

South Metro Fire Rescue Authority  
Centennial, Co  
Haz-Mat- SVI#1235  
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 South Metro Fire Rescue 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 1901 needed by the manufacturer to build the apparatus, including:

- 1) Requirements not uniquely specified in NFPA 1901, 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 1901.

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,

1. Estimated In-Service Weight,
2. Wheelbase, Turning Clearance Radius,
3. Principal dimensions, Angle of Approach, Angle of Departure,
4. 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**

### **ROLLOVER STABILITY**

The apparatus shall meet the criteria defined below, or it shall be equipped with a stability control system defined below.

The apparatus shall meet the criteria defined in either of the following:

- 1) The apparatus shall remain stable to 26.5 degrees in both directions when tested on a tilt table in accordance with SAE J2180, *A Tilt Table Procedure for Measuring the Static Rollover Threshold for Heavy Trucks*.
- 2) The calculated or measured center of gravity (CG) shall be no higher than 80 percent of the rear axle track width.

Compliance shall be certified by testing, calculating, or measuring the apparatus or by comparing the apparatus to a compliant, substantially similar example apparatus and the certification shall be delivered with the fire apparatus.

The example apparatus shall be considered substantially similar if it includes a chassis with the same or higher CG height, the same or narrower rear axle track width, the same or greater water tank size and CG height, the same type of front and rear suspension and the same type and size of aerial device.

The apparatus shall be loaded with fuel, fire-fighting agents, hose, ladders, a weight of 250 lb in each seating position and weight equivalent to the Miscellaneous Equipment Allowance as defined in Table 12.1.2.

If the apparatus is designed to meet a specified higher equipment loading or larger hose bed capacity or to carry additional ground ladders, these greater loads shall be included in the testing, calculating or measuring.

The weight added to the fire apparatus for the purpose of test, calculation or measurement shall be distributed to approximate typical in-service use of the fire apparatus while not exceeding the manufacturer's published individual compartment weight ratings.

If the apparatus is equipped with a stability control system, the system shall have, at a minimum, a steering wheel position sensor, a vehicle yaw sensor, a lateral accelerometer and individual wheel brake controls.

## **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:

- 1) Accelerating from 0 to 35 mph (55 km/hr) within 25 seconds on a 0 percent grade
- 2) Attaining a speed of 50 mph (80 km/hr) on a 0 percent grade
- 3) 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:

- 1) 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 13.8.16*)
  - 3) Siren manufacturer's certification of the siren (*see 13.9.1.1*)
  - 4) Written load analysis and results of the electrical system performance tests (*see 13.14.1 and Section 13.15*)
  - 5) Certification of slip resistance of all stepping, standing, and walking surfaces (*see 15.7.4.5*)
  - 6) If the apparatus has a fire pump, the pump manufacturer's certification of suction capability (*see 16.2.4.1*)
  - 7) If the apparatus is equipped with a fire pump and special conditions are specified by the purchaser, the pump manufacturer's certification of suction capacity under the special conditions (*see 16.2.4.2*)
  - 8) If the apparatus has a fire pump, a copy of the apparatus manufacturer's approval for stationary pumping applications (*see 16.3.1*)
  - 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 16.3.2.2*)
  - 10) If the apparatus has a fire pump, the pump manufacturer's certification of the hydrostatic test (*see 16.5.2.2*)
  - 11) If the apparatus has a fire pump with a maximum discharge pressure capability rating that exceeds the hydrostatic test pressure of 16.5.2.1, the pump manufacturer's certification of the hydrodynamic test
  - 12) If the apparatus has a fire pump, the certification of inspection and test for the fire pump (*see 16.13.1.1.5 or 16.13.1.2.4 as applicable*)
  - 13) If the apparatus is equipped with an auxiliary pump, the apparatus manufacturer's certification of the hydrostatic test (*see Section 17.13*)
  - 14) When the apparatus is equipped with a water tank, the certification of water tank capacity (*see Section 18.6*)
  - 15) If the apparatus has an aerial device, the certification of inspection and test for the aerial device (*see Section 19.24*)
  - 16) If the apparatus has an aerial device, all the technical information required for inspections to comply with NFPA 1911
  - 17) If the apparatus has a foam proportioning system, the foam proportioning system manufacturer's certification of accuracy (*see 20.10.4.2*) and the final installer's certification the foam proportioning system meets this standard (*see 20.11.2*)
  - 18) If the system has a CAFS, the documentation of the manufacturer's pre delivery tests (*see Section 21.9*)
  - 19) If the apparatus has a line voltage power source, the certification of the test for the power source (*see 22.15.7.2*)
  - 20) If the apparatus is equipped with an air system, air tank certificates (*see 24.5.1.2*), the SCBA fill station certification (*see 24.9.6*), and the results of the testing of the air system installation (*see 24.14.5 and 24.15.4*)
  - 21) Any other required manufacturer test data or reports

## **OPERATIONS AND SERVICE DOCUMENTATION**

The Contractor shall deliver with the fire apparatus at least three (3) sets of complete operation and service documentation covering the completed apparatus as delivered and accepted.

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

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

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

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

## **NFPA REQUIRED DOCUMENTATION FORMAT - USB FLASH DRIVES**

The vehicle construction details and the operations and service documentation as required per NFPA 1901 latest edition shall be provided on a USB Flash Drive. These manuals shall be divided into sections for ease of reference. There shall be three (3) USB flash Drives provided with the completed vehicle.

There shall be one (1) printed copies of the manual provided with the apparatus.

## **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:

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

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

## **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:

1. The chassis, body and tank(s)
2. Full fuel, lubricant, and other chassis or component fluid tanks or reservoirs
3. Full water and other agent tanks
4. \*250 lb (114 kg) in each seating position
5. Fixed equipment such as pumps, aerial devices, generators, reels and air systems as installed
6. Ground ladders, suction hose, designed hose load in their hose beds and on their reels
7. An allowance for miscellaneous equipment that is the greatest of the 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 (18,001 kg to 23,000 kg) GVWR	6,000	2,700
		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:

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

### **UL 120/240 VAC CERTIFICATION**

The 120/240 volt electrical system shall be third-party, independent, audit-certified through Underwriters Laboratory (UL) to the current edition of NFPA 1901 to perform as listed below;

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

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

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

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

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

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

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

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

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

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

Voltage shall be maintained within  $\pm 10\%$  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 22.15.7.3.11.2, shall be applied during the testing unless an auxiliary engine drives the power source.

