

All electrical loads shall be turned off prior to attempting to restart the engine. The battery system shall then be capable of restarting the engine. Failure to restart the engine shall be considered a test 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 two (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 third-party, independent, audit-certified through Underwriters Laboratory (UL) to the current edition of NFPA 1901 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 two (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 Body Manufacturer shall deliver the following with the fire apparatus:

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 one (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 one (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 County of Hawaii, Civil Defense Agency on all warranty work.

GENERAL LIMITED WARRANTY - TWO (2) YEARS

The vehicle shall be free of defects in material and workmanship for a period of two (2) years or 36,000 miles (or 57,936 kilometers), 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 (or 96,561 kilometers), whichever occurs first, starting thirty (30) days after the original invoice date.

CONSTRUCTION PERIOD

The completed vehicle shall be delivered within two hundred seventy (270) 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 County of Hawaii, Civil Defense Agency as to delays and to what extent these delays have in completing vehicle within the stated construction time period.

OVERALL HEIGHT REQUIREMENT

The overall height (OAH) of the vehicle shall be approximately 132“ (11' - 0") 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 328“ (27' - 4") maximum.

OVERALL WIDTH

The overall width (OAW) of the body shall be 96" (8' - 0") and 102" at mirrors.

FINAL INSPECTION CONFERENCE

A final inspection conference shall be required at the Contractor's factory for three (3) personnel from the County of Hawaii, Civil Defense Agency to inspect the vehicle and construction details prior to shipment of the completed vehicle. This inspection shall take place after any specified striping and lettering is installed.

The Contractor shall at his/her expense, provide transportation, lodging, rental car and meal expenses during the final inspection conference. Any travel distance greater than 250 miles shall be by non-stop commercial air travel.

SHIPPING INSTRUCTIONS

The unit shall be delivered to San Diego Pasha west coast port in preparation for ocean freight shipment to Hawaii. Only roll-on roll-off type shipping is acceptable, NO container, or rack type shipping is allowed for this unit.

Before loading onto freight ship the unit shall be completely cleaned and washed inside and exterior.

DELIVERY AND DEMONSTRATION

The Contractor shall be responsible for the delivery of the completed unit to the County of Hawaii, Civil Defense Agency's 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 County of Hawaii, Civil Defense Agency regarding the operation, care and maintenance of the apparatus and equipment supplied at County of Hawaii, Civil Defense Agency location.

The Delivery Engineer shall set delivery and instruction schedule with the person appointed by County of Hawaii, Civil Defense Agency.

After delivery of the apparatus, the County of Hawaii, Civil Defense Agency shall be responsible for ongoing training of its personnel to proficiency regarding the proper and safe use of the apparatus and associated equipment.

CHASSIS SPECIFICATIONS

Vehicle Configuration

MT55 FRONT ENGINE WALK-IN VAN CHASSIS
SET-FORWARD FRONT AXLE CHASSIS
LH PRIMARY STEERING LOCATION

General Service

EXPECTED FRONT AXLE LOAD: 8000 lbs
EXPECTED REAR DRIVE AXLE LOAD: 17500 lbs
EXPECTED GROSS VEHICLE CAPACITY: 25500 lbs
RESCUE AND EMERGENCY SERVICE
DOMICILED, USA 50 STATES (INCLUDING CALIFORNIA AND CARB OPT-IN STATES)

Engine

CUM ISB 6.7-300 300 HP @ 2600 RPM, 2600 GOV, 660 LB/FT @ 1600 RPM

2013 OBD/2010 EPA/CARB/GHG14
2008 CARB EMISSION CERTIFICATION - CLEAN IDLE

Engine Equipment

690 SQ-IN DOWNFLOW RADIATOR MOUNTED IN FRONT

ENGINE OIL CHECK MOUNTED ON RADIATOR AND OIL FILL IN VALVE COVER

FARR ECO BC AIR CLEANER WITH WATER SEPARATOR

FRONTAL AIR INTAKE

AIR INTAKE PIPING - CLNR TO ENGINE

AIR CLEANER MOUNTED ON RAIL

LN 12V 270 AMP 4942PA PAD MOUNT ALTERNATOR

(2) ALLIANCE MODEL 931, GROUP 31, 12 VOLT MAINTENANCE FREE 1300 CCA THREADED STUD BATTERIES

BATTERY BOX MOUNTED RIGHT HAND WITH BATTERIES PERPENDICULAR TO FRAME RAIL

FRAME GROUND RETURN, BATTERY CABLES WITH EYELET CONNECTORS

NO BATTERY SHUTOFF SWITCH

CUMMINS 18.7 CFM AIR COMPRESSOR WITH INTERNAL SAFETY VALVE

STANDARD AIR COMPRESSOR GOVERNOR

TEFLON COMPRESSOR DISCHARGE LINE

CUMMINS EXHAUST BRAKE INTEGRAL WITH VARIABLE GEOMETRY TURBO WITH ON/OFF DASH SWITCH

HORIZONTAL DIESEL PARTICULATE FILTER AFTERTREATMENT DEVICE

RH FRAME MOUNTED HORIZONTAL AFTERTREATMENT DEVICE

HORIZONTAL SCR CATALYST

RH IB FRAME MTD HZ SCR CATALYST
EXHAUST MITIGATION DEVICE FTL 4" ID SLIP-FIT
LH STANDARD HORIZONTAL TAILPIPE, EXIT AFT OF REAR TIRES
10 GALLON DEF TANK LH FRAME MTD

ADC ELEC-MG ON/OFF ENGINE FAN CLUTCH

CUMMINS SPIN ON FUEL FILTER

FULL FLOW OIL FILTER

RADIATOR MOUNTED SURGE TANK

AIR RECIRCULATION SHIELD

ANTIFREEZE TO -34F, ETHYLENE GLYCOL PRE-MIXED 50/50 COOLANT

RUBBER COOLANT HOSES

CONSTANT TENSION HOSE CLAMPS FOR COOLANT HOSES

ALUMINUM FLYWHEEL HOUSING

NIPPON-DENSO 12V STARTER WITH COPPER CONTACTS

Transmission

ALLISON 2200 EVS AUTOMATIC TRANSMISSION WITH PARK PAWL WITH PTO PROVISION

Transmission Equipment

WATER TO OIL TRANSMISSION COOLER

TRANSMISSION OIL CHECK AND FILL

SYNTHETIC TRANSMISSION FLUID (TES-295 COMPLIANT)

Front Axle & Equipment

DA-F-10.0-3 10,000# FF1 69.0 KPI/3.50DROP SINGLE FRONT AXLE
NON-ASBESTOS FRONT BRAKE LINING
MERITOR 15X4 Q+ CAM FRONT BRAKES
HALDEX FRONT BRAKE CHAMBERS
MERITOR 5.5" UNHANDED AUTOMATIC FRONTSLACK ADJUSTERS
CAST IRON OUTBOARD FRONT BRAKE DRUMS
GUNITE IRON FRONT HUBS
FRONT OIL SEALS
VENTED FRONT HUB CAPS W/WINDOW, CENTER AND SIDE PLUGS - OIL
SYNTHETIC 75W-90 FRONT AXLE LUBE
STANDARD SPINDLE NUTS FOR ALL AXLES
STANDARD CUPS AND CONES (WHEEL BEARINGS) FRONT AND REAR
TRW TAS-65 POWER STEERING
TRW POWER STEERING PUMP
2 QUART POWER STEERING RESERVOIR

Front Suspension

10,000# TAPERLEAF FRONT SUSPENSION
MAINTENANCE FREE RUBBER BUSHINGS - FRONT SUSPENSION
FRONT STABILIZER BAR
SACHS FRONT SHOCK ABSORBERS

Rear Axle & Equipment

MERITOR MS-19-14X 20,000# R-SRS SINGLE REAR AXLE
4.88 REAR AXLE RATIO
IRON REAR AXLE CARRIER WITH STANDARD AXLE HOUSING
SPL70 DANA SPICER MAIN DRIVELINE WITH HALF ROUND YOKES
SYNTHETIC 75W-90 REAR AXLE LUBE
MERITOR 16.5X7 Q+ CAST SPIDER CAM REAR BRAKES, DOUBLE ANCHOR, FAB'D SHOES
NON-ASBESTOS REAR BRAKE LINING
CHBR STD LOCATION
CAST IRON OUTBOARD REAR BRAKE DRUMS
REAR BRAKE DUST SHIELDS
REAR OIL SEALS
HALDEX GOLDSEAL TAMPER PROOF 1-DRIVE AXLE SPRING PARKING CHAMBERS W/ORANGE ALERT
BENDIX VERSAJUST AUTOMATIC REAR SLACK ADJUSTERS

