

DC Fire

Washington DC

Ventilation Unit- SVI#1333

Production Specification



## **LIABILITY INSURANCE**

The manufacturer 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 \$6,000,000.00 each occurrence, Aggregate of \$6,000,000.00. Garage Keepers Liability coverage of \$6,000,000.00 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 manufacturer shall post and maintain a website where the DC Fire & EMS will be able to view digital images of their apparatus as its being built. 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 unit.

## **RESPONSIBILITY OF PURCHASER**

It shall be the responsibility of the purchaser to specify the details of the apparatus in addition to the requirements in NFPA 1900 needed by the manufacturer to build the apparatus, including:

- 1) Requirements not uniquely specified in NFPA 1900, such as the type of apparatus desired.
- 2) Any features of the apparatus desired in addition to, or in excess of, the requirements in NFPA 1900.

After acceptance of the fire apparatus, the purchaser shall be responsible for ongoing training of personnel to develop and maintain proficiency regarding the proper and safe use of the apparatus and the associated equipment.

## **RESPONSIBILITY OF CONTRACTOR**

The Contractor shall provide a detailed description of the apparatus, a list of equipment to be furnished, and other construction and performance details to which the apparatus shall conform. The detailed description of the apparatus shall include, but shall not be limited to,

3. Estimated In-Service Weight,
4. Wheelbase, Turning Clearance Radius,
5. Principal dimensions, Angle of Approach, Angle of Departure,
6. Transmission, Axle Ratios.

The Contractor's detailed description shall include a statement specifically describing each aspect of the delivered apparatus that will not be fully compliant with the requirements of this standard.

The purpose of these Contractor specifications shall be to define what the contractor intends to furnish and deliver to the purchaser.

Responsibility for the apparatus and equipment shall remain with the contractor until they are accepted by the purchaser.

### **VEHICLE STABILITY SUPPLIED WITH CAB/CHASSIS**

The cab/chassis shall be equipped with a stability control system. The system shall have, at a minimum, a steering wheel position sensor, a vehicle yaw sensor, a lateral accelerometer and individual wheel brake controls.

### **FIRE APPARATUS PERFORMANCE**

The fire apparatus shall meet the requirements of this standard at elevations of 2000 ft (600 m) above sea level.

The fire apparatus shall meet all the requirements of this standard while stationary on a grade of 6 percent in any direction.

The fire apparatus shall meet the requirements of this standard in ambient temperature conditions between 32°F (0°C) and 110°F (43°C).

### **HIGHWAY PERFORMANCE**

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

- 7) Accelerating from 0 to 35 mph (55 km/hr) within 25 seconds on a 0 percent grade
- 8) Attaining a speed of 50 mph (80 km/hr) on a 0 percent grade
- 9) Maintaining a speed of at least 20 mph (32 km/hr) on any grade up to and including 6 percent

The maximum top speed of fire apparatus with a GVWR over 26,000 lb (11,800 kg) shall not exceed either 68 mph (109 km/hr) or the manufacturer's maximum fire service speed rating for the tires installed on the apparatus, whichever is lower.

If the combined water tank and foam agent tank capacities on the fire apparatus exceed 1250 gal (4732 L), or the GVWR of the vehicle is over 50,000 lb (22,680 kg), the maximum top speed of the apparatus shall not exceed either 60 mph (95 km/hr) or the manufacturer's maximum fire service speed rating for the tires installed on the apparatus, whichever is lower.

### **SERVICEABILITY**

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

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

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

## **FIRE APPARATUS DOCUMENTATION**

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

10) The manufacturers record of apparatus construction details, including the following documents:

- a) Owner's name and address
  - b) Apparatus manufacturer, model, and serial number
  - c) Chassis make, model, and serial number
  - d) GAWR of front and rear axles and GVWR
  - e) Front tire size and total rated capacity in pounds (kilograms)
  - f) Rear tire size and total rated capacity in pounds (kilograms)
  - g) Chassis weight distribution in pounds (kilograms) with water and manufacturer-mounted equipment (front and rear)
  - h) Engine make, model, serial number, rated horsepower and related speed, and governed speed; and if so equipped, engine transmission PTO(s) make, model, and gear ratio
  - i) Type of fuel and fuel tank capacity
  - j) Electrical system voltage and alternator output in amps
  - k) Battery make, model, and capacity in cold cranking amps (CCA)
  - l) Chassis transmission make, model, and serial number; and if so equipped, chassis transmission PTO(s) make, model, and gear ratio
  - m) Ratios of all driving axles
  - n) Maximum governed road speed
  - o) Pump make, model, rated capacity in gallons per minute (liters per minute where applicable), maximum discharge pressure capability rating, and serial number
  - p) Pump transmission make, model, serial number, and gear ratio
  - q) Auxiliary pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
  - r) Water tank certified capacity in gallons or liters
  - s) Foam tank (if provided) certified capacity in gallons (liters)
  - t) Aerial device type, rated vertical height in feet (meters), rated horizontal reach in feet (meters), and rated capacity in pounds (kilograms)
  - u) Paint manufacturer and paint number(s)
  - v) Company name and signature of responsible company representative
  - w) Weight documents from a certified scale showing actual loading on the front axle, rear axle(s), and overall fire apparatus (with the water tank full but without personnel, equipment, and hose)
- 2) Certification of compliance of the optical warning system (*see 10.7.17*)
  - 3) Siren manufacturer's certification of the siren (*see 10.8.1.1*)
  - 4) Written load analysis and results of the electrical system performance tests (*see 10.13.1 and Section 10.14*)
  - 5) Certification of slip resistance of all stepping, standing, and walking surfaces (*see 12.6.4.5*)
  - 6) If the apparatus has a fire pump, or a wildland fire pump, the pump manufacturer's certification of suction capability (*see 13.2.4.1 or 15.2.4.1*)
  - 7) If the apparatus is equipped with a fire pump or a wildland fire pump and special conditions are specified by the purchaser, the pump manufacturer's certification of suction capacity under the special conditions (*see 13.2.4.2 or 15.2.4.2*)
  - 8) If the apparatus has a fire pump, or a wildland fire pump a copy of the apparatus manufacturer's approval for stationary pumping applications (*see 13.3.1 or 15.3.1*)
  - 9) If the apparatus has a fire pump, the engine manufacturer's certified brake horsepower curve for the engine furnished, showing the maximum governed speed (*see 13.3.2.2*)
  - 10) If the apparatus has a fire pump or a wildland fire pump, the pump manufacturer's certification of the hydrostatic test (*see 13.5.2.2 or 15.5.2.2*)

- 11) If the apparatus has a fire pump with a maximum discharge pressure capability rating that exceeds the hydrostatic test pressure of 13.5.2.1, the pump manufacturer's certification of the hydrodynamic test
- 12) If the apparatus has a fire pump or a wildland fire pump, the certification of inspection and test for the fire pump (see 13.13.1.1.5 or 13.13.1.2.4 or 15.13.1.2.4 as applicable)
- 13) If the apparatus is equipped with an auxiliary pump, the apparatus manufacturer's certification of the hydrostatic test (see Section 14.13)
- 14) When the apparatus is equipped with a water tank, the certification of water tank capacity (see Section 17.6)
- 15) If the apparatus has an aerial device, the certification of inspection and test for the aerial device (see Section 20.31)
- 16) If the apparatus has an aerial device, all the technical information required for inspections to comply with NFPA 1910
- 17) If the apparatus has a foam proportioning system, the foam proportioning system manufacturer's certification of accuracy (see 18.10.4.2) and the final installer's certification the foam proportioning system meets this standard (see 18.11.2)
- 18) If the system has a CAFS, the documentation of the manufacturer's pre delivery tests (see Section 19.9)
- 19) If the apparatus has a line voltage power source, the certification of the test for the power source (see 21.15.7.2)
- 20) If the apparatus is equipped with an air system, air tank certificates (see 23.5.1.2), the SCBA fill station certification (see 23.9.6), and the results of the testing of the air system installation (see 23.14.5 and 23.15.4)
- 21) For wildland fire apparatus, or structural apparatus without stability control, certification of vehicle side slope stability, including the weight distribution assumed for the calculations or as loaded on the vehicle for the tilt table test (see 7.14.3)
- 22) Any other required manufacturer test data or reports

## **OPERATIONS AND SERVICE DOCUMENTATION**

The contractor shall deliver with the fire apparatus 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:

- 23) Manufacturer's name and address
- 24) Country of manufacture
- 25) Source for service and technical information
- 26) Parts replacement information
- 27) Descriptions, specifications, and ratings of the chassis, pump (if applicable), and aerial device (if applicable)
- 28) 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
- 29) Lubrication charts
- 30) Operating instructions for the chassis, any major components such as a pump or aerial device, and any auxiliary systems
- 31) Precautions related to multiple configurations of aerial devices, if applicable
- 32) Instructions regarding the frequency and procedure for recommended maintenance
- 33) Overall apparatus operating instructions
- 34) Safety considerations

- 35) Limitations of use
- 36) Inspection procedures
- 37) Recommended service procedures
- 38) Troubleshooting guide
- 39) Apparatus body, chassis and other component manufacturer's warranties
- 40) Special data required by this standard
- 41) 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 - Online @ SVI Trucks . com**

The vehicle construction details and the operations and service documentation as required per NFPA 1900 latest edition shall be provided online. These manuals shall be divided into sections for ease of reference.

#### **FIRE APPARATUS SAFETY GUIDE**

A Fire Apparatus Safety Guide published by Fire Apparatus manufacturer's Association shall be provided with delivered vehicle. This manual includes essential safety information for fire fighters, fire chiefs, apparatus mechanics, and fire department safety officers. The guide is applicable to municipal, wildland, and airport fire fighting apparatus manufactured on either custom or commercial chassis.

#### **STATEMENT OF EXCEPTIONS**

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

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

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

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

**CARRYING CAPACITY**

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

The estimated in-service weight shall include the following:

- 46. The chassis, body and tank(s)
- 47. Full fuel, lubricant, and other chassis or component fluid tanks or reservoirs
- 48. Full water and other agent tanks
- 49. \*250 lb (114 kg) in each seating position
- 50. Fixed equipment such as pumps, aerial devices, generators, reels and air systems as installed
- 51. Ground ladders, suction hose, designed hose load in their hose beds and on their reels
- 52. An allowance for miscellaneous equipment that is the greatest of the following:
  - a) The values shown for items 1 - 7
  - b) A purchaser-provided list of equipment to be carried with weights
  - c) A purchaser-specified miscellaneous equipment allowance

The manufacturer shall engineer and design the fire apparatus such that the completed apparatus, when loaded to its estimated in-service weight, with all movable weights distributed as close as is practical to their intended in-service configuration, does not exceed the GVWR.