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

## **DOCUMENTATION**

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

## **DIELECTRIC VOLTAGE WITHSTAND TEST**

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

The test shall be conducted as follows:

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

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

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

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

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

## **WARRANTY**

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

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

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

## **GENERAL LIMITED WARRANTY - TWO (2) YEARS**

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

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

## **LOW VOLTAGE ELECTRICAL WARRANTY - FIVE (5) YEARS**

The vehicle low voltage electrical system shall be free of defects in material and workmanship for a period of five (5) years or 60,000 miles (or 96,561 kilometers), whichever occurs first, starting thirty (30) days after the original invoice date.

## **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 five hundred ninety (590) days after pre-construction meeting and receipt and approval of any signed change orders from South Metro Fire Rescue.

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 South Metro Fire Rescue 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 1901.

## **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 1901.

Inspection Trips, Delivery, Demonstration

## **PRE-CONSTRUCTION CONFERENCE**

A pre-construction conference shall be required at the Contractor's factory for four (4) personnel from the South Metro Fire Rescue 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 South Metro Fire Rescue 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.

## **DELIVERY AND DEMONSTRATION**

The Contractor shall be responsible for the delivery of the completed unit to the South Metro Fire Rescue's location. On initial delivery of the apparatus, the Contractor shall supply a qualified representative to demonstrate the apparatus and provide initial instruction to representatives of the South Metro Fire Rescue regarding the operation, care and maintenance of the apparatus and equipment supplied at South Metro Fire Rescue location.

The Delivery Engineer shall set delivery and instruction schedule with the person appointed by South Metro Fire Rescue.

After delivery of the apparatus, the South Metro Fire Rescue shall be responsible for ongoing training of its personnel to proficiency regarding the proper and safe use of the apparatus and associated equipment.

## **FREIGHTLINER SPECIFICATION PROPOSAL**

### **Vehicle Configuration**

M2 106 CONVENTIONAL CHASSIS

2023 MODEL YEAR SPECIFIED

SET BACK AXLE - TRUCK

### **General Service**

DOMICILED, USA (EXCLUDING CALIFORNIA AND CARB OPT-IN STATES)

RESCUE AND EMERGENCY SERVICE

MEDIUM TRUCK WARRANTY

EXPECTED FRONT AXLE(S) LOAD : 18000.0 lbs

EXPECTED REAR DRIVE AXLE(S) LOAD : 40000.0 lbs

EXPECTED GROSS VEHICLE WEIGHT CAPACITY : 58000.0 lbs

### **Engine**

CUM L9 360EV HP @ 2200 RPM, 2200 GOV RPM, 1150 LB-FT @ 1200 RPM, F/E

### **Engine Equipment**

2010 EPA/CARB/GHG21 CONFIGURATION

SIDE OF HOOD AIR INTAKE WITH NFPA COMPLIANT EMBER SCREEN AND FIRE  
RETARDANT DONALDSON AIR CLEANER

DR 12V 300 AMP 40-SI BRUSHLESS PAD MOUNT ALTERNATOR WITH REMOTE BATTERY  
VOLTAGE SENSE

(2) DTNA GENUINE, FLOODED STARTING, MIN 2000CCA, 370RC, THREADED STUD  
BATTERIES

BATTERY BOX FRAME MOUNTED

WIRE GROUND RETURN FOR BATTERY CABLES WITH ADDITIONAL FRAME GROUND  
RETURN

POSITIVE LOAD DISCONNECT WITH CAB MOUNTED CONTROL SWITCH MOUNTED  
OUTBOARD DRIVER SEAT

CUMMINS TURBOCHARGED 18.7 CFM AIR COMPRESSOR WITH INTERNAL SAFETY  
VALVE

GVG, FIRE AND EMERGENCY SERVICE VEHICLES ENGINE WARNING

C-BRAKE BY JACOBS WITH HIGH MED LOW BRAKE WITH BRAKE LAMPS

RH OUTBOARD UNDER STEP MOUNTED HORIZONTAL AFTERTREATMENT SYSTEM  
ASSEMBLY WITH LH HORIZONTAL TAILPIPE EXITING FORWARD OF REAR TIRES

6 GALLON DIESEL EXHAUST FLUID TANK

HORTON DRIVEMASTER ADVANTAGE ON/OFF FAN DRIVE

AUTOMATIC FAN CONTROL WITHOUT DASH SWITCH, NON ENGINE MOUNTED

CUMMINS SPIN ON FUEL FILTER

COMBINATION FULL FLOW/BYPASS OIL FILTER

1100 SQUARE INCH ALUMINUM RADIATOR

ANTIFREEZE TO -34F, OAT (NITRITE AND SILICATE FREE) EXTENDED LIFE COOLANT

GATES BLUE STRIPE COOLANT HOSES OR EQUIVALENT  
CONSTANT TENSION HOSE CLAMPS FOR COOLANT HOSES  
RADIATOR DRAIN VALVE  
ELECTRIC GRID AIR INTAKE WARMER  
DELCO 12V 38MT HD STARTER WITH INTEGRATED MAGNETIC SWITCH

### **Transmission**

ALLISON 3000 EVS 6 SPD AUTOMATIC TRANSMISSION WITH PTO PROVISION

### **Transmission Equipment**

MAGNETIC PLUGS, ENGINE DRAIN, TRANSMISSION DRAIN, AXLE(S) FILL AND DRAIN  
PUSH BUTTON ELECTRONIC SHIFT CONTROL, DASH MOUNTED  
TRANSMISSION PROGNOSTICS - ENABLED 2013  
WATER TO OIL TRANSMISSION COOLER, IN RADIATOR END TANK  
TRANSMISSION OIL CHECK AND FILL WITH ELECTRONIC OIL LEVEL CHECK  
SYNTHETIC TRANSMISSION FLUID (TES-295 COMPLIANT)

### **Front Axle and Equipment**

DETROIT DA-F-18.0-5 18,000# FL1 71.0 KPI/3.74 DROP SINGLE FRONT AXLE  
MERITOR 16.5X6 Q+ CAST SPIDER CAM FRONT BRAKES, DOUBLE ANCHOR, FABRICATED SHOES  
FIRE AND EMERGENCY SEVERE SERVICE, NON-ASBESTOS FRONT LINING  
FRONT OIL SEALS  
BENDIX VERSAJUST AUTOMATIC FRONT SLACK ADJUSTERS  
TRW TAS-85 POWER STEERING  
MINERAL SAE 80/90 FRONT AXLE LUBE