Rear Suspension

20,000# AIRLINER REAR SUSPENSION
SPRING SUSPENSION - NO AXLE SPACERS
DUAL INSTANT RESPONSE REAR SUSPENSION LEVELING VALVES
REAR SWAYBAR
SACHS REAR SHOCK ABSORBERS

Brake System

AIR BRAKE PACKAGE
WABCO 4S/4M ABS WITHOUT TRACTION CONTROL
HALDEX PUREST AIR DRYER WITH ELECTRIC HEATER
AIR DRYER MOUNTED INBOARD ON LH RAIL
STEEL AIR BRAKE RESERVOIRS
(1) AUTO DRAIN VALVE AND (2) MANUAL DRAIN VALVES WITH PULL CORD

Wheelbase & Frame

(190 INCH) WHEELBASE
(93 INCH) REAR FRAME OVERHANG

Chassis Equipment

THREE-PIECE 14 INCH PAINTED STEEL BUMPER WITH COLLAPSIBLE ENDS
DRILLING PREP FOR CUST INSTALLED BODY SUPPORTS FOR 93" WALK-IN VAN BODY WIDTH

Fuel Tanks

90 GAL RECTANGULAR STEEL FUEL TANK - BETWEEN RAILS
FUEL TANK(S) MOUNTED BETWEEN RAILS AFT OF REAR AXLE
LH SIDEFILL FUEL TANK CAP
ALLIANCE FUEL FILTER/WATER SEPARATOR WITH PRIMER PUMP AND INDICATOR LIGHT

Tires

MICHELIN XZE 255/70R22.5 16 PLY RADIAL FRONT TIRES
MICHELIN XZE 255/70R22.5 16 PLY RADIAL REAR TIRES

Wheels

22.5X8.25 10-HUB PILOT 5-HAND STEEL DISC FRONT WHEELS PAINTED WHITE
22.5X8.25 10-HUB PILOT 5-HAND STEEL DISC REAR WHEELS PAINTED WHITE

Cab Exterior

OPERATOR STATION (CONTROL SUPPORT) - OUTBOARD MOUNTED
FREIGHTLINER NAMEPLATES
DUAL ELECTRIC HORNS
IGNITION KEY ONLY
INCANDESCENT BODY MTD MARKER LAMPS

Cab Interior

HVAC WIRING PROV LOC INSIDE CAB
5/8" HEATER PLUMBING HOSE - TO FRONT OF CHASSIS
(2) SANDEN COMPACT AIR CONDITIONER COMPRESSORS
RADIATOR MOUNTED AIR CONDITIONER CONDENSER
AUTO SELF-RESET CIRCUIT BREAKERS AND FUSES
FASTEN SEAT BELT INDICATOR, ACTIVE LOW, FOR CUSTOMER FURNISHED SEAT BELT
TRW TILT/3.00" TELESCOPIC STEERING COLUMN WITH FOOT ACTUATED PEDAL
4-SPOKE 18 INCH (450MM) STEERING WHEEL

Instruments & Controls

GREEN GAUGE BACKLIGHTING

DRIVER MESSAGE CENTER W/LCD DISPLAY,24 WARNING LAMPS, DATA LINKED, AMI

FIRE AND EMERGENCY SERVICE VEHICLES ENGINE WARNING

ELECTRONIC MPH SPEEDOMETER WITH TACHOMETER

2 INCH PRIMARY AND SECONDARY AIR PRESSURE GAUGES

ELECTRIC ENGINE OIL PRESSURE GAUGE W/WARNING LAMP AND ALARM

ELECTRIC ENGINE COOLANT TEMP GAUGE W/WARNING LAMP AND ALARM

DIGITAL VOLTAGE DISPLAY INTEGRAL WITH DRIVER DISPLAY

ELEC FUEL GAUGE & LOW FUEL IND LAMP

AUTOMATIC TRANSMISSION OIL TEMP GAUGE W/WARNING LAMP

ENGINE HOUR METER, INTEGRAL TO MESSAGE CENTER LCD

ENGINE COMPARTMENT MOUNTED AIR RESTRICTION INDICATOR WITH GRADUATIONS, WITH WARNING LIGHT IN DASH

97 DB BACKUP ALARM

CRUISE CONTROL SWITCHES-UNMOUNTED

PROGRAMMABLE RPM CTRL W/LOW VOLTAGE AUTO HIGH IDLE & RPM CTRL SWITCHES

WAGNER 7212 TURN SIGNAL FLASHER

Weight Summary

	Weight Front	Weight Rear	Total Weight
Factory Weight+	4467 lbs	3398 lbs	7865 lbs

MORGAN-OLSON BODY SPECIFICATIONS:

Body Dimensional Information
Inside Height: 85 Inside Length: 216.00 Inside Width: 90.0 Rear Door Opening (W x H): OXO
Note: Dimensional information above for reference only These dimensions may change based on any special pricing items included in this quotation.

Chassis Make: Freightliner	Expected Date	Rear Wheels: DUAL	A/C Prep Yes
Model: MT55	Engine Type: Cummins	Air Suspension: Yes	Air Filter Rest: No
Year: 2014	Block Heater: No	Tire Size: 19.5	Cruise Control: No
WB: 190	Fuel Tank Loc: 90 G. Rear	Emergency Air Brake Brake:	Clean Power/ Cable: Printer No
GVWR: 20500+	Fuel Type: Diesel	Transmission: Automatic	Bumper: 3-Piece 14inch painted steel

Specifications

Option	Description
CHASSIS	FREIGHTLINER CHASSIS
REAR DOORS	REAR FRAME, SOLID NO DOORS, 4 LAMPS IN SILL, LICENSE PLATE BOX HANDLES FOR CAB DOORS, BLACK KEY TO LOCK.
CAB DOORS	ROADSIDE SLIDING DOOR WITH ROLL-UP WINDOW CURBSIDE SLIDING DOOR WITH ROLL-UP WINDOW SIDE DOOR STRIKER INSTALL BRONZE
SIDE ENTRY DOOR	SIDE ENTRY, STREETSIDE AHEAD OF REAR WHEELS
SEATS	HIGH BACK DRIVER BUCKET SEAT FROM FREEDMAN, SALT AND PEPPER CLOTH SEATS, 3 POINT HARNESS INCLUDES PASSENGER SEAT TO MATCH DRIVERS SEAT SOCKET INSTALL WITH TILT. CURBSIDE SEAT BELT BLACK WITHOUT TEATHER
ROOF/INTERIOR LIGHTS/ VENTS	ROOF ASSEMBLY WITH 5 INCH O-LINE ROOF BOW OUTER ROOF SKIN ALUMINUM CAB ROOF LINER PLASTIC AND 1 INCH FIBERGLASS INSULATION DOME LIGHT IN CAB WITH ROCKER SWITCH ON INSTRUMENT PANEL, TRUCK-LITE 2-WIRE MODEL 80 WITH SCREW-ON POLYCARBONATE LENS, LOCATE CAB DOME CENTERED IN CAB DOME LAMP LED 18" RECTANGULAR IN LOAD SPACE RECESSED ROCKER SWITCH MOUNTED IN INSTRUMENT PANEL FOR LOAD DOME
FLOOR	HANGER PLATE INSTALL FOR REAR BUMPER FORWARD FLOOR. RIBBED EXTRUDED ALUMINUM MID FLOOR HEAVY DUTY RIBBED EXTRUDED ALUMINUM REAR FLOOR. RIBBED ALUMINUM 1 INCH WIDE SIDEWALL SUPPORT GUSSET ATTACHED TO LOWER SPRAY IN FROTH-PAK POLYURETHANE FOAM INSULATION IS SPRAYED AND PROVIDE INSULATION TO ELEMENTS. COMMONLY USED IN FOOD
BUMPERS/HOODS	FIBERGLASS HOOD, FREIGHTLINER HOOD PROP FOR FIBERGLASS HOOD HOOD STOP INSTALL. REAR BUMPER INSTALLATION 8 INCH, STEEL DIAMOND PLATE