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

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 unequipped fire apparatus in feet and inches (meters), the length of the completed fire apparatus in feet and inches (meters), and the GVWR in tons (metric tons).

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.

Apparatus Type	Equip. Storage Area	Apparatus Size	Equipment Allowance	
			lb.	kg.
Special Service Fire Apparatus	Minimum of 120 cu ft (3.4 cu mt) of enclosed compartmentation.	10,000 lb to 15,000 lb (4,500 kg to 7,000 kg) GVWR	2,000	910
		15,001 lb to 20,000 lb (7,001 kg to 9,000 kg) GVWR	2,500	1,135
		20,001 lb to 30,000 lb (9,001 kg to 14,000 kg) GVWR	3,000	1,350
		30,001 lb to 40,000 lb (14,001 kg to 18,000 kg) GVWR	4,000	1,800
		40,001 lb to 50,000 lb	6,000	2,700

		(18,001 kg to 23,000 kg) GVWR		
		50,001 lb to 60,000 lb (23,001 kg to 27,000 kg) GVWR	8,000	3,600
		60,001 lb and up (27,001 kg) GVWR	10,000	4,500

**TESTING**

**ROAD TEST**

Each apparatus shall be tested by the manufacturer before delivery to verify that it meets the following criteria;

Tests shall be conducted at a location and in a manner that does not violate local, state or provincial, or federal traffic laws. Tests shall be conducted on a dry, level, paved surface that is free of loose material, oil, or grease. Tests shall be conducted with the water and foam tanks full (water or product).

The apparatus shall accelerate from 0 to 35 mph (55 km/hr) within 25 seconds. The apparatus shall attain a speed of 50 mph (80 km/ hr).

The auxiliary braking system, if so equipped, shall function as intended by the auxiliary braking system manufacturer.

The air service brakes shall bring the apparatus to a complete stop from a speed of 20 mph (32.2 km/hr) in a distance not exceeding 35 ft (10.7 m).

The hydraulic service brakes shall bring the apparatus to a complete stop from a speed of 30 mph (48.2 km/hr) in a distance not exceeding 88 ft (26.8 m).

**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:

53) Documentation of the electrical system performance tests

54) 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 1900 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:

- 55) The power source output voltage, frequency and amperes
- 56) The prime mover's oil pressure, water temperature and transmission temperature, if applicable
- 57) The power source hydraulic fluid temperature, if applicable
- 58) 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  $\pm 10\%$  of the voltage stated on the power source specification label during the entire test. Frequency shall be maintained within  $\pm 3$  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 21.15.7.3.11.2, 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 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:

- 4) Isolate the power source from the panel board and disconnect any solid state low voltage components
- 5) Connect one lead of the dielectric tester to all the hot and neutral buses tied together
- 6) Connect the other lead to the fire apparatus frame or body
- 7) Close any switches and circuit breakers in the circuit(s)
- 8) 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 DC Fire & EMS on all warranty work.

### **GENERAL LIMITED WARRANTY - THREE (3) YEARS**

The vehicle shall be free of defects in material and workmanship for a period of three (3) years or 50,000 miles (or 80,467 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.

### **STRUCTURAL WARRANTY - TEN (10) YEARS**

The body shall be free of structural or design failure or workmanship for a period of ten (10) years, or 100,000 miles (or 160,934 kilometers), whichever occurs first, starting thirty (30) days after the original invoice date.

### **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.

### **PAINT LIMITED WARRANTY - TEN (10) YEARS**

The body shall be free of bubbling or peeling as a result of a defect in the method of manufacture for a period of ten (10) years or 100,000 miles (or 160,934 kilometers), whichever occurs first, starting thirty (30) days after the original invoice date. **Pro-rated warranties will not be acceptable.**

### **GRAPHICS LIMITED WARRANTY**

The 3M graphics installation shall be warranted for a period of two (2) years. The 3M materials installed on completed vehicle shall be warranted for seven (7) years. The 3M Diamond grade film (if specified) shall be warranted for ten (10) years.

### **CONSTRUCTION PERIOD**

The completed vehicle shall be delivered within six hundred (600) days after pre-construction meeting and receipt and approval of any signed change orders from DC Fire & EMS.

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 written notice to DC Fire & EMS as to delays and to what extent these delays have in completing vehicle within the stated construction time period.

### **OVERALL HEIGHT REQUIREMENT**

There is no overall height (OAH) restriction for this vehicle.

### **OVERALL LENGTH REQUIREMENT**

There is no overall length (OAL) restriction for this vehicle.

### **ANGLE OF APPROACH**

The angle of approach for this vehicle shall not be less than eight (8) degrees when it is loaded to the estimated in-service weight as specified by the current edition of NFPA 1900.

### **ANGLE OF DEPARTURE**

The angle of departure for this vehicle shall not be less than eight (8) degrees when it is loaded to the estimated in-service weight as specified by the current edition of NFPA 1900.

### **PRE-CONSTRUCTION CONFERENCE**

A pre-construction conference shall be required at the Contractor's factory for four (4) personnel from the DC Fire & EMS to finalize all construction details prior to manufacturing.

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

### **FINAL INSPECTION CONFERENCE**

A final inspection conference shall be required at the Contractor's factory for four (4) personnel from the DC Fire & EMS 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.

## **CAB CHASSIS SPECIFICATIONS**

### **Base Vehicle**

F5H Ford F550 XL, 2-Door Regular Cab, 4 x 4

### **Packages**

660A Order Code 660A

*Includes:*

- *Transmission: TorqShift 10-Speed Automatic Includes neutral idle and selectable drive modes: normal, tow/haul, eco, deep sand/snow and slippery.*
- *Wheels: 19.5" x 6" Argent Painted Steel Hub covers/center ornaments not included.*
- *Radio: AM/FM Stereo w/MP3 Player Includes 4 speakers.*
- *SYNC Communications & Entertainment System Includes enhanced voice recognition, 911 Assist, 4.2" LCD center stack screen, AppLink, 1 smart-charging USB-C port and steering wheel audio controls.*

### **Powertrain**

99T Engine: 6.7L 4V OHV Power Stroke V8 Turbo Diesel B20

*Includes Diesel Exhaust Fluid (DEF) tank, intelligent oil-life monitor and manual push-button engine-exhaust braking.*

*Includes:*

- *Dual 78-AH 750 CCA Batteries*

44G Transmission: TorqShift 10-Speed Automatic

*Includes neutral idle and selectable drive modes: normal, tow/haul, eco, deep sand/snow and slippery.*

X8L Limited Slip w/4.88 Axle Ratio

68M GVWR: 19,500 lb Payload Plus Upgrade Package

*Includes upgraded frame, rear-axle and low deflection/high capacity springs. Increases max RGAWR to 14,706.*

### **Seats & Seat Trim**

1 Cloth 40/20/40 Split Bench Seat

*Includes center armrest, cupholder, storage and driver's side manual lumbar.*

## Other Options

PAINT Monotone Paint Application

STDRD Radio: AM/FM Stereo w/MP3 Player

*Includes 4 speakers.*

*Includes:*

- SYNC Communications & Entertainment System Includes enhanced voice recognition, 911  
4.2" LCD center stack screen, AppLink, 1 smart-charging USB-C port and steering wheel  
controls.

Assist,  
audio

90L Power Equipment Group

*Deletes passenger side lock cylinder. Includes upgraded door-trim panel.*

*Includes:*

- Accessory Delay

- Advanced Security Pack

*Includes SecuriLock Passive Anti-Theft System (PATS) and inclination/intrusion sensors.*

- Manual Telescoping Folding Trailer Tow Mirrors

*Includes power/heated glass and heated convex spotter mirror.- MyKey, Includes owner controls feature.*

- MyKey

*Includes owner controls feature.*

- Power Front & Rear Side Windows

*Includes 1-touch up/down driver/passenger window.*

- Power Locks

- Remote Keyless Entry

41H Engine Block Heater

41P Transfer Case Skid Plates

61J 6-Ton Hydraulic Jack

62R Transmission Power Take-Off Provision

*Includes transmission mounted live drive and stationary mode PTO.*

98R Operator Commanded Regeneration (OCR)

67B 397 Amp Alternators

872 Rear View Camera & Prep Kit

*Pre-installed content includes cab wiring and frame wiring to the rear most cross member. Upfitters kit includes camera with mounting bracket, 20' jumper wire and camera mounting/aiming instructions.*

41A Rapid-Heat Supplemental Cab Heater

*Includes:*

- 397 Amp Alternators

43C 110V/400W Outlet

*Includes 1 in-dash mounted outlet.*

## Fleet Options

- 47J Fire/Rescue Prep Pkg w/EPA Special Emissions (LPO)  
Requires valid FIN code.  
*Includes 7,000 lbs. max front springs/GAWR rating for configuration selected. Incomplete vehicle package - requires further manufacture and certification by a final stage manufacturer. Ford urges Fire/Rescue vehicle manufacturers to follow the recommendations of the Ford Incomplete Vehicle Manual and the Ford Truck Body Builders Layout Book (and pertinent supplements).*  
*NOTE 1: Stationary Elevated Idle Control (SEIC) has been integrated into the engine control module.*  
*NOTE 2: Engine calibration significantly reduces the possibility of depower mode when in stationary PTO operation.*  
*NOTE 3: Operator commanded regen allowed down to 30% of DPF filter full, instead of 100%. NOTE 4: Must meet the definition of an emergency vehicle, an Ambulance or Fire Truck per 40 CFR 86.1803.01 in the federal register. NOTE 5: California Code of Regulations allows for the sale of federally certified emergency vehicles in California.*  
*Includes:*  
*- 397 Amp Alternator*  
*- Operator Commanded Regeneration*
- 525 Steering Wheel-Mounted Cruise Control (LPO)  
Requires valid FIN code.
- 942 Daytime Running Lamps (DRL) (LPO)  
Requires valid FIN code.  
*The non-controllable 942 Daytime Running Lamps (DRL) replace the standard Daytime Running Lamps (DRL) on/off cluster controllable.*
- 63G Bright Grille (LPO)  
Requires valid FIN code.
- 17F XL Decor Group (LPO)  
*Includes:*  
*- Chrome Front Bumper*
- E4\_02 Vermillion Red  
Requires Valid FIN Code.