### **Front Suspension**

18,000# TAPERLEAF FRONT SUSPENSION  
GRAPHITE BRONZE BUSHINGS WITH SEALS - FRONT SUSPENSION  
FRONT SHOCK ABSORBERS

### **Rear Axle and Equipment**

MT-40-14X 40,000# R-SERIES TANDEM REAR AXLE  
6.43 REAR AXLE RATIO  
IRON REAR AXLE CARRIER WITH OPTIONAL HEAVY DUTY AXLE HOUSING  
MXL 17T MERITOR EXTENDED LUBE MAIN DRIVELINE WITH HALF ROUND YOKES  
DRIVER CONTROLLED TRACTION DIFFERENTIAL - BOTH TANDEM REAR AXLES  
MERITOR 16.5X7 Q+ CAST SPIDER CAM REAR BRAKES, DOUBLE ANCHOR, FABRICATED SHOES  
FIRE AND EMERGENCY SEVERE SERVICE NON-ASBESTOS REAR BRAKE LINING  
REAR OIL SEALS  
BENDIX VERSAJUST AUTOMATIC REAR SLACK ADJUSTERS  
MINERAL SAE 80/90 REAR AXLE LUBE

### **Rear Suspension**

TUFTRAC GEN2 40,000# REAR SPRING SUSPENSION  
55 INCH AXLE SPACING  
FORE/AFT AND TRANSVERSE CONTROL RODS  
REAR SHOCK ABSORBERS - TWO AXLES (TANDEM)

## Brake System

AIR BRAKE PACKAGE  
WABCO 4S/4M ABS WITH TRACTION CONTROL, WITH ESC  
STANDARD BRAKE SYSTEM VALVES  
STANDARD AIR SYSTEM PRESSURE PROTECTION SYSTEM  
BW AD-9 BRAKE LINE AIR DRYER WITH HEATER  
STEEL AIR BRAKE RESERVOIRS  
BW DV-2 AUTO DRAIN VALVE WITH HEATER - WET TANK

## Trailer Connections

UPGRADED CHASSIS MULTIPLEXING UNIT  
UPGRADED BULKHEAD MULTIPLEXING UNIT

## Wheelbase & Frame

7800MM (307 INCH) WHEELBASE  
7/16X3-9/16X11-1/8 INCH STEEL FRAME (11.11MMX282.6MM/0.437X11.13 INCH) 120KSI  
1/4 INCH (6.35MM) C-CHANNEL INNER FRAME REINFORCEMENT  
3225MM (127 INCH) REAR FRAME OVERHANG  
CALC'D BACK OF CAB TO REAR SUSP C/L (CA) : 241.54 in

## Chassis Equipment

THREE-PIECE 14 INCH CHROME STEEL BUMPER WITH COLLAPSIBLE ENDS AND LH  
WING CUTOUT FOR SPEAKER  
FRONT TOW HOOKS - FRAME MOUNTED  
FENDER AND FRONT OF HOOD MOUNTED FRONT MUDFLAPS  
GRADE 8 THREADED HEX HEADED FRAME FASTENERS

## Fuel Tanks

50 GALLON RECTANGULAR ALUMINUM FUEL TANK - LH  
PLAIN ALUMINUM/PAINTED STEEL FUEL/HYDRAULIC TANK(S) WITH PAINTED BANDS  
FUEL/WATER SEPARATOR WITH WATER IN FUEL SENSOR AND 12 VOLT PREHEATER

## Tires

MICHELIN XZY-3 385/65R22.5 18 PLY RADIAL FRONT TIRES  
MICHELIN X MULTI D 11R22.5 14 PLY RADIAL REAR TIRES

## Hubs

CONMET PRESET PLUS PREMIUM IRON FRONT HUBS  
CONMET PRESET PLUS PREMIUM IRON REAR HUBS

## Wheels

ALCOA LVL ONE 82462X 22.5X12.25 10-HUB PILOT 4.68 INSET 10-HAND ALUMINUM DISC  
FRONT WHEELS  
ALCOA LVL ONE 88267X 22.5X8.25 10-HUB PILOT ALUMINUM DISC REAR WHEELS

## Cab Exterior

106 INCH BBC FLAT ROOF ALUMINUM CONVENTIONAL CAB  
AIR CAB MOUNTING  
2-1/2 INCH FENDER EXTENSIONS  
LH AND RH EXTERIOR GRAB HANDLES WITH SINGLE RUBBER INSERT  
HOOD MOUNTED CHROMED PLASTIC GRILLE



FIBERGLASS HOOD  
TUNNEL/FIREWALL LINER  
DUAL 25 INCH ROUND STUTTER TONE HOOD MOUNTED AIR HORNS WITH DUAL LANYARDS  
DUAL ELECTRIC HORNS  
LED HEADLIGHT ASSEMBLY AND INCANDESCENT MARKER/TURN LAMP WITH CHROME BEZEL  
LED AERODYNAMIC MARKER LIGHTS  
STANDARD FRONT TURN SIGNAL LAMPS  
DUAL WEST COAST BRIGHT FINISH HEATED MIRRORS WITH LH AND RH REMOTE  
LH AND RH 8 INCH BRIGHT FINISH CONVEX MIRRORS MOUNTED UNDER PRIMARY MIRRORS  
NO REAR WINDOW  
TINTED DOOR GLASS LH AND RH WITH TINTED NON-OPERATING WING WINDOWS  
RH AND LH ELECTRIC POWERED WINDOWS, PASSENGER SWITCHES ON DOOR(S)  
1-PIECE SOLAR GREEN GLASS WINDSHIELD  
2 GALLON WINDSHIELD WASHER RESERVOIR WITHOUT FLUID LEVEL INDICATOR, FRAME MOUNTED