BULKHEAD	BULKHEAD, ALUMINUM, WITH CENTERED SLIDING DOOR AND FINGER
EXTERIOR BODY	THE SIDEWALLS ARE CONSTRUCTED USING .102 ALUMINUM. FUEL FILL DOOR WITH SOUTHCO HINGE. FLUSH FIT DOOR FOR UREA TANK MUD FLAPS, NO LOGO CAB INSTALLATION NO ROADSIDE VENT AT FOOT AREA. HEATED AND REMOTE CONTROLLED EXTERIOR DUAL HEAD MIRROR
EXTERIOR LIGHTING	LICENSE PLATE BOX LAMP IN REAR SILL LED FRONT PARK/TURN LAMP INSTALL, OPTRONIC LAMP MARKER AMBER LED LAMP MARKER REAR SIDE RED LED LAMP MARKER (NOT SIDE) RED LED MARKER LAMPS IN TRANSOM CENTER AMBER LED
INTERIOR CAB	SUN VISOR BLACK TINTED PLASTIC ENGINE BOX FOR FREIGHTLINER MT45/MT55 JENSON HEAVY DUTY AM/FM RADIO WITH WEATHERBAND AND AUXILLIARY INPUT. DRIVERS CONVENIENCE CENTER MOUNTED TO THE ENGINE BOX WIPER MOTOR COVER PLATE, ALUMINUM, WITH ACCESS DOOR TO A STORAGE COMPARTMENT WITH DOOR ABOVE THE PASSENGER. 12V POWER POINT IN DASH. CAB STEPS, ALUMINUM, CURBSIDE HAS BATTERY ACCESS
CARGO AREA	STIFFENERS ON SIDEWALLS, 1.5 ALUMINUM HAT SECTION ON 48 INCH SIDEWALL STIFFNERS ON 48" CENTERS ANGLE STIFFENER INSTALL LOWER SIDE PANEL, ROADSIDE AND
PAINT	DUPONT PRIMER, DUPONT TOP COAT, DUPONT IMRON 5000 WHITE N0006H PAINT REAR BUMPER SAME COLOR AS BODY PAINT HUBS ONLY PAINT WHEEL HUBS SAME COLOR AS BODY
HEATING/AIR COND	CONTROL PANEL FOR ELECTRIC HEATER WITH AIR CONDITIONING AIR CONDITIONING FARM OUT FREIGHTLINER WITH OUT PREP CUMMINS CAB DASH HEATER WITH AIR CONDITIONING AND ELECTRIC CONTROLS.

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.

FINAL STAGE MANUFACTURER VEHICLE CERTIFICATION

A final stage manufacturer vehicle certification label shall be provided and installed in the driver cab door jamb area.

FRONT BUMPER

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

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. The tailpipe may require some modifications for proper ground clearances and fit with body.

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

Exhaust pipe discharge shall be directed away from any operator's position or entry doors on body.

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

BATTERIES

The cab/chassis supplied batteries shall be replaced with Optima "Yellow Top" deep cycle type batteries.

RADIO/ANTENNA INSTALLATION

There shall be one (1) County of Hawaii, Civil Defense Agency supplied radio(s) with antenna installed in the cab within easy reach of driver. The location of radio shall be determined by the County of Hawaii, Civil Defense Agency at the pre-construction meeting. All required radio programming shall be responsibility of County of Hawaii, Civil Defense Agency. Radio(s) may not be fully tested if no radio program is provided with radio and will be responsibility of County of Hawaii, Civil Defense Agency after delivery.

Radio shall be installed per Manufacturer's requirements and wired for proper 12 volt power and ground.

STORAGE MODULE

A storage module shall be provided in the cab. The module shall be as large as possible and fabricated of 1/8" smooth aluminum. A textured powder coat paint finish shall be provided for durability and finished appearance. The paint shall match the interior cab color.

The final design and location of console shall be determined by the County of Hawaii, Civil Defense Agency at the pre-construction meeting.

SIX (6) – LED TIRE PRESSURE VISUAL INDICATORS

Each tire shall be equipped with a VECSAFE heavy duty valve cap (or equal) LED indicator that indicates proper tire pressure.

POWER WINDOWS

The front door manual roll-down windows shall be modified with a universal power window kit with dash mounted switches.

RADIO

The factory radio shall be removed and replaced with an Pioneer DEH-X8500BS AM/FM/CD/MP3, premium sound, iPod Interface, USB and front auxiliary inputs system.

BATTERY JUMPER STUDS

Two (2) battery jumper studs, one (1) positive with a red weather cover, and one (1) negative with a black weather cover shall be provided in the lower front portion of the driver step area. Jumper studs shall be identified with color coded label.

These studs shall allow this vehicle to be jump started due to a battery failure, or to allow easy access to assist another vehicle.

HUB AND NUT COVERS

Front and rear wheels shall be provided with stainless steel hub caps and wheel nut covers.

ELECTRIC DOOR LOCK INTERFACE

The electric door locks shall be interfaced as follows:

The cab manual door locks shall be equipped with a POP Locks electric actuated door locking system. All cab doors shall be locked and un-locked from a numeric key pad located adjacent to the drivers door. All doors shall have a manual key operated override capability in the event of a failure of the electric lock system. All cab doors shall be keyed alike. Four (4) hand held remote controls shall be provided for controlling the cab.

ROAD EMERGENCY SAFETY KIT

One (1) set of three (3) 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 per DOT requirements shall be provided with the completed apparatus.

AUTOMATIC VEHICLE LEVELING SYSTEM

A Quadra Manufacturing, Inc. "Big Foot" model QE-2 designed for offset type slide-out system shall be installed on the unit designed for large heavy duty vehicles with a GVWR over 23,000 pounds. The system shall have four (4) mounting brackets bolted to the chassis frame rails, two (2) front and two (2) rear. Each jack shall bolt to the bracket attached to the chassis frame.

Each jack has its own hydraulic reservoir and 12 volt DC motor wired to the chassis electrical system. Jack pads shall have a 100 square inches surface to prevent sinking in soft ground. Jacks shall be rated for lifting 17,000 pounds minimum (each).

The system shall have a drive-off safety feature. If the vehicle ignition switch is on, or park brake is released and any legs are not fully retracted, a warning alarm shall sound with the Deluxe-Touch Pad, fully automatic panel with sensor. The vehicle leveling control panel shall be located in cab near driver's area.

The system shall be provided with a five (5) year limited warranty from Quadra Manufacturing, Inc.

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. NO EXCEPTIONS

VAN BODY EXTERIOR COMPARTMENTATION

The van body shall be modified to accommodate additional exterior compartments as per the detailed specifications.

The compartment floors and exterior panels shall be constructed with not less than 1/8" (.125) 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. Compartments shall be preformed, then positioned in van body cutout opening and bolted 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.

Seams shall be welded and caulked to prevent moisture from entering the compartments. Only stainless steel bolts, nuts, and sheet metal screws shall be used in mounting exterior trim, hardware and equipment. Exterior compartments shall be machine louvered in lower back wall of compartment for ventilation.

HINGED DOOR CONSTRUCTION

The exterior compartment doors shall be custom manufactured and built for each compartment. The compartment doors must be able to withstand years of rugged service and wear. For this reason, the compartment door design, metal thickness, and attachments must be strictly adhered to.

The compartment doors shall be all aluminum 3003H-14 alloy construction. The exterior panel shall be of 1/8" thickness smooth plate aluminum and the interior panel shall be of 1/8" thickness smooth plate aluminum. Lighter gauge material will NOT BE ACCEPTABLE in these areas. The double panel doors shall be 1-3/4" thick to completely enclose the door latching assembly. Doors shall have drain hole openings for drainage and ventilation.

Compartment door openings shall be sealed with closed cell automotive type rubber molding to provide a weather resistant seal around door. In addition, rubber molding shall be provided along hinge to prevent moisture entry. Open cell foam type rubber moldings are NOT ACCEPTABLE.

Hinged compartment doors shall have 14 gauge stainless steel hinge, with 1/4" stainless steel pin. The hinge shall be bolted to the door and body with stainless steel machine screws. A polyester barrier film gasket shall be placed between stainless steel hinge and any dissimilar metals as necessary.

Drip rails shall be installed above all compartment door openings. Drip rails shall be completely removable for easy replacement if necessary.

The latching mechanism of hinged compartment doors shall include stainless steel 6" offset bent D-ring keyed handles. A gasket shall be placed between stainless steel handle and door. Door latches shall be a double catching two-point rotary slam latch, recessed inside the double panel door with striker plate.