## Emissions

- 425 50-State Emissions System

## Interior Colors

- 1S\_02 Medium Earth Gray

## Warranty

- Bumper to Bumper: 3 years / 36,000 miles  
Powertrain: 5 years / 60,000 miles  
Corrosion (Perforation only): 5 years / Unlimited miles  
Roadside Assistance Program: 5 years / 60,000 miles  
Diesel: 5 year / 100,000 miles

## Wheels & Tires

- Tires: 225/70Rx19.5G BSW Traction (TGK)  
*Includes 4 traction tires on the rear and 2 traction tires on the front. Not recommended for over the road applications; could incur irregular front tire wear and/or NVH.*
- Wheels: 19.5" Aluminum  
*Hub covers/center ornaments not included.*

## **CAB TO AXLE DIMENSION**

**Cab to axle will be 108".**

## **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 unequipped vehicle in feet and inches (meters), the length of the completed vehicle in feet and inches (meters to nearest 1/10th), and the GVWR in tons (metric tons).

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

### **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.

### **SEAT BELT WARNING - FAMA06/07**

A safety sign FAMA06 shall be visible from each seat that is not equipped with occupant restraint and therefore not intended to be occupied while the vehicle is in motion.

A safety sign FAMA07, which warns of the importance of seat belt use, shall be visible from each seat that is intended to be occupied while the vehicle is in motion.

### **EQUIPMENT MOUNTING FAMA10**

A safety sign FAMA10, which warns of the need to secure items in the cab, shall be visible inside the cab.

### **FIRE SERVICE TIRES - FAMA12**

A safety sign FAMA12, which warns of the special requirements for fire service-rated tires, shall be visible to the driver entering the cab of any apparatus so equipped.

### **HELMET WARNING - FAMA15**

A safety sign FAMA15, which warns not to wear helmets while the vehicle is in motion, shall be visible from each seat that is intended to be occupied while the vehicle is in motion.

### **CLIMBING METHOD - FAMA23**

A safety sign FAMA23, which warns of the proper climbing method, shall be visible to personnel entering the cab and at each designated climbing location on the body.

### **REAR STEP CROSSWALK WARNING - FAMA24**

A safety sign FAMA24, which warns personnel not to ride on the vehicle, shall be located at the rear step areas and at any cross walkways.

### **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 REPLACEMENT**

**A Diversified products push bumper painted job color shall be installed.**

## **AIR INTAKE SYSTEM**

An air filter shall be provided in the engine's air intake system by the body builder. Air inlet restrictions shall not exceed the engine manufacturer's recommendations.

The air inlet shall be equipped with a means of separating water and burning embers from the air intake system.

This requirement shall be permitted to be achieved by either of the following methods:

9. Provision of a device such that burning particulate matter larger than 0.039 in. (1.0 mm) in diameter cannot reach the air filter element.
10. Provision of a multi screen ember separator capable of meeting the test requirements defined in the Parker Hannafin, Racor Division, publication LF 1093-90, *Ember Separation Test Procedure*, or an equivalent test.

## **EXHAUST TAILPIPE MODIFICATION**

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

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

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

## **NEDERMAN EXHAUST ANCHOR PLATE**

A Nederman exhaust anchor plate shall be provided and mounted in fender area near chassis engine exhaust tail pipe for use with Nederman exhaust extraction system. Center of anchor plate to center of exhaust pipe will be customer specified. The area must be clear of any obstructions to allow for install of anchor plate.

**Ship Anchor Loose.**

## **NEDERMAN AUTO START/STOP RADIO**

A Nederman ignition auto start **model #89299047 Gen 1B** auto start/stop radio transmitter for vehicle exhaust system shall be provided and installed.

WARNING LIGHT: CHASSIS CAB

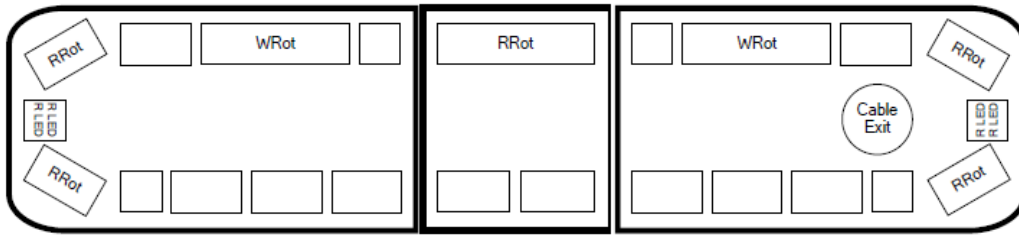
Warning Lights: Chassis Cab, Light, Whelen

## **ZONE A - FRONT WARNING LIGHTS, UPPER**

**There shall be one (1) Whelen SUBKT85" Freedom IV LED lightbar** permanently mounted to the cab roof. The lightbar configuration shall be as follows; **Ensure Photocell in Lightbar.**

All clear lights shall shut down when the parking brake is set to comply with "Blocking" mode requirements as outlined in NFPA 1900.

Configuration



The lightbar(s) shall be separately controlled at specified siren control head in cab.

ZONE A - FRONT WARNING LIGHTS

There shall be two (2) Whelen M6 linear super-LED Light(s) with full-fill optic provided, one (1) each side. The light head shall include an integral flasher with programmable flash patterns and Hi/Lo intensities.

Each Light shall have:

- Red LEDs
- Red Lens

Each light shall have a chrome flange.

- Flash Pattern shall be (factory default) Action Scan.
- The Low Power option will **NOT** be provided for the above lighting group.

The lights shall be controlled at the multiplex display(s) in the cab.

ZONES B AND D - CAB INTERSECTOR LIGHT (CAB FRONT CORNERS)

There shall be two (2) Whelen M6 linear super-LED Light(s) with full-fill optic provided, one (1) each side. The light head shall include an integral flasher with programmable flash patterns and Hi/Lo intensities.

Each Light shall have:

- Red LEDs
- Red Lens

Each light shall have a chrome flange.

- Flash Pattern shall be (factory default) Action Scan.
- The Low Power option will **NOT** be provided for the above lighting group.

The lights shall be controlled at the multiplex display(s) in the cab.

## **DOOR TRACER LIGHTS**

**Add a Whelen Tracer WeCanX Duo under each cab entry door (2). Feature red and white lights to be controlled by the Core Controller. Size appropriately.**

The Lights shall be controlled at the Switch Panel in Cab.

## **CAB STEP LIGHTS**

Two (2) (one each side) **Whelen OS light** installed on the vehicle

## **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.

## **CAB HAZARD WARNING LIGHT**

A Truck-Lite red LED flashing light shall be provided and located in the driving compartment and 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 ft<sup>3</sup> (0.1 m<sup>3</sup>).
- The compartment has an opening less than or equal to 144 in.<sup>2</sup> (92,900 mm<sup>2</sup>).
- 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."

In addition, label shall be in both English/French for units built for Canada; "*Ne pas déplacer l'engin lorsque la lumière est allumée.*"

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

## **SEATING MODIFICATION**

The center portion of the 40/20/40 split bench seat shall be removed to accommodate the installation of the specified console.

## **SEAT BELT COLOR AND MOUNTING**

The seat belt webbing color requirement of 11.1.3.3 shall not apply to vehicles with a GVWR of 19,500 lb (8,845 kg) or less.

Section 11.1.3.3 of the NFPA 1900 Standards, requires all seat belt webbing in cab to be bright red or bright orange in color, and section 11.1.3.4 the buckle portion of the seat belt shall be mounted on a rigid or semi rigid stalk such that the buckle remains positioned in an accessible location.

## **SEAT BELT WEB LENGTH - COMMERCIAL CAB**

The chassis seat belt web length as supplied by the commercial chassis manufacturer will not be compliant to NFPA Standards 11.1.3.1 and 11.1.3.2.

Sections 11.1.3.1 and 11.1.3.2 of the NFPA 1900 standards, require the effective seat belt web length for a Type 1 lap belt for pelvic restraint to be a minimum of 60", and a Type 2 pelvic and upper torso restraint-style seat belt assembly to be a minimum of 110".

Per DC Fire & EMS specification for a commercial chassis, this emergency vehicle may not have seat belts of this required length. These belts may not provide sufficient length for large firefighters in bunker gear. This specification for an emergency fire apparatus for these seat belts shall be non-compliant to NFPA 1900 standards, effective at the time of order.

## **SEAT BELT MONITORING SYSTEM - COMMERCIAL CAB**

Per DC Fire & EMS specification for a commercial chassis, this emergency vehicle may not have a seat belt monitoring system. Without this device, the driver must manually determine that all occupants are seated and belted before the apparatus is placed in motion. This specification for an emergency fire apparatus for the seat belt monitoring system shall be non-compliant to NFPA 1900 standards, effective at the time of order.

Section 11.1.3.8 of the NFPA 1900 Standards, requires that a seat belt warning system be provided. The seat belt warning device is intended to assist the driver or officer in determining whether all occupants are seated and belted before the vehicle is driven.

## **SIX (6) – LED TIRE PRESSURE VISUAL INDICATORS**

Each tire valve stem shall be equipped with an LED Tire Alert (or equal), heavy duty valve cap LED indicator that indicates proper tire pressure. The LED Tire Alert valve cap is self-calibrating. When the cap is mounted on the valve stem the first time, it will memorize that tire pressure, and can be set to recognize a drop in pressure as little as 6 psi. It can be checked for functionality and battery condition by simply unscrewing the cap. If it is in working condition, it will immediately start blinking.

## **HELMET STORAGE**

### **HELMET STORAGE, DRIVER POSITION**

Helmet storage shall be the responsibility of DC Fire & EMS in specified cab area.

A safety sign FAMA15, which warns not to wear helmets while the vehicle is in motion, shall be visible from each seat that is intended to be occupied while the vehicle is in motion.

## **HELMET STORAGE, OFFICER POSITION**

Helmet storage shall be the responsibility of DC Fire & EMS in specified cab area.

A safety sign FAMA15, which warns not to wear helmets while the vehicle is in motion, shall be visible from each seat that is intended to be occupied while the vehicle is in motion.

## **CAB TESTING CERTIFICATION**

Section 11.3.2 of the latest edition NFPA 1900 standards, require the cabs on apparatus with a GVWR greater than 26,000 lb. (11,800 kg) shall meet the requirements of one of the following sets of standards:

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

Per DC Fire & EMS specification for a commercial chassis, this emergency vehicle may not have a cab that has been tested to these standards. This specification for an emergency fire apparatus for the cab testing requirements shall be non-compliant to NFPA 1900 standards, effective at the time of the bid opening.