### **Cab Interior**

OPAL GRAY VINYL INTERIOR  
MOLDED PLASTIC DOOR PANEL WITHOUT VINYL INSERT WITH ALUMINUM KICKPLATE LOWER DOOR  
BLACK MATS WITH SINGLE INSULATION  
FORWARD ROOF MOUNTED CONSOLE WITH UPPER STORAGE COMPARTMENTS WITHOUT NETTING  
IN DASH STORAGE BIN  
(2) CUP HOLDERS LH AND RH DASH  
GRAY/CHARCOAL FLAT DASH  
HEATER, DEFROSTER AND AIR CONDITIONER  
MAIN HVAC CONTROLS WITH RECIRCULATION SWITCH  
PREMIUM INSULATION  
SOLID-STATE CIRCUIT PROTECTION AND FUSES  
12V NEGATIVE GROUND ELECTRICAL SYSTEM  
DOME DOOR ACTIVATED LH AND RH, DUAL READING LIGHTS, FORWARD CAB ROOF  
LH AND RH ELECTRIC DOOR LOCKS  
SEATS INC 911 UNIVERSAL SERIES HIGH BACK AIR SUSPENSION DRIVER SEAT WITH NFPA 1901-2009/2016 COMPLIANT SEAT SENSOR  
SEATS INC 911 UNIVERSAL SERIES HIGH BACK AIR SUSPENSION PASSENGER SEAT WITH NFPA 1901-2009/2016 COMPLIANT SEAT SENSOR  
BLACK CORDURA PLUS CLOTH SEAT COVERS  
NFPA 1901-2009 HIGH VISIBILITY ORANGE SEAT BELTS  
ADJUSTABLE TILT AND TELESCOPING STEERING COLUMN  
4-SPOKE 18 INCH (450MM) STEERING WHEEL  
DRIVER AND PASSENGER INTERIOR SUN VISORS

### **Instruments & Controls**

WOODGRAIN DRIVER INSTRUMENT PANEL  
BLACK GAUGE BEZELS

LOW AIR PRESSURE INDICATOR LIGHT AND AUDIBLE ALARM  
 2 INCH PRIMARY AND SECONDARY AIR PRESSURE GAUGES  
 ENGINE COMPARTMENT MOUNTED AIR RESTRICTION INDICATOR WITH GRADUATIONS,  
 WITH WARNING LIGHT IN DASH  
 97 DB BACKUP ALARM  
 ELECTRONIC CRUISE CONTROL WITH SWITCHES IN LH SWITCH PANEL  
 ICU3S, 132X48 DISPLAY WITH DIAGNOSTICS, 28 LED WARNING LAMPS AND DATA  
 LINKED  
 2 INCH ELECTRIC FUEL GAUGE  
 ELECTRICAL ENGINE COOLANT TEMPERATURE GAUGE  
 2 INCH TRANSMISSION OIL TEMPERATURE GAUGE  
 ENGINE AND TRIP HOUR METERS INTEGRAL WITHIN DRIVER DISPLAY  
 ELECTRIC ENGINE OIL PRESSURE GAUGE  
 OVERHEAD INSTRUMENT PANEL  
 ELECTRONIC MPH SPEEDOMETER WITH SECONDARY KPH SCALE  
 ELECTRONIC 3000 RPM TACHOMETER  
 IGNITION SWITCH CONTROLLED ENGINE STOP  
 DIGITAL VOLTAGE DISPLAY INTEGRAL WITH DRIVER DISPLAY  
 SINGLE ELECTRIC WINDSHIELD WIPER MOTOR WITH DELAY  
 MARKER LIGHT SWITCH INTEGRAL WITH HEADLIGHT SWITCH  
 ONE VALVE PARKING BRAKE SYSTEM WITH DASH VALVE CONTROL AUTONEUTRAL  
 AND WARNING INDICATOR  
 SELF CANCELING TURN SIGNAL SWITCH WITH DIMMER, WASHER/WIPER AND HAZARD  
 IN HANDLE  
 INTEGRAL ELECTRONIC TURN SIGNAL FLASHER WITH HAZARD LAMPS OVERRIDING  
 STOP LAMPS

## Design

TWO COLOR CUSTOM PAINT EMERGENCY 4

## Color

CAB COLOR A: 836914 BLACK  
 CAB COLOR B: 836914 RED  
 BLACK, HIGH SOLIDS POLYURETHANE FRAME/CHASSIS PAINT

## **CAB TO AXLE DIMENSION**

Cab to axle will be 241.5".

### **CAB/CHASSIS PREPAYMENT (100% PRE-PAY)**

The specified cab/chassis cost shall be deducted from the 100% Pre-Payment when payment is due from the chassis manufacturer.

### **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**

The front bumper shall be as provided by the cab/chassis manufacturer.

## **BUMPER GRAVELSHIELD**

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

## **AIR HORN(S)**

Air horn(s) if specified shall be supplied and installed by the cab/chassis manufacturer.

## **MOTOR DRIVEN SIREN**

There shall be a Federal model Q2B motor driven rotary siren with chrome plated grill and housing, recess in the extended front bumper. The siren shall be wired through the master warning light switch, and properly wired with heavy copper cable for minimum voltage drop.

The siren shall be located on the streetside of the front bumper.

There shall be a siren brake installed in the rocker switch control panel to activate the siren brake.

## **SIREN ACTIVATION**

There shall be one foot switch provided to activate the siren for the driver. The switch shall be mounted on the floor in a location to prevent accidental activation.

## **FRONT TOW PROVISIONS**

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

## **SIREN SPEAKER**

One (1) Cast Products Inc. model SA4311, 100 watt siren speaker shall be provided, recessed in the front bumper.

The siren speaker shall be located on the streetside of front bumper.

## **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:

1. 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.
2. 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

The existing exhaust tailpipe shall be extended to ahead of the rear axle on the streetside.

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.

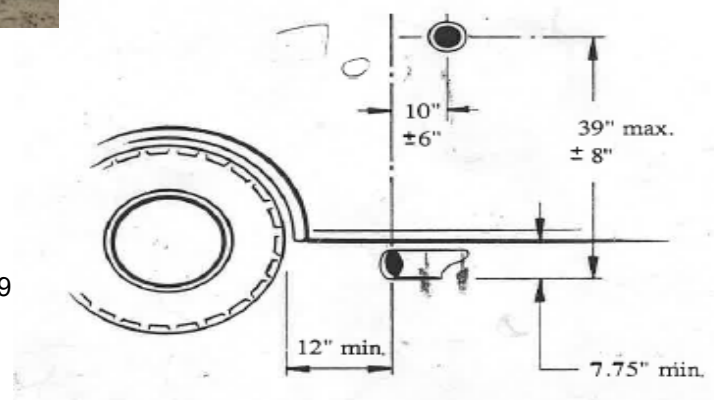
## NEDERMAN EXHAUST ANCHOR PLATE

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 should be 24".

**Note: Forward Direction**



The tail pipe(s) shall terminate parallel to rear axle and flush with body.