All vertically hinged compartment doors shall have a pneumatic cylinder to hold door in the open and closed positions. Each door shall be capable of being closed without unlatching. Door checks shall be bolted to the upper compartment door header and the box pan of the door. Door checks that require unlatching by hand will NOT BE ACCEPTABLE. All horizontally hinged compartment door shall have a door check as specified with each door.

STREETSIDE COMPARTMENT - FRONT (S1)

A bolt-in type cabinet shall be provided built into lower skirt from step van body manufacturer.

The interior useable compartment space shall be approximately 80.0" wide.

The compartment door opening shall be approximately 73.0" wide.

- This compartment shall have a horizontally hinged, drop-down style box pan door fabricated of 1/8" thick smooth aluminum. The inner liner of the door shall be 1/8" thick smooth aluminum with an unpainted finish. The door exterior shall be painted job color.

- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.

- The hinged door(s) shall have a stainless steel 6" offset bent D-ring locking handle. A gasket shall be placed between handle and door. Door latches shall be a two-point rotary slam, double-catch latch, recessed inside the double panel door with striker plate.

- The hinged door(s) shall have a pair of tailgate style mechanisms to stop the door at 90 degrees. Each door shall be capable of being closed without unlatching.

COMPARTMENT LAYOUT

- One (1) OnScene 36" Access LED compartment light, horizontally mounted at the top of the compartment toward the door opening.

- The 12 volt electrical distribution panel shall be located in the front lower compartment.

STREETSIDE COMPARTMENT - REAR (S2)

A bolt-in type cabinet shall be provided built into lower skirt from step van body manufacturer.

The interior useable compartment width shall be approximately 35.0" wide.

The compartment door opening shall be approximately 28.0" wide.

- This compartment shall have a horizontally hinged, drop-down style box pan door fabricated of 1/8" thick smooth aluminum. The inner liner of the door shall be 1/8" thick smooth aluminum with an unpainted finish. The door exterior shall be painted job color.

- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.

- The hinged door(s) shall have a stainless steel 6" offset bent D-ring locking handle. A gasket shall be placed between handle and door. Door latches shall be a two-point rotary slam, double-catch latch, recessed inside the double panel door with striker plate.

- The hinged door(s) shall have a pair of tailgate style mechanisms to stop the door at 90 degrees. Each door shall be capable of being closed without unlatching.

COMPARTMENT LAYOUT

- One (1) OnScene 36" Access LED compartment light, horizontally mounted at the top of the compartment toward the door opening.

- The diesel engine driven generator location.

- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

CURBSIDE COMPARTMENT - FRONT (C1)

A bolt-in type cabinet shall be provided built into lower skirt from step van body manufacturer.

The interior useable compartment space shall be approximately 80.0" wide.

The compartment door opening shall be approximately 73.0" wide.

- This compartment shall have a horizontally hinged, drop-down style box pan door fabricated of 1/8" thick smooth aluminum. The inner liner of the door shall be 1/8" thick smooth aluminum with an unpainted finish. The door exterior shall be painted job color.

- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.

- The hinged door(s) shall have a stainless steel 6" offset bent D-ring locking handle. A gasket shall be placed between handle and door. Door latches shall be a two-point rotary slam, double-catch latch, recessed inside the double panel door with striker plate.

- The hinged door(s) shall have a pair of tailgate style mechanisms to stop the door at 90 degrees. Each door shall be capable of being closed without unlatching.

COMPARTMENT LAYOUT

- One (1) OnScene 36" Access LED compartment light, horizontally mounted at the top of the compartment toward the door opening.

CURBSIDE COMPARTMENT - REAR (C2)

The interior useable compartment width shall be approximately 35.0" wide.

The compartment door opening shall be approximately 28.0" wide.

- This compartment shall have a horizontally hinged, drop-down style box pan door fabricated of 1/8" thick smooth aluminum. The inner liner of the door shall be 1/8" thick smooth aluminum with an unpainted finish. The door exterior shall be painted job color.

- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.

- The hinged door(s) shall have a stainless steel 6" offset bent D-ring locking handle. A gasket shall be placed between handle and door. Door latches shall be a two-point rotary slam, double-catch latch, recessed inside the double panel door with striker plate.

- The hinged door(s) shall have a pair of tailgate style mechanisms to stop the door at 90 degrees. Each door shall be capable of being closed without unlatching.

COMPARTMENT LAYOUT

- One (1) OnScene 36" Access LED compartment light, horizontally mounted at the top of the compartment toward the door opening.

- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

FRONT CAB HANDRAILS

There shall be two (2) vertical handrails, one (1) at each cab entry door. Handrails shall be NFPA compliant 1-1/4" knurled 304 stainless steel with welded end stanchions.

WALK-IN INTERIOR FINISH DETAILS

DESK, CABINET, CONSOLE FINISH

All specified interior desks, cabinets, overhead cabinets, or consoles shall be fabricated from formed 1/8" 3003 H14 alloy smooth aluminum. After fabrication is completed they shall be painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray.

The use of wood materials or laminated surfaces in the construction of desks, cabinets, overhead cabinets, or consoles will not be allowed. There will be **No Exceptions** allowed on specified ruggedized finish.

INTERIOR SPECIFICATIONS

INTERIOR INSULATION

Following the sheet metal fabrication the roof area, upper exterior walls and the entry door of the apparatus body shall be insulated with Dow Thermax, or equal 1-1/2" glass-fiber reinforced polyisocyanurate foam core laminated between 1.0 mil smooth, reflective aluminum foil facers on both sides, with an R9.8 value. The reinforcement, along with chemical modifications, contributes to fire resistance and dimensional stability . This insulation shall be the type that will not absorb moisture, move once in place or deteriorate. Mat type fiberglass or spray in foam insulation is not acceptable.

INTERIOR FINISH

The interior of the apparatus body shall have carpeted walls. The interior finish shall be installed on the ceiling, front wall, and interior side walls from top of exterior compartments to ceiling height.

The interior plywood panels shall be installed with sheet metal screws and the carpet will be glued to it using high bond adhesive.

The interior finish shall be medium texture gray.

INTERIOR WALKWAY FLOOR

There shall be Lonseal, Loncoin-II Flecks installed on the floor substrate. Loncoin II Flecks is a heterogeneous resilient sheet vinyl with a decorative raised coin texture, breathtaking color, and intriguing style. The fleck coloration provides camouflage for simpler maintenance while the raised coin embossing provides enhanced traction. Excellent for interior, retail, commercial, or institutional use where design parameters call for a high performance, sophisticated flooring solution.

Loncoin II Flecks is composed of polyvinyl chloride (PVC) resin, plasticizers, fillers, and pigments. The co-calendared wear layer is formulated to provide maximum resistance to foot traffic and most commercial and healthcare chemicals.

The middle layer provides dimensional stability, sound-absorbing properties, and resiliency under foot. The backing layer provides strength and stability of the flooring and enhances the bonding strength of the adhesive.

The material shall be black in color (Loncoin-II Flecks - Onyx).

Lonseal, Inc. warrants that Lonseal flooring products shall be free from manufacturing defects for a period of one (1) year from the date of purchase and that, when properly installed and maintained, shall not wear through as a result of normal foot traffic for a period of 7 years from the date of installation.

INTERIOR SUB-FLOOR

Above the body subframe shall be an isolation sheet that shall prevent outside elements from permeating the full length sound and thermal barrier of 3/4" thick grade plywood. The sheet shall be fabricated from the same type of material as is used in the subframe. The isolation sheet shall be flanged on both sides with a 1" high vertical break.

AIR CONDITIONER - HEATER

Two (2) Coleman Mach 3, 120 VAC, 60 cycle, single phase air conditioner(s) shall be provided and installed on the body roof. The unit shall be a roof top integral evaporator/condenser type with built-in heating elements.

Each unit shall be rated at 13,500 BTU cooling capacity with a heating element rated at 5,600 BTU.

A two-speed fan shall supply a maximum of 320 CFM air flow capacity.

The roof mounted air conditioner shall be approximately 13" high x 29" wide x 43" long and weigh approximately 85 pounds. The opening in roof shall be properly reinforced to support the air conditioner.

EXHAUST FAN

One (1) Fantastic model 6000RBTA, 12 VDC, 3-speed ventilation fan(s) shall be provided for air circulation. Each fan shall be wired to a wall switch located near fan location.