## **EXTRA IGNITION KEY**

**Two (2) Additional ignition key will be provided for a total of four (4).**

## **CAB PAINT**

The finish paint and color as provided from the cab/chassis manufacturer shall be provided. Cab shall not be repainted.

(Note: Most departments do NOT find that the fleet paint finish from a commercial cab/chassis manufacturer is acceptable. The Body Builder will NOT be responsible for paint quality and finish issues.)

## **REPAINT CAB**

The cab exterior (door jambs not painted unless specified otherwise) shall be re-painted with PPG Delfleet Evolution paint. NO Door jambs painted. **Match paint break in folder.**

**DC RED FLNA 3028**  
**WHITE FLNA 4006**

## **CHASSIS PAINT WARRANTY**

The portion of the cab re-painted shall be provided with a ten (10) year, non-prorated paint warranty to the original owner. The warranty shall be provided by PPG Inc. A warranty sheet with all conditions and maintenance procedures shall be provided with the delivered vehicle.

### **REFLECTIVE STRIPE - CAB DOOR INTERIOR**

Any door of the apparatus designed to allow persons to enter or exit the apparatus shall have at least 96 in.2 (62,000 mm2) of retroreflective material affixed to the inside of the door.

The inside of each cab door shall have 4" Chevron style 3M Scotchlite 680 series graphic film.

This reflective chevron stripe shall alternate red and yellow in color.

### **CAB INTERIOR COMPONENT PAINT COLOR, OEM SUPPLIED**

Powder coat shall be hammertone black. Cardinal T013-BK62

### **CAB RUNNING BOARDS**

The chassis shall be provided with running boards each side, below the cab doors. The running boards shall be constructed of aluminum 3003H-14 alloy NFPA nonskid compliant tread plate.

### **CAB STEP LIGHTS**

Two (2) (one each side) **Whelen OS** light(s) installed on the vehicle

### **MUDFLAPS**

There shall be 1/4" rubber mudflaps with logo provided and installed behind rear axle tires to prevent throwing road debris and lower road spray.

### **ROAD EMERGENCY SAFETY KIT**

The completed unit shall be supplied with one (1) set of three (3) dual faced reflective triangles, and three (3) warning flares complete with storage case per DOT requirements.

One (1) 2.5 lb. ABC type vehicle fire extinguisher with bracket per DOT requirements shall be provided and mounted inside cab area.

### **FUEL FILL**

There shall be one (1) chassis supplied fuel fill mounted above the streetside fender, behind the rear axle.

### **FUEL FILL CAP**

**There shall be a Protect O Seal fuel cap located on chassis fuel tank. The fuel cap will be green colored. A permanent label shall be provided with the text "DIESEL FUEL ONLY".**

#P3432819 1.00 PC

### **DEF FLUID FILL**

The DEF fluid fill shall be as supplied by commercial cab/chassis manufacturer and located between the cab and body.

## DEF TANK RELOCATION

The cab/chassis supplied DEF tank shall be re-located as required for installation of specified generator or pump. Kit shall include OEM brackets, fasteners, harness extension, (4) connectors, and installation manual.

## BODY

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 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.

Body design shall be a custom flatbed style body with forward transverse compartment and rear area for Super Vacuum engine driven PPV ventilation fan per following specification

**Add a Heavy duty fully welded, gusseted, steel tubular structure that is bolted to the rearmost portion of the frame, just beneath the rearmost portion of the body. The structure shall extend past the body on both sides so that it is in line with the rubrails. Add four (4) bumper as shown in provided photo, and will be Line-X or comparable and Black in color.**

**Clarify: The Cover Rear of body below aluminum deck with treadplate similar to Oklahoma City.**

## EXTERIOR ALUMINUM BODY

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

The body compartment floors and exterior panels shall be constructed with not less than 3/16" (.187) aluminum 3003H-14 smooth plate. Lighter gauge sheet metal will not be acceptable in these areas, No Exceptions.

The compartments shall be an integral part of the body construction. Compartment floors shall be preformed, then positioned in body and welded into final position. Compartment floors shall have a "sweep-out" design with door opening threshold positioned lower than compartment floor, permitting easy cleaning of compartments. Angles, lips, or door moldings are not acceptable in the base of compartment door opening.

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

## BODY SUBFRAME

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

The body subframe shall be constructed from 6061T6 aluminum alloy tubing. Subframe shall consist of two (2) 2" x 4" x 1/4" aluminum tubes minimum, the same width as the chassis frame rails. Welded to this tubing shall be cross members of 2" x 4" x 1/4" aluminum. Smaller dimension, lighter gauge tubing or angle material subframe shall not be accepted.

These cross members shall extend the full width of the body to support the compartments. Cross members shall be located at front and rear of the body, below compartment divider walls, and in front and rear of wheel well opening. Additional aluminum cross members shall be located on 16" centers, or as necessary to support walkway or heavy equipment.

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

### **BODY MOUNTING**

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

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

### **REAR TOW EYES**

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

### **TRAILER HITCH**

A 2" Square Class IV weight carrying capacity rear hitch receiver shall be provided below the rear bumper. The receiver shall be attached to chassis frame with heavy duty steel frame work with a black hammertone powder coat paint finish.

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

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

Without the use of a "weight distribution" ball hitch the Class IV receiver shall have a capacity of 10,000 lbs. gross trailer weight and a maximum tongue weight of 1,000 lbs. With the use of a "weight distribution" ball hitch the Class IV receiver shall have a capacity of 12,000 lbs. gross trailer weight and a maximum tongue weight of 1,200 lbs.

### **TRAILER ELECTRICAL RECEPTACLE**

For hydraulic brake equipped or electric brake equipped trailer towing capability, a primary electrical receptacle shall be provided near the hitch point and shall match the umbilical cable specified. Receptacle shall be a 7-Way Blade Type socket, the same as used on most Light Duty Trucks and RV's.

## **TRAILER AUXILIARY ELECTRICAL RECEPTACLE**

An auxiliary electrical receptacle shall be provided near the hitch point and shall match the umbilical cable specified for optical warning lights. Receptacle shall be a 7-Way Pin Type Socket, ISO3731 compliant with a reverse ground terminal.

## **RECEIVER WITH TRAILER BALL**

No hitch receiver with trailer ball will be provided with completed unit.

## **BODY PAINT SPECIFICATIONS**

### **BODY PAINT PREPARATION**

After the body and components have been fabricated they shall be disassembled so when vehicle is complete there shall be finish paint beneath the removable components. The body shall be removed from chassis during the paint process to insure proper paint coverage. The body and components shall be metal finished as follows to provide a superior substrate for painting.

The exterior (and interior, if painted) body shall undergo a thorough cleaning process starting with a biodegradable phosphoric acid solution to begin the etching process followed by a complete clear water rinse. The next step shall consist of a chemical conversion coating applied to seal the metal substrate and become part of the metal surface for greater film adhesion.

All bright metal fittings, if unavailable in stainless steel or polished aluminum, shall be chrome plated. Iron fittings shall be copper under plated prior to chrome plating.

### **PAINT PROCESS**

The paint process shall follow the strict standards set forth by PPG Industries guidelines. Painters applying PPG products will be PPG Certified Commercial Technicians, and re-certified every two (2) years. The body shall go through the following paint process;

- 13) Clean bare metal with a wax and grease remover using low lint rags.
- 14) Inspect, straighten, and hammer high points, grind all seams, sharp edges, and welds. DA sand entire paintable surfaces using 24-180 grit dry paper. Plastic fill all low spots and DA sand fill areas using 36-180 grit dry paper. Apply pinhole filler and DA sand areas using 80-180 grit dry paper.
- 15) Re-clean bare metal using a wax and grease remover and low lint rags.
- 16) Within 24 hours, a PPG Delfleet® epoxy color primer with proper hardener for corrosion resistance using a pressure pot spray gun and applying 2-5 full wet coats or 1.5-8.0 dry mils max. achieving full hiding and allow to air dry 60 minutes @ 70°F or bake for 45 minutes @ 140°F degree.
- 17) Inspect, putty fill, and dry guild coat entire body surface and DA sand using 180-400 grit dry paper.
- 18) Re-clean bare metal using a wax and grease remover using low lint rags.
- 19) A PPG Delfleet® primer sealer with proper hardener and thinner shall be sprayed using a pressure pot spray gun and applying 1 full wet coat or 1.0-2.0 dry mils achieving full hiding and allow to flash off in spray booth for minimum of 60 minutes @ 70°F.
- 20) A PPG Delfleet® FBCH basecoat (color) with proper hardener and dry additive shall then be sprayed using a pressure pot set @ 45-60 PSI and achieving full hiding or 1.5-2.0 wet mils and allow to flash off in spray booth 45-60 minutes before applying clearcoat.
- 21) A PPG Delfleet® clearcoat with proper hardener and thinner shall be sprayed using a pressure pot spray gun and applying 2-3 full wet coats or 5.0 wet mils for a uniform gloss and allow to flash off in spray booth 10 minutes and bake for 120-140 minutes @ 125°F (surface temp.).

- 22) After cooling, DA sand heavy orange peel or runs using 1000 grit dry sand paper and final DA sand using 1500-2000 grit dry sand paper. Wipe off all surfaces to remove dust and debris. Buff unit as needed using 3M rubbing compound and a white wool pad and inspect until all sand scratches are removed.
- 23) Polish as needed using 3M Perfect-It-Polish and a black foam pad, repeat as necessary and inspect until all sand scratches are removed.

### **PAINT - ENVIRONMENTAL IMPACT**

The contractor shall meet or exceed their current State regulations concerning paint operations pollution control and shall include measures to protect the atmosphere, water and soil. PPG Delfleet® Evolution paint shall be free of all heavy metal (lead & chromate) components. Paint emissions from sanding and painting shall be filtered and collected. All paint wastes shall be disposed of in an environmentally safe manner. Solvents used in cleanup operations shall be collected, sent off-site for distillation and returned for reuse.

### **FASTENERS**

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

### **ELECTROLYSIS CORROSION CONTROL**

The apparatus shall be assembled using ECK or similar corrosion control on all high corrosion potential areas.

ECK protects aluminum and stainless steel against electrolytic reaction, isolates dissimilar metals and gives bedding protection for hardware and fasteners. ECK contains anti-seizing lubricant for threads. ECK is dielectric and perfect for use with electrical connectors.

### **PAINT FINISH - SINGLE COLOR**

The body shall be painted with a single color of PPG Delfleet® Evolution paint per approved customer spray-out.

Touch-up paint shall be provided with completed vehicle.