## **COMMUNICATION RADIO/ANTENNA INSTALLATION**

There shall be one (1) mobile communication radio(s) with antenna installed in the cab.

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

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

**Note: This will be one install with two (2) remote heads.**

## **CAB DOOR INTERIOR HAZARD LIGHT - TWO DOOR CAB**

There shall be one (1) surface mounted flashing LED light mounted to the inside of each cab entry door to provide a visual indication to oncoming traffic that the door is open. Each light shall be activated when the door is open.

## **SCBA SEAT AIR PACK BRACKETS**

No SCBA air pack bracket(s) shall be provided in specified commercial cab SCBA seats. South Metro Fire Rescue will provide and install necessary bracket(s) after delivery.

## **SEAT BELT COLOR AND MOUNTING**

The seat belt webbing color requirement of 14.1.3.3 shall not apply to vehicles with a GVWR of 19,500 lb (8,845 kg) or less.

Section 14.1.3.3 of the NFPA 1901 Standards, requires all seat belt webbing in cab to be bright red or bright orange in color, and the buckle portion of the seat belt shall be mounted on a rigid or semi rigid stalk such that the buckle remains positioned in an accessible location.

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

Sections 14.1.3.2 and 14.1.3.3 of the NFPA 1901 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".

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

## **SEAT BELT MONITORING AND VEHICLE DATA RECORDER (VDR) SYSTEMS**

### **SEAT BELT MONITORING**

A Weldon 6444 series gateway interface module shall be integrated into V-MUX multiplex system display to allow the driver to know if all persons seated in the vehicle are secured with seat belts before moving the vehicle. Built-in smart seating logic shall detect if the correct sit and buckle sequence is not followed for all seats. System shall also provide an output for an external alarm. Weldon diagnostic port will be located under dash on driver side. System shall include the following features;

### **VEHICLE DATA RECORDER (VDR)**

The vehicle data recorder shall have the following features;

- Recorded Data Includes: Vehicle Speed, Acceleration, Deceleration, Engine Speed, Engine Throttle Position, ABS Event, Seat Occupied Status, Seat Belt Status, Master Optical Warning Switch, Park Brake, Service Brake, Time, Date and Engine Hours.
- Password Protected by the customer
- Six (6) seat position inputs for occupied and belts buckled. Additional six (6) seat expansion module available.
- Easily interfaces with V-MUX™ or other multiplexing systems
- Data is extracted by a standard, mini USB cable

### **OCCUPANT RESTRAINT INDICATOR**

The occupant restraint indicator shall have the following features;

- Will be displayed on Vista IV panel.
- Supports commercial and custom cab seating layouts; up to 12 seats
- Built-in audible alarm
- Use in conjunction with Vehicle Data Recorder (VDR)

### **IGNITION KEY**

If the vehicle is specified to have an ignition key it will be attached to steering column or dash with vinyl covered steel cable.

### **CROSSFIRE DUAL**

Rear axle(s) shall be provided with one (1) set of Crossfire model CF-100-ST tire equalization system with stainless steel hoses and the following features;

- maximizes tire life
- decreases rolling resistance for increased fuel mileage
- cuts maintenance time due to single-point inflation and the visual pressure gauge
- improves stability, braking and overall safety
- installs in minutes and requires little maintenance
- pays for itself in less than a year
- guaranteed for two (2) years
- internal check valve to prevent air loss in other tire
- visual color indicator; black = under inflated, yellow = correct, red = over inflated

### **HELMET STORAGE, DRIVING AREA**

No helmet storage is required in the cab driving 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, CREW AREA**

No helmet storage is required in the cab crew 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 CRASH TEST CERTIFICATION**

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

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

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

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

### **CAB MIRRORS, DRIVER ADJUSTABLE**

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

### **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.)

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

Powder coat shall be hammertone silver/grey. Cardinal T064-GR05

### **CAB STEP OVERLAY**

One (1) of the cab/chassis supplied entry steps will be overlaid with 1/8" NFPA compliant aluminum treadplate non-skid stepping surface.

The maximum stepping height shall not exceed 18", with the exception of the ground to first step, which shall not exceed 24" when the vehicle is loaded to its estimated in-service weight. All steps shall have a minimum area of 35 sq in and shall be of such a shape that a 5" diameter disk does not overlap any side when placed on the step, and shall be arranged to provide a t least 8" of clearance between the leading edge of the step and any obstruction. All platforms shall have a minimum depth of 8" from the leading edge of the platform to any obstruction.

### **CAB STEP LIGHTS**

Two (2) (one each side) OnScene 8" Access white LED light(s) installed on the vehicle capable of providing illumination at a minimum level of 2 fc (20 lx) on ground areas within 30 in. (800 mm) of the edge of the vehicle in areas designed for personnel to climb onto or descend from the vehicle to the ground level.

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

### **HUB AND NUT COVERS**

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

### **MUDFLAPS**

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

### **AIR BRAKE SYSTEM QUICK BUILD-UP**

The air brake quick build-up system shall be supplied from the specified automatic electric compressor in order to maintain full operating air pressure while the vehicle is not running.

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

### **CHASSIS AIR TANK DRAINS**

The cab/chassis air brake system tank drains shall remain as provided by cab/ chassis manufacturer.

### **CHASSIS ENGINE COOLING SYSTEM DRAIN VALVES**

Readily accessible drain valves shall be installed at the lowest point of the cooling system and at such other points as are necessary to permit complete removal of the coolant from the system.

Drain valves shall be designed or positioned such that they will not open accidentally.

### **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 **Shipped Loose**.

### **AUTOMATIC VEHICLE LEVELING SYSTEM**

A Quadra Manufacturing, Inc. "Big Foot" model QEIIAM-26 shall be provided and installed on the completed vehicle designed for large heavy duty vehicles. The system shall have the following features;

- Simple, one touch operation for fully automatic leveling of the vehicle or trailer.
- Individual power units at each corner, which means nearly 4x the pump life compared to ordinary central pump systems due to each pump only running 25% of the time, less cycles = less wear & tear.
- All-Up safety feature signals if one or more of the cylinders are not fully retracted before you drive off.
- Manual adjustment feature that allows you to operate each cylinder individually.

- Four powder coated cylinders made at our facility capable of lifting 17,000 pounds each with 18" of stroke.
- Four weatherproof hydraulic power units, each with an American made marine pump & motor wrapped in a steel housing, allows the unit to be mounted outside in the elements so it does not take up storage space.
- 100 square inch "Bigfoot" pads for secure ground contact during operation.
- Emergency Retract operation.