Technical Information:

- Durable, proven longevity
- Quiet, 12 – volt ceiling fan with 3-speeds
- Polycarbonate dome/Lifetime guarantee
- Removable screen for easy cleaning
- Reversible fan blade motor (in or out)
- Low AMP draw insures full-time use

Performance:	SCFM	AMPS	Decibels
High	920	3.00	40
Medium	653	2.29	39
Low	478	1.86	39

Specifications:

- Rooftop weight: 11lbs.
- Dimensions: 16 1/2 x 16 1/2 x 4 1/2 (Fits Most Standard 14"x14" Openings)
- CSA / UL Certified

STREETSIDE INTERIOR AREA (IS1/IS2)

- There shall be two (2) magnetic whiteboard(s), approximately 30" wide x 36" tall located on wall at each work station.

- There shall be one (1) sliding pocket door(s) provided on interior of walk-in body area. Pocket door shall be fabricated from 1/8" smooth aluminum and be approximately 1-1/2" thick and hang on adjustable pocket door hardware. The door shall be painted to match the interior wall color. A stainless steel handle shall be provided on each side of door. The door shall be equipped with a pneumatic cylinder which will "over-center" to hold the door in open and closed positions.

- There shall be one (1) interior counter height cabinet provided under rear of the 112" desk. Cabinet shall be constructed of 1/8" smooth finish aluminum, and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray. Each cabinet shall be approximately 24" W x 28" H x 24" D.

  - The above cabinet(s) shall have a 4" x 4" toe kick area at the base to allow for the top surface to be used as a working surface.

- The above cabinet(s) shall have a vertically hinged aluminum door(s) and painted with a hammer tone powder coat paint finish to match cabinet color choice.

- There shall be one (1) vertically adjustable shelf in each of the above cabinets. It shall have a 1.25" lip to contain items while minimizing space used.

- There shall be three (3) 34" wide x 14" high x 14" deep overhead cabinet(s) provided on interior. Cabinet(s) shall be constructed of 1/8" smooth finish aluminum, and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray.

- The above cabinet(s) shall have lift-up type door(s) with dry-erase outer surface.

- Three (3) OnScene Solution model #70152, 10” x 6” x 7/8”, 10-30 VDC, surface mount dual red and white LED light(s) with clear lens shall be provided under cabinet. Each light shall be individually switched with a high/low intensity setting. In addition light(s) will be capable of a five (5) second delay after switching off.

- The interior of body shall be provided with a 112" wide desk top which shall be 24" deep and located approximately 30" from floor. The front edge of the desk top shall be reinforced with 2" x 2" tubing in order to support a person sitting on the edge of the desk. The desk top surface shall be fabricated of 3/16" smooth finish aluminum. It shall have a 2" vertical downward edge along front to cover the 2" x 2" reinforcement. There shall be 2-1/2" diameter holes with plastic edge grommet provided at each rear corner for wiring of future equipment located on the desk top. The desk top shall be painted dark gray with a hammer tone powder coat paint finish for a hard and durable surface.

- There shall be two (2) 34” wide desk top mounted radio/communication console provided in the interior. The radio cabinet shall provide mounting for the radios and any 12 volt control switches required in the walk-in. Radio cabinet(s) shall be constructed of 1/8" smooth finish aluminum and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray or black. A hinged access cover shall be provided on side to access equipment mounting and wiring with ¼ turn knobs to secure cover closed. Two (2) 12 volt cooling fans and 12 volt power and ground provisions shall be provided for proper installation and ventilation of radio equipment.

  - There shall be two (2) radio(s) mounted in the front face of the component console.
  - There shall be four (4) data port(s) provided in the front face of the component console.
  - There shall be four (4) 120 VAC, 20 amp, duplex straight-blade receptacle (NEMA 5-20R) outlet(s) provided in the front face of the component console.

STREETSIDE INTERIOR AREA (IS3)

- There shall be one (1) sliding pocket door(s) provided on interior of walk-in body area. Pocket door shall be fabricated from 1/8" smooth aluminum and be approximately 1-1/2" thick and hang on adjustable pocket door hardware. The door shall be painted to match the interior wall color. A stainless steel handle shall be provided on each side of door. The door shall be equipped with a pneumatic cylinder which will "over-center" to hold the door in open and closed positions.

- There shall be one (1) interior stand-up cabinet located ahead of rear bench seat. Cabinet shall be constructed of 1/8" smooth finish aluminum, and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray. Cabinet shall be approximately 34" W x 42" H x 30" D.

  - The above cabinet(s) shall have a 4" x 4" toe kick area at the base to allow for the top surface to be used as a working surface.

- The above cabinet(s) shall have a vertically hinged aluminum door(s) and painted with a hammer tone powder coat paint finish to match cabinet color choice.

- There shall be one (1) vertically adjustable shelf in each of the above cabinets. It shall have a 1.25" lip to contain items while minimizing space used.

- There shall be one (1) 34" wide x 14" high x 14" deep overhead cabinet(s) provided on interior. Cabinet(s) shall be constructed of 1/8" smooth finish aluminum, and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray.

- The above cabinet(s) shall have lift-up type door(s) with dry-erase outer surface.

- One (1) OnScene Solution model #70152, 10” x 6” x 7/8”, 10-30 VDC, surface mount dual red and white LED light(s) with clear lens shall be provided under cabinet. Each light shall be individually switched with a high/low intensity setting. In addition light(s) will be capable of a five (5) second delay after switching off.

STREETSIDE INTERIOR AREA (IS4)

WINDOW(S)

There shall be one (1) 32" wide x 22" high, double-paned insulated, horizontal sliding window(s) installed. The window shall slide open towards the front of the vehicle such that wind pressure would tend to shut the window. Each window shall have tinted automotive type safety glass mounted in an extruded aluminum frame. The frame shall have a black anodized finish. Sliding style windows shall be complete with a sliding screen.

REMOVABLE CONFERENCE TABLE

The interior body shall be provided with a removable conference table which shall be approximately 72" long x 30" wide and be supported by 30" fixed table legs. The exterior edges of the conference table shall be reinforced to support a person leaning on the edge of the table.

The tabletop surface shall be fabricated of 3/16" smooth finish aluminum. The desk top shall be painted dark gray with a hammer tone powder coat paint finish for a hard and durable surface.

Storage shall be provided for the removable conference table.

INTERIOR BENCH SEAT

The rear interior shall be provided with a 72" bench seat along the side wall (above generator). The bench seat base shall be fabricated of 1/8" aluminum to form an under seat storage compartment. A hinged door with single point "D"-ring handle and latch shall be provided at front of the seat compartment.

The seat shall be fabricated of 3/4" exterior grade plywood with 3" thick foam and Duraware heavy duty fabric covering. The seat backrest shall be approximately 12" high x 2" thick and constructed the same as the seat.

CURBSIDE INTERIOR AREA (IC1/IC2)

- There shall be two (2) magnetic whiteboard(s), approximately 30" wide x 36" tall located on wall at each work station.

- There shall be one (1) interior counter height cabinet provided under rear of the 112" desk. Cabinet shall be constructed of 1/8" smooth finish aluminum, and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray. Each cabinet shall be approximately 24" W x 28" H x 24" D.

  - The above cabinet(s) shall have a 4" x 4" toe kick area at the base to allow for the top surface to be used as a working surface.

- The above cabinet(s) shall have a vertically hinged aluminum door(s) and painted with a hammer tone powder coat paint finish to match cabinet color choice.

- There shall be one (1) vertically adjustable shelf in each of the above cabinets. It shall have a 1.25" lip to contain items while minimizing space used.

- There shall be three (3) 34" wide x 14" high x 14" deep overhead cabinet(s) provided on interior. Cabinet(s) shall be constructed of 1/8" smooth finish aluminum, and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray.

- The above cabinet(s) shall have lift-up type door(s) with dry-erase outer surface.

- Three (3) OnScene Solution model #70152, 10” x 6” x 7/8”, 10-30 VDC, surface mount dual red and white LED light(s) with clear lens shall be provided under cabinet. Each light shall be individually switched with a high/low intensity setting. In addition light(s) will be capable of a five (5) second delay after switching off.

- The interior of body shall be provided with a 72" wide desk top which shall be 24" deep and located approximately 30" from floor. The front edge of the desk top shall be reinforced with 2" x 2" tubing in order to support a person sitting on the edge of the desk. The desk top surface shall be fabricated of 3/16" smooth finish aluminum. It shall have a 2" vertical downward edge along front to cover the 2" x 2" reinforcement. There shall be 2-1/2" diameter holes with plastic edge grommet provided at each rear corner for wiring of future equipment located on the desk top. The desk top shall be painted dark gray with a hammer tone powder coat paint finish for a hard and durable surface.