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

### **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 resist corrosion under the vehicle.

### **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.

## **REFLECTIVE STRIPE REQUIREMENTS**

### **Material**

All retroreflective materials shall conform to the requirements of ASTM D4956, *Standard Specification for Retroreflective Sheeting for Traffic Control*, Section 6.1.1 for Type I Sheeting.

All retroreflective materials used that are colors not listed in ASTM D4956, Section 6.1.1, shall have a minimum coefficient of retro-reflection of 10 with observation angle of 0.2 degrees and entrance angle of -4 degrees.

Any printed or processed retroreflective film construction used shall conform to the standards required of an integral colored film as specified in ASTM D4956, Section 6.1.1.

### **Minimum Requirements**

A retroreflective stripe(s) shall be affixed to at least 50 percent of the cab and body length on each side, excluding the pump panel areas, and at least 25 percent of the width of the front of the vehicle, not including mirrors or other protrusions.

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

The 4 in. (100 mm) wide stripe or combination of stripes shall be permitted to be interrupted by objects (i.e., receptacles, cracks between slats in roll up doors) provided the full stripe is seen as conspicuous when approaching the apparatus.

A graphic design shall be permitted to replace all or part of the required striping material if the design or combination thereof covers at least the same perimeter length(s).

### **GRAPHICS PROOF (Will match signed approval)**

A color graphics proof of the reflective striping layout shall be provided for approval by DC Fire & EMS prior to installation. The graphics proof shall be submitted to DC Fire & EMS on 8.5" x 11" sheets with front, sides, rear and plan views, each on one (1) sheet. In addition if there is any special art work an additional sheet shall be provided showing all details. **Note:** The graphics color proof may not reflect the correct paint break lines on the chassis and body please refer to the paint section of your specifications for correct paint break lines.

The reflective stripe material shall be 6" wide, 3M Scotchlite 680 series graphic film. special art work an additional sheet shall be provided showing all details.

One (1) copy of the above custom logo shall be provided and located on the completed vehicle as directed by DC Fire & EMS.

### **SVI Manufacturer Badge**

**EXTERIOR COMPARTMENT DOORS**

**DOOR CONSTRUCTION- WILL BE AMDOR**

**BODY WIDTH DIMENSIONS**

The body shall be 96.0" wide, and 98.0" wide at drip rails. Interior compartment depth dimensions shall be approximately:

<u>Area Description</u>	<u>Dimension</u>
Transverse above subframe	91.0"
Compartment depth below subframe	21.0"

## **STREETSIDE COMPARTMENT - FRONT (S1)**

The interior useable compartment width shall be approximately 43.5" wide.

- This compartment shall have an Amdor roll-up door.
- The compartment door opening shall be approximately 39.0" wide.
- The roll-up door slats and the door track components shall be painted to match the single tone exterior color.
- The Amdor door shall be equipped with a **mechanical** switch in the upperdoor slat to activate compartment lighting and door ajar signal in cab when door is opened.
- A keyed 1250 cylinder lock shall be provided on bottom rail of the roll-up door.
- The roll-up doors shall be manually operated with a key.
- Compartment threshold protection shall be provided on the bottom edge of the compartment door sill. The threshold protection shall be an extruded aluminum shape with an un-painted anodized finish.
  - Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

## **COMPARTMENT LAYOUT**

- The floor of the compartment above the frame rails shall cover the area directly above the frame rails ONLY (non-extended floor).
- There shall be vertically mounted aluminum shelf-Trac for specified component installation.
- There shall be two (2) adjustable shelf/shelves approximately 45" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges.
  - Any equipment mounting on adjustable shelf shall be provided by DC Fire & EMS after delivery.
  - The above component(s) shall have a smooth un-painted finish.
- The 12 volt electrical distribution panel shall be located in the front lower compartment.

### **Reel Mounting: Reel #1**

- One (1) Hannay ECR1618-17-18 electric cable reel(s) capable of storing 200' of 10/3 electric cable. Reel(s) shall be designed to hold 110% of the capacity of cord length, with fully enclosed 45 amp, three (3) conductor collector rings. Reel(s) shall be mounted to channel structure that allows for side-to-side adjustment of reel position.
  - Power rewind control(s) shall be in a position where the operator can observe the rewinding operation and not be more than 72 in. (1830 mm) above the operator's standing position, and shall be marked with a label indicating its function and shall be guarded to prevent accidental operation.
  - A label shall be provided in a visible location adjacent to reel with following information: Current rating, Current type, Phase, Voltage, and Total cord length.

- The cable reel shall be equipped with 200' of 10/3 SEOW yellow cable, a molded plastic ball clamp, and a single heavy duty L5-30 twist-lock female plug at the end.
- One (1) Circle-D, cast aluminum power distribution box with yellow powder coat painted finish shall be provided. The power distribution box shall meet all requirements described in NFPA 1900. The power distribution box shall include:
  - The electric junction box shall be direct wired to cable on the cord reel. The outlet configuration shall include:
    - One (1) 120 VAC, 5-15 duplex straight-blade receptacle.
    - One (1) 120 VAC, 5-15 duplex straight-blade receptacle.
    - One (1) 120 VAC, **L5-30R** single twist lock receptacle.
    - One (1) 120 VAC, **L5-15R GFI** duplex straight-blade receptacle.
- The fairlead roller shall be mounted directly to the reel.
  - Two (2) OnScene Access white LED, full height compartment lights, vertically mounted.
  - The generator gauge panel.
- There shall be one (1) 120 VAC custom fabricated outlet strip provided with approximately two (2) duplex outlets per foot in height. Strip shall be approximately long.
  - Outlet(s) shall be powered by both the on-board generator and shore power system through a relay system.
  - The outlet shall be located on rearward wall, upper left area.

## CURBSIDE COMPARTMENT - FRONT (C1)

The interior useable compartment width shall be approximately 43.5" wide.

- This compartment shall have an Amdor roll-up door.
- The compartment door opening shall be approximately 39.0" wide.
- The roll-up door slats and the door track components shall be painted to match the single tone exterior color.
- The Amdor door shall be equipped with a **mechanical** switch in the upperdoor slat to activate compartment lighting and door ajar signal in cab when door is opened.
- A keyed 1250 cylinder lock shall be provided on bottom rail of the roll-up door.
- The roll-up doors shall be manually operated with a key.
- Compartment threshold protection shall be provided on the bottom edge of the compartment door sill. The threshold protection shall be an extruded aluminum shape with an un-painted anodized finish.
  - Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

## COMPARTMENT LAYOUT

- The floor of the compartment above the frame rails shall cover the area directly above the frame rails ONLY (non-extended floor).
- There shall be vertically mounted aluminum shelf-Trac for specified component installation.
- There shall be two (2) adjustable shelf/shelves approximately 45" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges.
  - Any equipment mounting on adjustable shelf shall be provided by DC Fire & EMS after delivery.
  - The above component(s) shall have a smooth un-painted finish.
- **There shall be one (1) Sensible Products Extinguisher Bracket model # E862 for 5lb extinguisher DC Fire & EMS supplied extinguisher.**

SHIP LOOSE

## Reel Mounting: Reel #1

- One (1) Hannay ECR1618-17-18 electric cable reel(s) capable of storing 200' of 10/3 electric cable. Reel(s) shall be designed to hold 110% of the capacity of cord length, with fully enclosed 45 amp, three (3) conductor collector rings. Reel(s) shall be mounted to channel structure that allows for side-to-side adjustment of reel position.
  - Power rewind control(s) shall be in a position where the operator can observe the rewinding operation and not be more than 72 in. (1830 mm) above the operator's standing position, and shall be marked with a label indicating its function and shall be guarded to prevent accidental operation.

- A label shall be provided in a visible location adjacent to reel with following information: Current rating, Current type, Phase, Voltage, and Total cord length.
  - The cable reel shall equipped with 200' of 10/3 SEOW yellow cable, a molded plastic ball clamp, and a single heavy duty L5-30 twist-lock female plug at the end.
- One (1) Circle-D, cast aluminum power distribution box with yellow powder coat painted finish shall be provided. The power distribution box shall meet all requirements described in NFPA 1900. The power distribution box shall include:
  - A 12" pigtail that terminates in an L5-30 configuration to match the cable on the cord reel. The outlet configuration shall include:
    - One (1) 120 VAC, 5-15 duplex straight-blade receptacle.
    - One (1) 120 VAC, 5-15 duplex straight-blade receptacle.
    - One (1) 120 VAC, **L5-30R** single twist lock receptacle.
    - One (1) 120 VAC, **L5-15R GFI** duplex straight-blade receptacle.
- The fairlead roller shall be mounted directly to the reel.
  - Two (2) OnScene Access PRO white LED, full height compartment lights, vertically mounted.
- There shall be one (1) 120 VAC custom fabricated outlet strip provided with approximately two (2) duplex outlets per foot in height. Strip shall be approximately long.
  - Outlet(s) shall be powered by both the on-board generator and shore power system through a relay system.
  - The outlet shall be located on rearward wall, upper left area.

## **REAR DECK**

Deck surface will be aluminum NFPA treadplate approximately 96" wide x 116" long.

### **REAR DECK STORAGE BOX - STREETSIDE**

A storage box shall be provided on rear deck streetside with hinged lift-up door provided with rubber style "T" latch and gas shock to hold door in open position. Storage boxes shall be fabricated of aluminum tread plate.

Add a hose trough box to hold 300' of 1-1/2" hose, include mounting for a Hydrant wrench and custodian wrench (DCFD will provide).

Trough will be equipped with cover on the passenger side to prevent hose from coming out, and straps across top NO lid. Should be equipped with decking to allow air flow water drainage, also adding an adjustable divider (left to right in trough but front to back as it is oriented on the truck like cross lay.)

### **REAR DECK STORAGE BOX - CURBSIDE**

A storage box shall be provided on rear deck curbside with hinged lift-up door provided with rubber style "T" latch and gas shock to hold door in open position. Storage boxes shall be fabricated of aluminum tread plate.

## **FLATBED MOUNTED GAS POWERED VENTILATION UNIT**

SVU mounted on the bed of the body location only.

## **BODY OPTIONS AND UPGRADES**

NO Plastic Grating (LR, WA)

## **LOWER SIDE BODY PROTECTION - RUB RAIL**

Rub rails shall be provided below the compartment door openings on both the streetside and curbside.

The rub rails shall be fabricated from UHMW plastic, measuring approximately 2-3/4" high x 1-1/2" thick. The rub rail shall be bolted to the body using stainless steel bolts and 1-1/2" diameter x 5/8" thick rubber mount isolators to prevent damage to the body. The bolt heads holding the rubrail to the body will be recessed from the face of the rub rail so they won't catch on anything.