The system shall be provided with Lifetime Cylinders, 2 Years Parts, 1 Year Labor limited warranty from Quadra Manufacturing, Inc.

### **FRONT CAB INTERIOR COMPONENTS**

#### **MOBILE DATA TERMINAL**

There shall be a MDT mount provided by South Metro Fire Rescue and installed on officer side dash area for a South Metro Fire Rescue supplied mobile data terminal.



## **DEF FLUID FILL**

The DEF fluid fill shall be as supplied by commercial cab/chassis manufacturer.

## **BODY DESIGN**

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

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

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

The fabrication of the body shall be formed sheet metal. Formed components shall allow the South Metro Fire Rescue to have the body repaired locally in the case where any object has struck the body and caused damage. The use of proprietary extrusions will prevent the South Metro Fire Rescue from such repair and shall NOT be used. All fabricated body components to be cut by a laser or water-jet for superior cut edge quality.

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

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

## **EXTERIOR ALUMINUM BODY**

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

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

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

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

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

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

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

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

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

### **ROOF CONSTRUCTION**

The roof structure shall be integral with the body sheet metal construction and shall be an all welded assembly. The body roof structure shall be overlaid with not less than 3/16" aluminum 3003H-14 alloy NFPA compliant non-skid tread plate and welded to roof structure and body sheet metal. All seams in roof material shall be fully and continuously welded to prevent entry of moisture.

There shall be a total of four (4) 2" x 2" x 1/4" 6061-T6 alloy aluminum "C" channels running the length of body, two (2) on each outboard side. These "C" channels shall be used for roof support and in addition shall be used for mounting of any specified reels. This open "C" channel design along with special reel mounting clips allows for a universal location of any specified reels within each compartment.

In between the two (2) center "C" channels running the length of body shall be 2" x 2" x 1/4" 6061-T6 alloy aluminum tubing running in between and welded in place on approximate 16" centers to support roof and/or walkway structure if specified.

A 2" formed radius shall be provided along the body sides and utilized as a wiring trough. The use of aluminum extrusions in this area shall not be acceptable, .

### **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 6" x 1/4" aluminum tubes, the same width as the chassis frame rails, NO EXCEPTION. Welded to this tubing shall be cross members of 2" x 6" x 1/4" aluminum. 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 six (6) spring loaded body mounts. Each mount shall be configured using a two-piece encapsulated slide bracket. The two (2) brackets shall be fabricated of heavy duty 1/4" thick steel and shall have a powder coat finish to resist any corrosion. Each mounting assembly shall utilize two (2) 3/4" diameter x 6" long grade 8 bolts and two (2) heavy duty springs. The assembly design shall allow the body and subframe to act as one (1) component, separate from the chassis. As the chassis frame twists under driving conditions, the spring mounting system shall eliminate any stress from being transferred into the body. The spring loaded body mounts shall also prevent frame side rail or body damage caused by unevenly distributed stress and strains due to load and chassis movement.

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

## **10" REAR STEP BUMPER**

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

## **REAR TOW EYES**

There shall be two (2) heavy duty rear mounted tow eyes securely attached to the body subframe, below 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.

## **GROUND LIGHTS**

There shall be two (2) OnScene 8" Access white LED lights installed below bumper capable of providing illumination at a minimum level of 2 fc (20 lx) on ground areas within 30 in. (800 mm) of the edge of the vehicle in areas designed for personnel to climb onto or descend from the vehicle to the ground level.

Lighting shall be switchable but activated automatically when the vehicle park brake is set.

## **WHEEL WELL EXTERIOR PANEL**

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

## **RUBBER BODY FENDERETTES**

The body wheel well openings shall be provided with round radius, rubber fenderettes. The fenderettes shall be bolted and easily replaceable if damaged. The fenderettes shall be installed using stainless steel fasteners with plastic isolators to help prevent corrosion.

## **WHEEL WELL LINERS**

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

## **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;

- 1) Clean bare metal with a wax and grease remover using low lint rags.
- 2) 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.
- 3) Re-clean bare metal using a wax and grease remover and low lint rags.
- 4) 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.
- 5) Inspect, putty fill, and dry guild coat entire body surface and DA sand using 180-400 grit dry paper.
- 6) Re-clean bare metal using a wax and grease remover using low lint rags.
- 7) 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.
- 8) 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.
- 9) 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.).
- 10) 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.
- 11) 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, a Mylar isolation tape, or gasket shall be used to prevent damage to the finish painted surface. These components shall be fastened to body using either a plastic insert into body metal with stainless steel screws or zinc coated nut-surts into body surface using stainless steel bolts to prevent corrosion from dissimilar metals.

## **ELECTROLYSIS CORROSION CONTROL**

The vehicle shall be assembled using ECK brand or similar corrosion control compound 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 - TWO COLOR**

The body shall be painted with a two-tone color of PPG Delfleet® Evolution paint per approved customer spray-out. The two-tone paint break line will be at upper body drip rail location unless an alternate location is approved at the pre-construction meeting.

### **NOTE: Break at rear entry door drip rail**

- 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 prevent corrosion under the vehicle.

## **UNDERCOAT WARRANTY**

The body undercoating shall have a warranty provided by the manufacturer for the lifetime of the vehicle or twenty (20) years, whichever occurs first. The warranty shall be transferable between vehicle owners. Should the undercoating material applied to the underside of the body and wheel wells of the vehicle ever flake off, peel, chip or crack due to drying out, the damaged area shall be re-sprayed without charge to the vehicle owner.



## **PAINT WARRANTY**

The vehicle shall be provided with a ten (10) year non-prorated warranty to the original owner. Warranty is provided by PPG Inc. A warranty sheet with all conditions and maintenance procedures shall be provided with the delivered vehicle. **Pro-rated warranties will not be acceptable.**

## **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.

## **NFPA REQUIRED REFLECTIVE STRIPE**

The NFPA 1901 required reflective striping including the rear chevron shall be furnished and installed by the Dealer or the South Metro Fire Rescue prior to the unit being entered into emergency service. The Manufacturer will NOT be required to furnish or install any material.

## **CHEVRON REFLECTIVE STRIPE - REAR SIDES PANELS**

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

The rear side panels of the body on each side of a rear stairway or compartment shall have a chevron style reflective stripe, extending from bumper to full body height. Each chevron panel shall be a full sheet and shall have a 3M UV over laminate to protect from UV rays, scene damage, and everyday use. Chevron panel shall have a minimum 10 year warranty for material failure, and colorfastness.