- There shall be two (2) 34” wide desk top mounted radio/communication console provided in the interior. The radio cabinet shall provide mounting for the radios and any 12 volt control switches required in the walk-in. Radio cabinet(s) shall be constructed of 1/8" smooth finish aluminum and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray or black. A hinged access cover shall be provided on side to access equipment mounting and wiring with ¼ turn knobs to secure cover closed. Two (2) 12 volt cooling fans and 12 volt power and ground provisions shall be provided for proper installation and ventilation of radio equipment.

  - There shall be two (2) radio(s) mounted in the front face of the component console.
  - There shall be four (4) data port(s) provided in the front face of the component console.
  - There shall be four (4) 120 VAC, 20 amp, duplex straight-blade receptacle (NEMA 5-20R) outlet(s) provided in the front face of the component console.

CURBSIDE INTERIOR AREA (IC3)

- There shall be one (1) interior stand-up cabinet located ahead of rear bench seat. Cabinet shall be constructed of 1/8" smooth finish aluminum, and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray. Each cabinet shall be approximately 34" W x 42" H x 30" D.
  - The above cabinet(s) shall have a 4" x 4" toe kick area at the base to allow for the top surface to be used as a working surface.
- The above cabinet(s) shall have a vertically hinged aluminum door(s) and painted with a hammer tone powder coat paint finish to match cabinet color choice.
  - There shall be one (1) vertically adjustable shelf in each of the above cabinets. It shall have a 1.25" lip to contain items while minimizing space used.
- There shall be one (1) 26" wide x 14" high x 14" deep overhead cabinet(s) provided on interior. Cabinet(s) shall be constructed of 1/8" smooth finish aluminum, and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray.
- The above cabinet(s) shall have lift-up type door(s) with dry-erase outer surface.
- One (1) OnScene Solution model #70152, 10” x 6” x 7/8”, 10-30 VDC, surface mount dual red and white LED light(s) with clear lens shall be provided under cabinet. Each light shall be individually switched with a high/low intensity setting. In addition light(s) will be capable of a five (5) second delay after switching off.

CURBSIDE INTERIOR AREA (IC4)

WINDOW(S)

There shall be one (1) 32" wide x 22" high, double-paned insulated, non-sliding window(s) installed on the completed apparatus. Each window shall have tinted automotive type safety glass mounted in an extruded aluminum frame. The frame shall have a black anodized finish.

INTERIOR BENCH SEAT

The interior rear shall be provided with a 72" bench seat along the side wall. The bench seat base shall be fabricated of 1/8" aluminum to form a under seat storage compartment. A hinged door with single point "D"-ring handle and latch shall be provided at the front of the seat compartment.

The seat shall be fabricated of 3/4" exterior grade plywood with 3" thick foam and Duraware heavy duty fabric covering. The seat backrest shall be approximately 12" high x 2" thick and constructed the same as the seat.

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 DIAGNOSTIC RELAY CONTROL CENTER

The 12 volt power distribution shall be conveniently located with easy access for service. All relays and circuit breakers shall be plug-in type allowing for removal for repairs without necessitating soldering or tools. The sockets mounts for both the relays and circuit breakers shall be of a design that permits the use of standard automotive type components.

The 12 volt distribution panel shall utilize printed circuit boards mounted in high strength enclosure. Each printed circuit board shall be provided with twelve (12) heavy duty independent switching relays. Each relay shall have the ability to be configured either normally open or normally closed and be protected by a 20 amp automatic reset breaker. Each circuit will be provided with a LED for visual diagnostic.

Power distribution panel shall be located in apparatus body within a protected enclosure with removable or hinged cover.

ROCKER SWITCH PANEL

The control of the 12 volt equipment installed on chassis and body shall be centrally located in the cab. The individual rocker style switches shall be located on a separate electrical panel, complete with backlit name tags describing function of each individual switch. The back lighting shall have two (2) levels of intensity, low level lights activated when the vehicle lights or ignition switch is turned "On", and high level lights activated when individual switch is turned "On". An internally lighted rocker switch shall be furnished to the left of specified emergency lighting switches, and identified as "MASTER EMERGENCY SWITCH".

Switch circuitry shall be on a printed circuit board. The lights shall be solid state type and have a 100,000 hour life span.

The rocker switch panel shall be located in chassis/cab dash for access by the Driver. The switch module shall contain all master switches and emergency light switches. The box and faceplate shall be fabricated with black "Laminol" aluminum.

ELECTRICAL SYSTEM MANAGER

LOAD MANAGEMENT

If the total continuous electrical load exceeds the minimum continuous electrical output rating of the installed alternator(s), an automatic electrical load management system shall be required. The minimum continuous electrical loads shall not be subject to automatic load management.

The apparatus 12 volt electrical system shall be provided with a system manager for:

- Monitoring chassis battery voltage
- Shedding pre-determined electrical circuits
- Sequencing pre-determined electrical circuits
- Automatically controlling chassis engine fast-idle
- Monitor master switch and parking brake applications
- Automatically control warning light modes ("Calling-For" and "Blocking Right of Way")
- Provide low voltage alarm
- Programmable control circuits
- Remote system status indicator panel

System manager shall perform all electrical functions required by current NFPA 1901 Standards.

BATTERY MONITORING

The system manager shall monitor the vehicle battery voltage. When electrical loads exceed the alternator output and the voltage drops, the load manager shall start shutting down electrical outputs. The system shall shut down only as many outputs required to maintain the system voltage. A special indicator to show different states of the electrical system by flashing at rate proportional to the battery discharge.

LOAD SEQUENCING AND SHEDDING

The system shall be capable of sequentially switching and shedding 12 volt loads. The Master light switch starts the sequential switch when it is turned "On". Likewise turning the Master Switch "Off" will sequentially de-energize the loads.

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 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.

BATTERY SOLENOID

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

BATTERY CONDITIONER

One (1) Kussmaul model Auto Charge 1200 single battery conditioner, with 120 VAC input and 40 amp, 12 volt output shall be provided. This system shall monitor the condition of batteries and provide an electrical current at variable rates to overcome battery failure. A display shall be provided with charge indicator, remote mounted.

SHORE POWER INLET

One (1) Kussmaul 120 VAC, 20 amp Super Auto-Eject shore power inlet(s) shall be provided. The shore power connection shall automatically disengage from vehicle when chassis ignition is engaged.

The protective ground from the shoreline inlet shall be bonded to the vehicle frame.

- The outlet cover shall be white.

- The shore power plug shall be located near the Driver door area.

ENGINE COMPARTMENT LIGHT

There shall be one (1) light(s) mounted in the engine compartment with integral switch with a light output of at least 20 candlepower (250 lumens). The engine compartment light(s) shall operate only when the master battery switch is turned "On".

CAB HAZARD WARNING LIGHT

A red flashing or rotating light, located in the driving compartment, shall be illuminated automatically whenever the vehicles parking brake is not fully engaged and any of the following conditions exist:

- Any passenger or equipment compartment door is not closed.
- Any ladder or equipment rack is not in the stowed position.
- Stabilizer system is not in its stowed position.
- Powered light tower is not stowed.
- Any other device permanently attached to the apparatus is open, extended, or deployed in a manner that is likely to cause damage to the apparatus if the apparatus is moved.

Compartments and equipment meeting all of the following conditions shall be permitted to be exempt from being wired to the hazard light:

- The volume is less than or equal to 4 ft3 (0.1 m3).
- The compartment has an opening less than or equal to 144 in.2 (92,900 mm2).
- The open door does not extend sideways beyond the mirrors or up above the top of the fire apparatus.
- All equipment in the compartment is restrained so that nothing can fall out if the door is open while the apparatus is moving.
- Manually raised pole lights with an extension of less than 5 ft (1.5 m).

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

An audible alarm shall be provided for the door ajar light.

BACK-UP ALARM

The body manufacturer shall furnish and install one (1) 107 dB(A) electronic back-up alarm. Back-up alarm to actuate automatically when the transmission gear selector is placed in reverse.

INTERIOR LED LIGHTS

Six (6) OnScene Solution model #70156, 10” x 10” x 7/8”, 10-30 VDC, surface mount dual red and white LED light(s) with clear lens shall be provided throughout the vehicle. Each light shall be individually switched with a high/low intensity setting switchable at the entry door(s). In addition light(s) will be capable of a five (5) second delay after switching off.