The UHMW plastic material shall be black in color.

## **FRONT GRAVEL GUARDS**

Gravel guards shall be provided on front lower body corners. Guards shall be 12" high, extend from behind cab or step and wrap around to the front compartment door opening fabricated from 20 gauge brushed stainless steel.

## **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 10.

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 over-current protective devices. Such devices shall be readily accessible and protected against heat in excess of the over-current 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:

- 24) SAE J156, *Fusible Links*
- 25) SAE J553, *Circuit Breakers*
- 26) SAE J554, *Electric Fuses (Cartridge Type)*
- 27) SAE J1888, *High Current Time Lag Electric Fuses*
- 28) SAE J2077, *Miniature Blade Type Electrical Fuses*

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

#### Power Supply

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

#### Minimum Continuous Electrical Load

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

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

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

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

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

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

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

### Electromagnetic Interference

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

### Wiring Diagram

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

### Low Voltage Electrical System Performance Test

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

## **12 VOLT MULTIPLEX CONTROL CENTER**

The apparatus shall be equipped with a Weldon V-MUX multiplexed 12 volt electrical system that will provide complete diagnostic capability, No Exception. The system shall have the capability of delivering multiple signals via a CAN bus, utilizing specifications set forth by SAE J1939. The system shall be node based to maximize stability so that failure of one node does not affect the operation of the other nodes. The system shall use shielded twisted-pair wire for transmission of system function signals. The shielded wire shall provide protection against EMI and RFI noise interruptions.

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

### **Outputs:**

The outputs shall perform all the following items without added modules to perform any of the tasks;

1. **Load Shedding:** The system shall have the capability to load shed with 8 levels any output. This means you can specify which outputs (barring NFPA restrictions) you would like load shed. Level 1 12.9v, Level 2 12.5V, Level 3 - 12.1V, Level 4 - 11.7V, Level 5 11.3V, Level 6 10.9V, Level 7 10.5, Level 8 10.1. Unlike conventional load shedding devices you can assign a level to any or all outputs.
2. **Load Sequencing:** The system shall be able to sequence from 0 8 levels any output. With 0 being no delay and 1 being a 1 second delay, 2 being a 2 second delay and so on. Sequencing reduces the amount of voltage spikes and drops on your vehicle, and can help limit damage to your charging system.
3. **Output Device:** The system shall have solid-state output devices. Each solid-state output shall be a MOS-FET (Metal Oxide Semiconductor - Field Effect Transistors); MOS-FETs are solid-state devices with no moving parts to wear out. A typical relay when loaded to spec has a life of 100,000 cycles. The life of a FET is more than *100 times* that of a relay.

4. **Flashing Outputs:** The system shall be able to flash any output in either A or B phase, and logic is used to shut down needed outputs in park, or any one of several combined interlocks. The flash rate can be selected at either 80, 160 or 200 FPM. This means any light can be specified with a multiplex truck with no need to add flashers. Flashing outputs can also be used to warn of problems or other unique idea you may come up with.
5. **PWM:** The modules shall have the ability to PWM at some outputs so that a headlight PWM module is not needed.
6. **Diagnostics:** An output should be able to detect either a short or open circuit. The system should be able report in “real time” a text based message that points the maintenance person to a specific output.

#### **Inputs:**

1. The inputs shall have the ability to switch by a ground or vbatt signal.
2. The inputs shall be filtered for noise suppression via hardware and software so that RF or dirty power will not trick an input into changing its status.

#### **Auto-Throttle:**

The multiplex system shall be able to perform automatic high idle via a network gateway or by using an existing output on a module to provide the proper signals to an OEM Engine ECU. This task should be handled with existing inputs and outputs.

#### **Displays:**

Displays shall be able to provide real time information regarding load shedding and system status, such as network traffic/errors or shorts and open circuits.

#### **System Network:**

The multiplex system shall contain a Peer-to-Peer network. A Master Slave Type network is not suitable for this type of unit. A Peer-to-Peer network means that all the modules are equal on the network; a Master is not needed to tell other nodes when to talk, **No Exceptions.**

#### **System Reliability:**

The multiplex system shall be able to perform in extreme temperature conditions, from 40° to +85° C (-40° to +185° F.) The system shall be sealed against the environment, moisture, humidity, salt or fluids such as diesel fuel, motor oil or brake fluid. The enclosures shall be rugged to withstand being mounted in various locations or compartments around the vehicle. The modules shall be protected from over voltage and reverse polarity.

#### **WELDON CERTIFICATION**

A letter shall be provided with bid submittal that the Contractor has successfully completed the Weldon training requirements for Level 1 of the V-MUX Certified Supplier Program and is authorized to design, build, and service V-MUX electrical systems.

## CAB CONSOLE

A center cab console shall be provided between the Driver's and Officer's seats extending to rear wall of cab. Console 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.

Console shall include;

- Forward section of cab console shall include;
  - **MULTIPLEX SYSTEM INTERFACE DISPLAY** Weldon V-MUX Vista IV multiplex system interface display(s) with push-button control shall be provided in cab easily accessible to driver and/or passenger. The full-color Vista interface display allows the user to control warning and scene lighting, HVAC controls (when specified), and view on-board diagnostics including service information. This display has a wide operating temperature range, automatic screen switching in response to current conditions, and a sleep mode option to eliminate night glare. The following features shall be included;
    - 800 x 480 resolution
    - Four video ports
    - Flash updates with USB memory stick
    - Display inside and outside temperature (when specified)
    - Automatic climate control (when specified)
    - 100% Configurable (OEM Level)
    - Field re-programmable
    - Peer to peer network
    - On-board diagnostics / service information
    - Colors change to indicate button status
    - Video Ready for: Backup camera, Thermal camera, DVD, GPS...
- Forward section, driver side of cab console shall include;
  - No components provided at this position.
- Forward section, officer side of cab console shall include;
  - No components provided at this position.
- Cab console, panel position forward shall include;
- There shall be one (1) communications radio and/or siren 3" filler plate(s) with black powdercoat paint finish provided for future radio/siren location in specified console.

## ELECTRONIC SIREN

**Whelen CCTL6 siren controller microphone is equipped with a a magnetic microphone holder (mounting will be determined at Final), i. Traffic Advisor Button #1 to be Master warning, ii. Traffic Advisor Button #2 to be White Cutoff, iii. Traffic Advisor #3 to be Cruise. Add VSG Module and Antenna, Add Whelen Cloud subscription for 3years, Add Whelen CV2V Vehicle to Vehicle sync module. Ensure there is a Whelen LCPHOTO to the**

**cab mounted lightbar. Add Whelen Core Cab Speaker to the headliner along with DCFD Radio Speaker (That DCFD will Ship).**

**ELECTRONIC SIREN (WHELEN CORE CONTROL HEAD)**

One (1) Whelen CCTL6 Core control head shall be provided. Control head shall consist of 3 sections.

- Section 1 shall be located across the top of head with eight (8) push button switches for control of scene and auxillary lighting as well as other ancillary functions.
- Section 2 shall be for the Siren fuctions with a seven position rotary knob and a "MANUAL" siren button as well as an "AIR HORN" button.
- Section 3 shall have three (3) switches for individual functions of a Traffic Advisor.
- There shall also be a wired microphone and extension cable included with this control head.

The CCTL6 will be programmed and connected to the CenCom Core controller/siren and auxillary modules via an included communication cable.

Siren: Whelen CCTL\* Control Head, Slide Switch

- Button 1 (top row, left most) shall be used to control:  
"FRONT SCENE"
- Button #2 (top row, 2nd from the left) shall be used to control:  
"LEFT SCENE"
- Button #3 (top row, 3rd from the left) shall be used to control:  
"RIGHT SCENE"
- Button #4 (top row, 4th from the left) shall be used to control:  
"REAR SCENE"
- Button #5 (top row, 5th from the left) shall be used to control:  
NO FUNCTION
- Button #6 (top row, 6th from the left) shall be used to control:  
NO FUNCTION
- Button #7 (top row, 7th from the left) shall be used to control:  
NO FUNCTION
- Button #8 (top row, 8th from the left) shall be used to control:  
NO FUNCTION
- Button #9 (top row, 9th from the left) shall be used to control:

## "GROUND LIGHTS"

- Traffic Advisor Button #1 (bottom row, left hand) shall be used to control:

"LEFT"

- Traffic Advisor Button #2 (bottom row, middle) shall be used to control:
  - Position #1 optical and audible warning devices

"RIGHT"

- Traffic Advisor Button #3 (bottom row, right hand) shall be used to control:
  - Position #1 optical and audible warning devices
  - Position #2 optical and audible warning devices

"FLASH"

## **ELECTRONIC SIREN (WHELEN CORE EXPANSION MODULE 16 OUT/4 IN)**

one (1) Whelen CEM16 Core, 16 output / 4 input expansion module(s) shall be provided.

## **ELECTRONIC SIREN (WHELEN CORE OBDII MODULE)**

One (1) Whelen C399K\*, Core OBDII module shall be provided for data communications to the:

- C399K1 - Ford Super Duty F250 - F550

The specified siren functions shall be controlled by siren mounted switches.

- Cab console, panel position center shall include;

## **RADIO INSTALLATION**

There shall be one (1) DC Fire & EMS supplied radio(s) installed in the cab center console within easy reach of driver and/or officer. The final location of radio shall be determined by the DC Fire & EMS at the pre-construction meeting.

All required radio programming shall be responsibility of DC Fire & EMS. Radio(s) may not be fully tested if no radio program is provided with radio and will be responsibility of DC Fire & EMS after delivery.

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

- There shall be one (1) communications radio and/or siren 3" recess mount(s) with black powdercoat paint finish in specified console.
- Cab console, panel position rearward shall include;
- There shall be one (1) communications radio and/or siren 3" filler plate(s) with black powdercoat paint finish provided for future radio/siren location in specified console.

## **BATTERY SYSTEM**

Any body builder supplied battery connections 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.

If 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.

## **BATTERY SWITCH**

One (1) battery "On/Off" switch shall be provided and located in cab within easy reach of Driver.

- A green "BATTERY ON" pilot light shall be visible from the driver's position.

## **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 40/20 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.**

## **BATTERY CHARGE INDICATOR**

**A Kussmaul 091-194-IND-WT\_RD charge indicator display** shall be provided and located near drivers' door area. This single battery system indicator is a suppressed zero bar graph voltage display which may be installed in any 12 volt system.

- The charge indicator display shall be located on the streetside front of body, outboard of the cab.