The stripe material shall be 3M Scotchlite 680 series graphic film.

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

## **EXTERIOR COMPARTMENT DOORS**

### **FLUSH FITTING HINGED DOOR CONSTRUCTION**

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

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

The doors shall be flush mounted so that the outer surface is in line with the side body surface. Lap or bevel type constructed doors, doors framed with extrusions, or doors requiring rubber bumpers to prevent unnecessary contact are NOT ACCEPTABLE.

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

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

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

Each door shall be capable of being opened or closed without unlatching. Door checks shall be bolted to the upper compartment door header and the box pan of the door. Door checks that require unlatching by hand will NOT BE ACCEPTABLE.

Vertically hinged door openings up to 32" wide shall be single door construction. Door openings over 32" shall be double door construction with the forward first opening door overlapping the second opening door.

### **BODY HEIGHT MEASUREMENTS**

The vertical body dimensions shall be as follows:

#### **AHEAD OF REAR AXLE**

	<u>Description</u>	<u>Dimension</u>
A	Bottom of Subframe to Top of Body	88.7"
B	Bottom of Subframe to Bottom of Body	22.5"
C	Total Body Height	111.2"
D	Compartment Height Above Frame	48.0"
E	Compartment Height Below Frame	25.0"
F	Vertical Door Opening - (Full Height Compartment):	
	-with roll-up door	65.0"
	-with hinged door	68.5"
G	Vertical Door Opening (Below Frame Compartment):	
	-with hinged door	19.0"

#### **ABOVE REAR AXLE**

	<u>Description</u>	<u>Dimension</u>
H	Vertical Door Opening - Above Rear Wheel	
	-with roll-up door	34.0"
	-with hinged door	37.5"

#### **BEHIND REAR AXLE**

	<u>Description</u>	<u>Dimension</u>
I	Bottom of Subframe to Bottom of Body	20.0"
J	Compartment Height Above Frame	48.0"
K	Compartment Height Below Frame	22.5"
L	Vertical Door Opening - (Full Height Compartment):	
	-with roll-up door	62.0"
	-with hinged door	65.5"
M	Vertical Door Opening - (Below Frame Compartment):	
N	-with hinged door	16.5"

#### **GENERAL**

	<u>Description</u>	<u>Dimension</u>
O	Bottom of Drip Rail to Top of Body	38.5"
P	Walk-in Interior Height	78.0" (min.)

(Dimensions are approximate and subject to change during construction or design process.)

#### **BODY WIDTH DIMENSIONS**

The body shall be 100.0" wide, and 102.0" wide at drip rails. Interior compartment depth dimensions shall be approximately:

<u>Area Description</u>	<u>Dimension</u>
Transverse above subframe	95.0"
Compartment depth below subframe	24.5"

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

The interior useable compartment width shall be approximately 59.5" wide.

- This compartment shall have a flush fitting horizontally hinged, drop-down style compartment door. The door exterior shall be painted job color.
- The compartment door opening shall be approximately 52.0" wide.
- The interior door panel shall have a smooth un-painted aluminum panel.
- The hinged door(s) shall have a stainless steel 6" offset bent D-ring non-locking handle. A gasket shall be placed between handle and door. Door latches shall be a two-point rotary slam, double-catch latch, recessed inside the double panel door with striker plate.
- The hinged door(s) shall have a pair of tailgate style mechanisms to stop the door at 90 degrees. Each door shall be capable of being closed without unlatching.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior door track to activate compartment lighting and door ajar signal in cab when door is opened.

### **COMPARTMENT LAYOUT**

- One (1) OnScene Access white LED mounted at the top of the compartment toward the door opening.
- The controls for the specified light tower(s).
- One (1) 6" x 7-1/16" large air vent shall be provided in lower compartment wall for air displacement.
- The 12 volt electrical distribution panel shall be located in the front lower compartment.

## **STREETSIDE COMPARTMENT - AHEAD OF REAR WHEELS (S2)**

The interior useable compartment width shall be approximately 59.5" wide.

- This compartment shall have a flush fitting horizontally hinged, drop-down style compartment door. The door exterior shall be painted job color.
- The compartment door opening shall be approximately 52.0" wide.
- The interior door panel shall have a smooth un-painted aluminum panel.
- The hinged door(s) shall have a stainless steel 6" offset bent D-ring non-locking handle. A gasket shall be placed between handle and door. Door latches shall be a two-point rotary slam, double-catch latch, recessed inside the double panel door with striker plate.
- The hinged door(s) shall have a pair of tailgate style mechanisms to stop the door at 90 degrees. Each door shall be capable of being closed without unlatching.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior door track to activate compartment lighting and door ajar signal in cab when door is opened.

## **COMPARTMENT LAYOUT**

- There shall be vertically mounted aluminum Shelf-Trac welded to compartment walls for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- One (1) OnScene Access white LED mounted at the top of the compartment toward the door opening.
- One (1) OnScene Solutions Rough-Service 9" white LED light(s) shall be provided below the body. Each light shall be mounted in an extruded aluminum housing to protect against damage from personnel or equipment. Light(s) shall be switchable but activated automatically when the park brake is set.
- One (1) 6" x 7-1/16" large air vent shall be provided in lower compartment wall for air displacement.

### **STREETSIDE COMPARTMENT - AHEAD OF REAR WHEELS (S3)**

The interior useable compartment width shall be approximately 59.5" wide.

- This compartment shall have a flush fitting horizontally hinged, drop-down style compartment door. The door exterior shall be painted job color.
- The compartment door opening shall be approximately 52.0" wide.
- The interior door panel shall have a smooth un-painted aluminum panel.
- The hinged door(s) shall have a stainless steel 6" offset bent D-ring non-locking handle. A gasket shall be placed between handle and door. Door latches shall be a two-point rotary slam, double-catch latch, recessed inside the double panel door with striker plate.
- The hinged door(s) shall have a pair of tailgate style mechanisms to stop the door at 90 degrees. Each door shall be capable of being closed without unlatching.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior door track to activate compartment lighting and door ajar signal in cab when door is opened.