TAIL LIGHTS

The step van body manufacturer tail lights shall be mounted and located per Federal Motor Vehicle Safety Standards, FMVSS and Canadian Motor Vehicle Safety Standards CMVSS.

MARKER LIGHTS

The body shall be equipped with all necessary clearance lights and reflectors in accordance with Federal Motor Vehicle Safety Standards (FMVSS) and Canadian Motor Vehicle Safety Standards (CMVSS) regulations. Clearance lights shall be wired to the headlight circuit of the chassis.

CAB STEP LIGHTS / GROUND LIGHTS

There shall be two (2) OnScene Solutions 9" LED light(s) installed on the vehicle capable of providing illumination at a minimum level of 2 fc (20 lx) on ground areas within 30 in. (800 mm) of the edge of the vehicle in areas designed for personnel to climb onto or descend from the vehicle to the ground level.

Lighting designed to provide illumination on areas under the driver and crew riding area exits shall be switchable but activated automatically when the exit doors are opened.

LICENSE PLATE LIGHT

One (1) license plate light shall be installed on the rear of the body. License plate light shall be wired to the headlight circuit of chassis. A fastener system shall be provided for license plate installation.

SIREN

No siren is provided with completed vehicle.

SIREN SPEAKER

No siren speaker is provided with completed vehicle.

SIDE SCENE LIGHTS

There shall be four (4) Whelen Super LED 900 series (9" x 7") recess mounted scene lights (9SC0ENZR) provided on the upper body. Light quantity shall be divided equally per side. Each light will have twenty-four LED diodes that draw a total of 4.0 amps, with 3,000 lumens. The light shall be an 8-32 degree gradient lens and chrome flange.

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 12 volt control panel in the cab.

REAR SCENE LIGHTS

Two (2) Whelen Super LED 900 series (9" x 7") recess mounted scene lights (9SC0ENZR) 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 twenty-four LED diodes that draw a total of 4.0 amps, with 3000 Lumens. The light shall be an 8-32 degree gradient lens and chrome flange.

The lights shall be switched at the 12 volt control panel in the cab.

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

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 (4) 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 (4) 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 (2) separate signaling modes during emergency operations. One (1) mode shall signal to drivers and pedestrians that the apparatus is responding to an emergency and is calling for the right-of-way. One (1) 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 (2) 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 Rear Corner Linear LED	Clear
2	Red Front Corner Linear LED	Clear
3	Blank	Clear
4	Clear Linear LED	Clear
5	Blank	Clear
6	Red Linear LED	Clear
7	Blank (Opticom if specified)	Clear
8	Blank (Opticom if specified)	Clear
9	Red Linear LED	Clear
10	Blank	Clear
11	Clear Linear LED	Clear
12	Blank	Clear
13	Red Front Corner Linear LED	Clear
14	Red Rear Corner Linear 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 12 volt control panel in the cab.

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 12 volt control panel 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 12 volt control panel 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 12 volt control panel 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

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 12 volt control panel in the cab.

ZONES B AND D - CAB INTERSECTOR LIGHT (CAB FRONT 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 12 volt control panel in the cab.

ZONES B AND D - BODY INTERSECTOR LIGHT (BODY WHEELWELL AREA)

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 12 volt control panel 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 12 volt control panel 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 12 volt control panel in the cab.

PAINT FINISH - SINGLE COLOR

The cab and body unit shall be painted with a single color of white paint.

BODY UNDERCOATING

The entire underside of body shall be sprayed with black automotive undercoating. Undercoating shall cover all areas underside of body and wheel well area to help prevent corrosion under the vehicle.

UNDERCOAT WARRANTY

The body undercoating shall have a warranty provided by the manufacturer for the lifetime of the vehicle or twenty (20) years, whichever occurs first. The warranty shall be transferable between vehicle owners. Should the undercoating material 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.

COMPARTMENT INTERIOR FINISH

The interior of all exterior body compartments shall be a "Maintenance Free" smooth unpainted finish. All body seams shall be finished with a caulk sealant for both appearance and moisture protection.

LINE VOLTAGE ELECTRICAL SYSTEM

DIESEL GENERATOR

An Onan model 8HDKAU, diesel driven generator shall be installed on the vehicle. The generator shall be installed so that fumes, vapors, heat, and vibrations do not enter the driving or crew compartment. The generator shall be rated at 8,000 watts at 120 VAC, 66 amps, single phase. Current frequency shall be stable at 60 hertz.

Generator features shall include:

- 3-cylinder diesel engine
- Permanent magnet alternator
- Digital voltage regulation with no adjustments required
- Integral enclosed muffler
- USDA approved spark arrestor
- Internal radiator
- Sound insulated cover
- Intake silencer
- Heavy-duty air cleaner
- Maintenance-free electronic governor
- Fused DC circuits
- Automotive type starter
- Overvoltage, low oil pressure, overtemp, overspeed, and overload safeties
- 10 A battery charging
- Hourmeter
- Waterproof connector for remote operation
- Electric fuel pump
- Fuel filter
- Full flow oil filter
- Automatic timed glow plugs for quick easy start

Overall size of generator shall be 36" L x 24" W x 22" H and weigh 420 lbs.

Generator shall be equipped with a high temperature automatic shutdown system and a low oil (pressure or level) automatic shutdown system.

The generator shall be installed in accordance with the generator manufacturer's requirements for ventilation and service accessibility.

If the generator is installed in a compartment and the compartment doors must be open during its operation, the generator shall be equipped with an interlock system to prevent its operation if the doors are not open, or the compartment shall be equipped with a high temperature alarm.

If the generator is installed in a compartment on a slide tray and the slide tray must be in the extended or out position during operation, an interlock shall be provided to prevent operation unless the tray is in the correct position, or the compartment shall be equipped with a high temperature alarm.

Permanently installed generators shall have readily accessible engine oil drain provisions or piping to a remote location for oil changing.

If the generator is located in a position on the vehicle where the operator cannot see the instrumentation and operate the controls while standing at ground level or positioned at a specifically designated operator station, an operating panel with the required instrumentation, start and stop controls, and other controls necessary for safe operation shall be provided at a remote operator's panel.

GENERATOR BONDING

A minimum of four (4) 16" x 2 gauge copper ground straps shall be bolted to body sub-frame and chassis sub-frame for proper bonding of high voltage system. 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.

WARRANTY PERIOD

Provided such goods are operated and maintained in accordance with Onan's written instructions, Onan warrants that the CMQD Quiet Diesel Series Generators shall be free from defects in material and workmanship for a period of two (2) years or two thousand (2,000) hours, whichever comes first, from the date of delivery to the first purchaser.

GENERATOR MOUNTING

The generator shall be mounted in a lower exterior compartment on rubber vibration isolators. The compartment shall be reinforced where necessary to hold weight of generator. A valve shall be provided on the generator oil drain outlet and piped to underside of generator compartment with flexible hose and plug. The drain shall be located where easily accessible for generator service.

FUEL SYSTEM

The generator fuel system shall be plumbed to the chassis main fuel tank. A separate fuel line shall be installed directly from the tank, not connected to the truck engine fuel line system. The generator fuel line shall be properly protected and secured inside of chassis frame. A shut-off valve shall be provided between the generator and fuel line as it enters the compartment.

Fuel lines shall be protected from chafing at all wear points. If the fuel source is shared with the apparatus engine, a separate fuel pickup system shall be provided that is arranged to ensure that the generator cannot utilize more than 75 percent of the fuel tank capacity.

STARTING SYSTEM

The generator starting system shall be powered by chassis battery system with heavy duty stranded copper cables. The starter line shall by-pass the chassis master switch to permit generator operation when the apparatus engine is not running. This starter line shall be of sufficient size for the generator, adequately protected and supported inside the chassis frame area.

EXHAUST SYSTEM

The generator exhaust system shall be equipped with a residential type muffler for maximum quieting, and black iron rigid pipe to link the generator to the muffler.

The exhaust piping and discharge shall be located or shielded to prevent thermal damage to the apparatus or equipment. The exhaust shall be piped to the exterior of the vehicle and discharged at a location away from any operator’s position.

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

Silencing devices shall be provided and shall not create exhaust back pressure that exceeds the limits specified by the engine manufacturer.

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.

GENERATOR CONTROLS

Generator controls shall be provided at the generator.