## **SHORE POWER INLET**

One (1) **Kussmaul 120 VAC, 20 amp Super Auto-Eject model # 091-55-20-120** shore power inlet(s) 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.

- Auto eject inlet cover color shall be red.
  - The shore power inlet shall be located on the streetside front of body, outboard of the cab.

## **REAR VIEW CAMERA**

There shall be one (1) ROSCO Safety Vision Model #STSK7665 rear observation camera system with 7" monitor provided and installed on completed unit. The system shall include one (1) box style camera with black housing installed on rear of body.

## **EVENT RECORDING CAMERA SYSTEM**

An Rosco DV660 camera shall be provided and installed on completed vehicle designed for on-board vehicle recording.

Camera will be located interior on windshield.

Two (2) extra 512 SD cards will be provided.

## **TAIL LIGHTS**

Rear body tail lights shall be vertically mounted and located per Federal Motor Vehicle Safety Standards, FMVSS and Canadian Motor Vehicle Safety Standards CMVSS. The following lights shall be furnished;

- Two (2) Whelen M6 Series M6BTT red LED stop/tail/turn lights
- Two (2) Whelen M6 Series M6BUW clear LED back-up lights with clear lens

Clarify: there will be amber turn signals. (Should be six (6) heads, two (2) Brake/tail, two (2) turn w/arrow, two (2) backup. Layout should be inboard to outboard Brake/tail, Reverse, Turn.

Each light shall have a chrome flange.

## **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.

## **LICENSE PLATE LIGHT**

One (1) Arrow #437 chrome plated LED 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.

## **FRONT SCENE LIGHT(S)**

The following front scene lights shall be mounted on body front panel.

## **REAR SCENE LIGHTS**

There shall be two (2) Whelen model M9 EZ Series LED Scene Light , 10.35" x 6.28" surface mounted scene lights provided on the upper body. Light quantity shall be divided equally per side. Each light shall have a chrome flange.

The lights shall be controlled at the multiplex display(s) in the cab.

## **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.

Steadily burning, non flashing optical sources shall be permitted to be used.

Control System: Whelen

CORE System

## **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.

There shall be two (2) Whelen **M9RCZ** linear super-LED Light(s) with full-fill optic provided, **one (1) each side front of the body**. The light head shall include an integral flasher with programmable flash patterns and Hi/Lo intensities.

Each Light shall have:

- Colored Lens

Clear warning lights shall be deactivated when vehicle is in Blocking Mode (Parking Brake Set and/or Transmission in Park).

**Lights will be located on front of body outboard location.**

Each light shall have a chrome flange.

- Red Light Streetside / White Light Curbside
  - Flash Pattern shall be (factory default) Action Scan.
- The Low Power option will be provided for the above lighting group.
  - Flash Pattern shall be DVI Single Flash 75 Lo Intensity all on (default)

The lights shall be controlled at the multiplex display(s) in the cab.

ZONE A - FRONT WARNING LIGHTS

See Chassis Modification section for cab mounted warning lights.

**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 1600 mm) above level ground.

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

ZONES B AND D - **BODY LIGHT (BODY FRONT CORNERS)**

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

There shall be two (2) Whelen M6 linear super-LED Light(s) with full-fill optic provided, one (1) each side. The light head shall include an integral flasher with programmable flash patterns and Hi/Lo intensities. **RECESSED in pockets.**

Each Light shall have:

- Red LEDs
- Red Lens

Each light shall have a chrome flange.

- Flash Pattern shall be (factory default) Action Scan.
- The Low Power option will be provided for the above lighting group.
  - Flash Pattern shall be DVI Single Flash 75 Lo Intensity all on (default)

The lights shall be controlled at the specified siren control head in the cab.

ZONES B AND D - BODY INTERSECTOR LIGHT (BODY REAR CORNERS)

There shall be two (2) Whelen M6 linear super-LED Light(s) with full-fill optic provided, one (1) each side. The light head shall include an integral flasher with programmable flash patterns and Hi/Lo intensities.

Each Light shall have:

- Red LEDs
- Red Lens

Each light shall have a chrome flange.

- Flash Pattern shall be (factory default) Action Scan.
- The Low Power option will be provided for the above lighting group.
  - Flash Pattern shall be DVI Single Flash 75 Lo Intensity all on (default)

The lights shall be controlled at the specified siren control head in the cab.

ZONE C - REAR WARNING LIGHTS (LOWER REAR CORNERS)

There shall be two (2) Whelen M6 linear super-LED Light(s) with full-fill optic provided, one (1) each side. The light head shall include an integral flasher with programmable flash patterns and Hi/Lo intensities.

Each Light shall have:

- Red LEDs
- Red Lens

**Add one (1) Whelen VXE DUO Blue/White, warning light adjacent to the license plate. Shall be Steady Burn Blue when warning lights are activated, and White when placed in reverse or Rear Scene lights are activated.**

Each light shall have a chrome flange.

- Flash Pattern shall be (factory default) Action Scan.
- The Low Power option will be provided for the above lighting group.
  - Flash Pattern shall be DVI Single Flash 75 Lo Intensity all on (default)

The lights shall be controlled at the specified siren control head in the cab.

## **LINE VOLTAGE ELECTRICAL SYSTEM**

### **PTO GENERATOR**

The vehicle shall be equipped with an PTO generator system with a capacity of 15,000 watts at 120/240 VAC, 125/62 amps, single phase. Current frequency shall be stable at 60 hertz.

The transmission's PTO port and PTO, or the split shaft PTO, and all associated drive shaft components shall be rated to support the continuous duty torque requirements of the generator's continuous duty rating as stated on the power source nameplate.

Where the generator is driven by the chassis engine and transmission through a split shaft PTO, the driving compartment speedometer shall register when the generator drive system is engaged.

Where the generator is driven by the chassis engine and transmission through a split shaft PTO and a chassis transmission retarder is furnished, it shall be automatically disengaged for generator operations.

The direct drive generator shall be mounted so that it does not change the ramp break-over angle, angle of departure, or angle of approach as defined by other components, and it shall not extend into the ground clearance area.

The direct drive generator shall be mounted away from exhaust and muffler areas or provided with a heat shield to reduce operating temperatures in the generator area.

### **GENERATOR 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.

### **GENERATOR ENGAGEMENT**

A "Generator Engaged" indicator shall be provided in the driving compartment to indicate that the generator shift has been successfully completed.

An "OK to Operate Generator" indicator shall be provided in the driving compartment to indicate that the generator is engaged (if not always engaged), the transmission is in the proper gear (if required, automatic transmissions only), and the parking brake is engaged (if applicable).

An interlock system shall be provided to prevent advancement of the engine speed in the driving compartment or at any operator's panel unless the parking brake is engaged, and the transmission is in neutral or the output of the transmission is correctly connected to a pump or generator instead of the drive wheels.

### **WARRANTY PERIOD**

Provided such goods are operated and maintained in accordance with written instructions, this generator warrants that the PTO generators shall be free from defects in material and workmanship for a period of five (5) years or one thousand (1,000) hours, whichever comes first, from the date of delivery to the first purchaser.

### **GENERATOR CONTROL**

The generator shall be engaged at the switch panel in the cab.

Control will be a switch in cab console.

### **GENERATOR MOUNTING**

The generator shall be mounted below the chassis frame rails. The generator mounting brackets shall be fabricated using steel plate and/or tubing and powder coat primed and painted black. The generator mounting shall be bolted to the side of the chassis frame rail and removable so that the generator can be lowered from under apparatus for service, if necessary. The generator case shall not extend below the bottom edge of the apparatus body.

### **MANUALS AND SCHEMATICS**

Two (2) complete manuals on parts list, maintenance, wiring schematics, hydraulic schematics, circuit boards, voltage regulator board and other components shall be provided on delivery.

### **POWER-TAKE-OFF GENERATOR DRIVE**

There shall be a "Hot Shift" power-take-off (PTO) installed on the transmission PTO opening of the chassis. The "Hot Shift" PTO is provided to allow the engagement of the PTO at higher engine RPM speeds. The PTO output shall be connected to the generator through hollow tube type driveline with heavy duty universals.

The engagement of the PTO shall be in the chassis cab with a rocker switch and red pilot light to note engagement of the PTO or via the V-Mux screen if so equipped.

The power supply to the PTO engagement control shall be wired to the parking brake and a neutral position transmission switch to prevent engagement unless the vehicle is stopped and transmission has been placed in neutral.

The installation of the engine, transmission, driven accessories (power takeoffs (PTO), etc.) shall meet the engine and transmission manufacturers' installation recommendations for the service intended.

Model part number shall be Chelsea 210 series.

(Note: If diesel, the DEF tank may be relocated to outboard curbside frame.)

### **ENGINE SPEED CONTROL**

An engine speed auxiliary control device (high idle switch or throttle) shall be installed to maintain a stable cycle output from generator when the apparatus is parked.

An interlock shall prevent the operation of the engine speed auxiliary control device unless the parking brake is engaged and the transmission is in neutral or park, or the parking brake is engaged and the engine is disengaged from the drive wheels.

The engine shall be prevented from regulating its own engine speed during times when engine rpm control is critical for consistent apparatus functions such as generator, water pump, or aerial operation.

### **LOADCENTER**

The loadcenter shall be an Eaton BR Series specifically designed for protection and distribution of AC line voltage such as lighting and small motor branch circuits. The loadcenter enclosure is made of 16 gauge galvanized sheet steel with a

galvanized coating provided for corrosion protection. All trims used on BR loadcenters are chromate sealed and finished with an electro-disposition epoxy paint (ANSI-61) which exceeds requirements for outdoor and indoor applications. A combination surface/flush cover with integral door is supplied with indoor loadcenters rated from 100 through 400 amperes. All plug-in loadcenters are CSA listed to file LL98266. CSA Certified to C22.2 No.29, to loadcenter type and CSA listing.

### **GENERATOR MONITORING PANEL**

An Accuenergy Acuvim II multifunction power and energy meter shall be provided to properly monitor the generator performance and load demand during operation. The Accuenergy Acuvim CL includes a digital RS485 communication port running Modbus protocol. The electrical parameters can be viewed on a backlit LCD screen. Unit shall be capable of displaying the following;

- Generator frequency in hertz
- Line 1 current in amperes
- Line 2 current in amperes
- Generator voltage in volts
- Meter running time

### **SHORE POWER INLET - BATTERY CHARGER**

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

### **LINE VOLTAGE ELECTRICAL SYSTEM**

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.

#### **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;

- (x) Pictorial representations of circuit logic for all electrical components and wiring
- (y) Circuit identification
- (z) Connector pin identification
- (aa) Zone location of electrical components
- (bb) Safety interlocks

(cc) Alternator–battery power distribution circuits  
 (dd) Input/output assignment sheets or equivalent circuit logic implemented in multiplexing systems

**INTERNET CONNECTION**

**5G ROUTER - CELLULAR**

A cellular router shall be installed on completed unit.

1	1104708	Sierra Wireless Airlink MG90 5G Single 5G 4x4 Router
1	9010358	Airlink Support 5yrs
1	6001030	OBD-II Telemetry Scanner Kit, MG (Y-Cable)
1	9010218	AMM Annual Maintenance & Support (Hardware & Software) 5yrs
2	Cat 6 Cable	(2) Cat 6 STP 23AWG solid copper network cable run from Router to MDC Toughbook docking station, terminated with RJ-45 connectors

**COMPUTER**

**COMPUTERS**

One (1) laptop style computer(s) shall be provided and installed by DC Fire & EMS on completed unit.

Unit shall be complete and fully operational, including all required cabling, 120 volt AC wiring, and cable connections.

**COMPUTER DOCKING STATION**

**Add install of MDC Docking equipment; one (1)- C-HDM-134 Universal Heavy-Duty Short Adaptor Plate Mount, one (1)- C-MD-119 11" Slide Out Locking Arm w/ Low Profile Motion Device, one (1)- DS-PAN-432-2 Docking station for Toughbook 55 w/ Advanced Port Replication and Dual pass-thru Antenna Connections with LIND power Supply, one (1)- LPS-211 Multipurpose power supply bracket ( this will allow the LIND to be mounted to the bottom of the Havis Docking Station, one (1)-DS-DA-417 Screen Support Arm for DS-PAN Docking Station.**

**RADIO AND COMMUNICATION SYSTEM**

**RADIOS**

One (1) radios shall and all necessary cabling and antennas shall be provided and installed by contractor. All required radio programming shall be responsibility of DC Fire & EMS. Radio(s) may not be fully tested if no radio program is provided with radio and will be responsibility of DC Fire & EMS after delivery.

All radios shall be installed per manufacturer's instructions including proper 12 VDC power and grounding.

**Radios shall be as follows;**

- One (1) M37TSS9PW1AN APX8500 ALL BAND MP MOBILE**
- One (1) GA09008AA ADD: GROUP SERVICES 1**
- One (1) GA09007AA ADD: OUT OF THE BOX WIFI PROVISIONING**
- One (1) G996AS ENH: OVER THE AIR PROVISIONING**
- One (1) GA00255AF ADD: 5Y ESSENTIAL ACCIDENTAL DAMAGE**
- One (1) GA00580AA ADD: TDMA OPERATION**
- One (1) GA01515AA ADD: J600 ADAPTER CABLE**
- One (1) GA00631AA ADD: DVRS MSU ACTIVATION**
- One (1) G51AT ENH:SMARTZONE**
- One (1) GA01620AA ADD: MULTI SYSTEM OTAR**
- One (1) GA05509AA DEL: DELETE UHF BAND**
- One (1) GA01606AA ADD: NO BLUETOOTH/ WIFI/GPS ANTENNA NEEDED**
- One (1) GA09001AA ADD: WI-FI CAPABILITY 1**
- One (1) G298AS ENH: ASTRO 25 OTAR W/ MULTIKEY**
- One (1) B18CR ADD: AUXILIARY SPKR 7.5 WATT APX**
- One (1) G843AH ADD: AES ENCRYPTION AND ADP**
- One (1) G610AC ADD: REMOTE MOUNT CABLE 30 FT APX**
- One (1) G89AC ADD: NO RF ANTENNA NEEDED**
- One (1) G444AH ADD: APX CONTROL HEAD SOFTWARE**
- One (1) G67EH ADD: REMOTE MOUNT E5 MP**
- One (1) QA03399AA ADD: ENHANCED DATA APX**
- One (1) G806BL ENH: ASTRO DIGITAL CAI OP APX**
- One (1) GA01767AG ADD: RADIO AUTHENTICATION**
- One (1) GA01670AA ADD: APX E5 CONTROL HEAD**
- One (1) W22BA           ADD: STD PALM MICROPHONE APX**
- One (1) QA09113AB ADD: BASELINE RELEASE SW**
- One (1) G361AH ENH: P25 TRUNKING SOFTWARE APX**

**The following antennas will be installed on the completed unit: Routed to center console**

One (1) SH-IN2618 5G SHARKEE KIT with 5m cables  
One (1) \*GPSD-6-60-TW 5G RADIO SHARKEE Base Antenna  
One (1) C32SP-5SJ-5GA CELL CABLE  
One (1) C32SP-5SJ-5GB CELL CABLE  
Three (3) C32SP-5SMARV WIFI CABLES  
One (1) C29FR-FP-5SP-GNSS GPS CABLES  
One (1) \*C23F-5M MOTOROLA RADIO CABLE (MINI-U)  
One (1) \*C29F-5QMAP MOTOROLA RADIO CABLE (QMA)  
One (1) ASFC-155-US-821 TRI-BAND WHIP (VHF, UHF, & 7/800)

## **EQUIPMENT PAYLOAD WEIGHT ALLOWANCE**

In compliance with NFPA 1900 standards, the special service vehicle shall be designed for an equipment loading allowance of 2,500 lbs. of DC Fire & EMS provided equipment based on a 15,001 - 20,000 pound gross vehicle weight rating.

## **EQUIPMENT**

The following equipment shall be furnished with the completed special service SVU vehicle;

- One (1) container of assorted stainless steel nuts, bolts, screws and washers used in the construction of the apparatus shall be provided with the completed apparatus.
- There shall be two (2) Zico AC-32, NFPA approved aluminum wheel chocks provided for 32" diameter tires that together will hold the vehicle when loaded to its GVWR or GCWR, on a hard surface with a 20% grade, with the transmission in neutral, and the parking brake released.
  - The wheel chock(s) shall be mounted behind rear wheels, below body on streetside.
- Two (2) **Super Vac 718EVS**, 18" electric variable speed ventilation fan(s) shall be provided with the completed unit.

### **Will be provided with two (2) Misting Systems**

- The above specified ventilation fan(s) shall be installed on completed unit using mounting brackets and/or straps, location to be determined by the DC Fire & EMS.
- Two (2) Super Vac Valor V18-BD-12-AC-SP, 18" DeWalt battery electric variable speed ventilation fan(s) with two (2) 12 Ah batteries, two (2) battery chargers, and shore power inlet shall be provided with the completed unit.

### **Will be provided with two (2) misting systems.**

- The above specified ventilation fan(s) shall be installed on completed unit using mounting brackets and/or straps, location to be determined by the DC Fire & EMS.
- 
- **Two (2) battery chargers will be mounted in compartment, location TBD.**

**FLATBED MOUNTED DIESEL POWERED VENTILATION UNIT**

**Fan shroud will have DCFD laser cut ILO SVU-50**

**Painted Black shroud, and engine cover will be painted job color.**

**Clarify: the two (2) LED lights on unit will be Whelen.**

A Large Positive Pressure Ventilator for use exclusively in the Fire Emergency and Armed Services shall be provided. Industrial or balloon type blowers are not acceptable.

The diesel positive pressure ventilator shall be supplied with a 6-point carbon fiber blade. Excluding the engine, all components of the positive pressure ventilator shall be 100% manufactured and assembled in the United States; no exceptions.

The one-piece shroud shall be constructed of solid-molded fiberglass and include a standard StreamShaper Guard that delivers a narrower stream for farther setback from the structure's entrance. The unit shall be designed to OSHA and U.L. standards to prevent accidental contact with the blade. The unit's air movement shall exceed 200,000 cfm (339,800 cmh).

The successful manufacturer shall have built more than twelve (12) ventilators of this type in North America prior to supplying the unit; no exceptions.

The blade shall be driven by a Cummins 3.8L diesel engine capable of producing 132 HP and equipped with a 18 gal. (68 L) fuel tank while consuming 4.5 gph (17 L/hr). Ventilators that utilize hydraulic drives are not acceptable due to the power lost in the hydraulic system; no exceptions. The engine will be protected by a 1/8" aluminum cover, powder coated to protect against rust and corrosion.

The positive pressure ventilator shall be designed with the following:

Engine:	Cummins 3.8L
Speed:	2450 rpm
Airflow:	200,000 cfm (339,800 cmh)
Dimensions:	70" high x 70" wide x 42" deep (1,778 mm x 1,778 mm x 2,717 mm)
Weight:	1,850 lbs. (839 kg)

The ventilator shall be capable of operation in temperature from -30 to 100°F.

The PPV shall have a minimum (1) one-year warranty.

\*Specifications are subject to change and improvements.

## **TRAINING**

Upon delivery of the completed unit, a qualified representative from manufacturer shall demonstrate and provide initial instruction to representatives of DC Fire & EMS regarding the operation, care, and maintenance of the apparatus and supplied equipment.

The delivery engineer is to set delivery and instruction schedule with the person appointed by DC Fire & EMS.

- A fixed control panel shall be provided and shall include an instrument cluster consisting of water temperature, oil pressure, hour meter, fuel level, battery voltage and engine rpm. Final location and layout to be determined at pre-construction meeting.
- The gas positive pressure ventilator shall be equipped with a Scissor Lift, extending the fan 30" in the air and providing 20° of up-and-down tilt for multiple-story ventilation and an Electric Turntable, allowing the ventilator to rotate 270 degrees.
- The large positive pressure ventilator shall be provided with two (2) LED scene lights mounted directly to fan shroud.
- The large positive pressure ventilator shall be provided with a misting system capable of 30 gpm at 60 psi via a 1.5-inch NPHS connection.
- **Two (2) Streamlight Fire Vulcan C4 LED flashlight(s) model # 44451 with quick release shoulder strap** shall be provided with 80,000 candela and 3 hour run time. Each flashlight shall be orange in color and have a 12 volt DC charger and vehicle mount kit. Each flashlight shall have an LED spotlight style bulbs and reflectors. The flashlight(s) shall be wired to battery direct unless otherwise specified by DC Fire & EMS.
- **Lights will be hot stamped with DCFD.**
  - Two (2)The flashlight(s) shall be mounted in the cab in the following locations;

## **REMAINING NFPA MINOR EQUIPMENT BY PURCHASER**

All other minor equipment not specified above, but recommended by NFPA 1900 for special service vehicles section A.8.4 shall be supplied and mounted by DC Fire & EMS before the unit is placed in emergency service.