GENERATOR CONTROLS

In addition to generator controls provided at the generator, there shall be controls provided in the cab near the 12 volt control panel. The following controls shall be provided:

- One (1) pre-heat switch (if generator is diesel).
- One (1) start/stop switch.
- One (1) generator running indicator light.

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.

No main breaker will be provided, the main breaker will be supplied on the specified generator.

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.

- 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.

SHORE POWER INLET - BATTERY CHARGER

The above mentioned shore power inlet, and battery conditioner shall be specified in the 12 volt section.

SHORE POWER INLET - 60 AMP

A 60 ampere, 240 VAC, single phase shore power inlet shall provide an external shore power source for vehicle electrical circuits. A matching 60 ampere plug shall be shipped loose with the completed vehicle for County of Hawaii, Civil Defense Agency supplied external shore power source wiring after delivery.

Shore power shall be wired to the vehicle main circuit breaker in the circuit breaker distribution panel and feed all 120/240 electrical circuits.

To protect both the generator and external shore power source from back feed, a 3-way manual rotary switch shall be installed at the generator circuit breaker panel to cut-off the connection between the vehicle circuits and the generator when the external shore power source plug is in use. Switch shall be labeled "SHIP" - "OFF" - "SHORE".

SHORE POWER EXTENSION CORD

A 25' shore power extension cord shall be provided with completed unit. Extension cord shall be properly sized as to required amperage and extension cord length.

OUTLETS AND CIRCUITS

The generator and or shore power shall supply the 120/240 volt 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 outlet receptacle(s) shall be 20 amp, straight-blade (NEMA 5-20R).
- Two (2) 120 volt exterior outlets, one (1) each side rear of body.
  - The outlet receptacle(s) shall be 20 amp, straight-blade (NEMA 5-20R).

LINE VOLTAGE ELECTRICAL SYSTEM

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 panel board 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 over current 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 over current devices shall be installed to protect the line voltage electrical system components.

Power Source Protection

A main over current 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 over current 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 over current protection device, where so recommended by the power source manufacturer.

If the main over current protection device is subject to road spray, the unit shall be housed in a Type 4–rated enclosure.

Branch Circuit Overcurrent Protection

Over current 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 panel board 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 over current 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 panel board 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 over current devices.
2) Only one circuit is hardwired to the power source, which is protected by an integrated over current device.

The panel shall be visible and located so that there is unimpeded access to the panel board controls. All panel boards 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 panel board 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 prewiring 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

REAR TRIPOD SCENE LIGHTS

Two (2) Fire Research Focus; model FCA656-S50, tripod telescopic light shall be provided. The light pole shall be anodized aluminum and have a knurled twist lock mechanism to secure the extension pole in position. The extension pole shall extend 28" and rotate 360 degrees. An internal brake shall slow the extension pole during lowering. The outer pole shall be a grooved aluminum extrusion. The folding legs shall be anodized aluminum tubing with plastic endcaps. The fully extended tripod system shall exceed a height of 8' and be less than 5' when collapsed. Wiring shall extend from the pole bottom with a 4' retractile cord.

The lamphead 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. The lamphead angle of elevation shall be adjustable at a pivot in the mounting arm and the position locked with a round knurled locking knob. The lamphead shall incorporate heat-dissipating fins and be no more than 5" deep by 3 3/8" high by 10" wide. 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.

A weatherproof on-off toggle switch shall be mounted in a switchbox below the lamphead. A wire guard shall be furnished to protect the lamphead glass.

A tripod truck mount bracket set shall be provided for each light. Each set shall include a lower base plate, an upper lock with a quick release spring loaded locking pin, and a shim set.

INFORMATION TECHNOLOGY (IT) SYSTEMS

All information technology systems specified below shall be supplied, installed, and supported by the contractor including, but not limited to the design, inter-connecting wiring, and integration of all specified systems. Under no circumstances will the installation of these systems be subcontracted

The following information technology systems shall be provided and installed on completed unit as follows;

DATA RACK #1

MIDDLE ATLANTIC 16U DATA RACK

There shall be one (1) Middle Atlantic Products model # SRS4-16 slide-out style, EIA compliant 19" gangable equipment rack(s) provided and installed on completed vehicle.

Overall dimensions of rack shall be 19.06" W x 29.875" H x 18.88" D with 16 useable rack spaces and 250 lb. weight capacity.

Useable frame depth for installed components shall be 18.25", rack shall pull out 19" on integrated ball bearing slides for equipment servicing. Rack rail shall be 11-gauge steel with tapped 10-32 holes in universal EIA spacing.

Rack rail shall be finished in black e-coat with marked rack spaces. SRS rough-in pan shall be 14-gauge steel. Finish on SRS assembly shall be durable flat black powder coat.

Trim/locking panel shall lock SRS in closed position and be 11-gauge aluminum with brushed black anodized finish.

DATA RACK ENCLOSURE

Specified data rack shall have removable enclosed sides and front door with a powder coated painted finish over mounted components.

The PD-920R-NS rack mount power distribution unit is equipped with 8 circuit breaker protected rear outlets (NEMA 5-20R), and one front outlet (NEMA 5-15R). An illuminated combination power switch/circuit breaker is located on the front panel. UL listed in the US and Canada. Occupies one rack space.

DATA SWITCH, UN-MANAGED

One (1) Cisco Small Business 100 Series (or equal) 24-port 10/100/1000 unmanaged rackmount Ethernet switch shall be provided and installed in specified data rack and connected to on-board network system with the following features;

The Cisco 100 Series unmanaged switches are part of the Cisco Small Business networking solutions, that provide wire-speed Fast Ethernet and Gigabit Ethernet connectivity to connect your small business. They use less power and provide the robust, reliable connectivity your business demands, as well as support for advanced features such as quality of service (QoS), all in a switch that you can set up yourself, in minutes. A business-class, affordable network solution, Cisco 100 Series switches bring the proven reliability and investment protection of Cisco networking solutions to your small business.

ELECTRONIC PATCH PANEL

An electronic patch panel shall be provided on exterior of body. Patch panel shall be located inside a Cast Products Phone box door with hinged and gasketed door for protection from elements. The followings audio/video input/outputs shall be properly labeled on panel and supplied as follows;

1. One (1) pair RCA audio inputs
2. One (1) pair RCA audio outputs
3. One (1) RCA video inputs
4. One (1) RCA video outputs
5. Two (2) CAT 5 inputs
6. Two (2) CAT 5 outputs
7. Two (2) standard 2 pair phone jack inputs
8. Two (2) standard 2 pair phone jack outputs
9. Two (2) USB Inputs

All wiring shall terminate inside the specified data rack or cabinet.

PHONE AND NETWORK CABLING STANDARDS

If a telephone or fax machine is specified it will be connected to the central phone system from the RJ-11 wall jacks and wired through to the data rack or technical cabinet using yellow Category 6, 4 pair twisted copper cabling with yellow boot ends.

If a computer network is specified it will be connected to the network switch location, if specified from the RJ-45 wall jacks wired through to the data rack or technical cabinet using blue Category 6, 4 pair twisted copper cabling with blue boot ends. The pin pair assignments will be based on the T568B standard configuration. The termination ends in shall be RJ-45 male ends and connected to the network switch.

Only Category 6, 4 pair twisted copper cable shall be used for all computer cabling for improved transmission performance and superior immunity from external noise. All wiring shall be installed to Institute of Electrical and Electronics Engineers (IEEE) 802 standards.

All Category 6 cable must be properly installed and terminated to meet specifications. Incorrect installation practices include kinking or bending the cable too tightly will not be allowed. The cable bend radius should be no less than 4 times the outer diameter of the cable. Incorrect termination practices include untwisting the wire pairs or stripping the outer jacket back too far will not be allowed. When used for 10/100/1000 BASE-T, the maximum allowed length of a Category 6 cable is 100 meters (330 ft). All cabling shall be properly labeled at both termination ends for proper identification in future.

The running of Category 6 cabling in the same loom with any VAC wiring will not be allowed.

WIRING CHANNELS

Minimum 4" x 4" wiring channels shall be provided directly below the desk tops along the outside walls for computer, radio, and communications wiring. The top of desk tops shall have minimum 3" diameter openings that drop directly into wiring channel. The wiring channels shall have openings for future wiring installation and access. The wiring channels shall run as direct as possible to the data rack or technical cabinet location with several cross overs provided in roof structure for running wiring across body.