### **COMPARTMENT LAYOUT**

- There shall be vertically mounted aluminum Shelf-Trac welded to compartment walls for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be one (1) 400 lbs. slide-out tray(s) approximately 24" deep and as wide as the compartment layout or door opening permits. The tray top shall be fabricated from 3/16" 3003 aluminum sheet with a 3" vertical lip and welded corners to form a box type tray surface. The sliding tracks shall extend 100% of the slide length. The tray assembly shall utilize a pneumatic cylinder mounted on underside to hold the tray in both the extended and closed positions.
  - The above component(s) shall have a smooth un-painted finish.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front and side faces of the tray. The striping shall be 2" wide and red/white in color.
- One (1) OnScene Access white LED mounted at the top of the compartment toward the door opening.
- One (1) 6" x 7-1/16" large air vent shall be provided in lower compartment wall for air displacement.

### **STREETSIDE COMPARTMENT - BEHIND REAR WHEEL (S5 LOWER)**

The interior useable compartment space shall be approximately 70.5" wide.

- This compartment shall have flush fitting vertically hinged compartment door. The door exterior shall be painted job color.
- The compartment door opening shall be approximately 64.0" wide.
- The compartment door shall provide compartment with ventilation involving door mounted power fans and expanded metal grating. The interior door panel shall have a smooth un-painted aluminum panel.
- The hinged door(s) shall have a stainless steel 6" offset bent D-ring non-locking handle. A gasket shall be placed between handle and door. Door latches shall be a two-point rotary slam, double-catch latch, recessed inside the double panel door with striker plate.
- The hinged door(s) shall have a pneumatic cylinder to hold door in the open and closed positions. Each door shall be capable of being closed without unlatching. Door checks shall be bolted to the compartment door header and the box pan of the door.
- The door ajar switch shall be provided with specified hinged door and pneumatic cylinder switch assembly to activate compartment lighting and door ajar signal in cab when door is opened.
- Compartment threshold protection shall be provided on the bottom edge of the compartment door sill. The threshold protection shall be fabricated from brushed 304 stainless steel sheet metal.

### **COMPARTMENT LAYOUT**

- Two (2) OnScene Access white LED, full height compartment light, vertically mounted.
- The diesel engine driven generator location.
- One (1) OnScene Solutions Rough-Service 9" white LED light(s) shall be provided below the body. Each light shall be mounted in an extruded aluminum housing to protect against damage from personnel or equipment. Light(s) shall be switchable but activated automatically when the park brake is set.

### **STREETSIDE COMPARTMENT - REAR (S5 UPPER)**

The interior useable compartment space shall be approximately 70.5" wide.

- This compartment shall have flush fitting vertically hinged compartment door. The door exterior shall be painted job color.
- The compartment door opening shall be approximately 62.0" wide.
- The interior door panel shall have a smooth un-painted aluminum panel.
- The hinged door(s) shall have a stainless steel 6" offset bent D-ring non-locking handle. A gasket shall be placed between handle and door. Door latches shall be a two-point rotary slam, double-catch latch, recessed inside the double panel door with striker plate.
- The hinged door(s) shall have a pneumatic cylinder to hold door in the open and closed positions. Each door shall be capable of being closed without unlatching. Door checks shall be bolted to the compartment door header and the box pan of the door.
- The door ajar switch shall be provided with specified hinged door and pneumatic cylinder switch assembly to activate compartment lighting and door ajar signal in cab when door is opened.
- Compartment threshold protection shall be provided on the bottom edge of the compartment door sill. The threshold protection shall be fabricated from brushed 304 stainless steel sheet metal.

### **COMPARTMENT LAYOUT**

- One (1) Hannay EF1514-17-18 low pressure air hose reel(s) shall be provided in this compartment. Reel shall be designed to hold 110% of the capacity needed.
  - 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: (1) Utility air or breathing air, (2) Operating pressure, (3) Total hose length, (4) Hose size (ID).
  - The hose reel shall equipped with 200' of 3/8" Parker Series 7092 GST II low pressure air hose rated for 300 PSI maximum pressure. A molded plastic ball clamp shall be provided on the hose to stop it at the 4-way roller. The hose shall be Red in color with blue color coded end.
  - The air supply shall be from the utility air compressor.
  - A reel shut-off valve, 0 - 125 psi adjustable low pressure regulator, and 0 - 300 psi gauge shall be provided on an aluminum control panel with flow diagram graphic overlay near the air reel location, not exceeding 72" from ground.



- The fairlead roller shall be mounted directly to the reel.
- Two (2) OnScene Access white LED, full height compartment light, vertically mounted.
- The utility air compressor.

### **CURBSIDE COMPARTMENT - FRONT (C1 UPPER)**

The interior useable compartment shall be large enough to hold a 34" Monitor.

- This compartment shall have flush fitting horizontally hinged, lift-up and drop down style compartment doors. The upper door shall be approximately two-thirds of the overall compartment height and the lower door shall be able to be used as a work surface. The door exterior shall be painted job color.
- The compartment door opening shall be approximately 50.5" wide.
- The interior door panel shall have a smooth un-painted aluminum panel.
- The hinged door(s) shall have a stainless steel 6" offset bent D-ring non-locking handle. A gasket shall be placed between handle and door. Door latches shall be a two-point rotary slam, double-catch latch, recessed inside the double panel door with striker plate.
- The hinged door(s) shall have a pneumatic cylinder to hold door in the open and closed positions. Each door shall be capable of being closed without unlatching. Door checks shall be bolted to the compartment door header and the box pan of the door.
- The door ajar switch shall be provided with specified hinged door and pneumatic cylinder switch assembly to activate compartment lighting and door ajar signal in cab when door is opened.
- Compartment threshold protection shall be provided on the bottom edge of the compartment door sill. The threshold protection shall be fabricated from brushed 304 stainless steel sheet metal.

### **COMPARTMENT LAYOUT**

- The floor of the compartment above the frame rails shall be extended to the interior edge of the door. The floor shall have a 2" vertical lip and a 1" return to increase strength.
- One (1) OnScene Access white LED, full height compartment light, horizontally mounted. The light shall have a rocker switch to shut the light off to prevent glare on the monitor.

### **CURBSIDE COMPARTMENT - FRONT (C1 LOWER)**

The interior useable compartment width shall be approximately 49.5" wide.

- This compartment shall have a flush fitting horizontally hinged, drop-down style compartment door. The door exterior shall be painted job color.
- The compartment door opening shall be approximately 42.0" wide.
- The interior door panel shall have a smooth un-painted aluminum panel.
- The hinged door(s) shall have a stainless steel 6" offset bent D-ring non-locking handle. A gasket shall be placed between handle and door. Door latches shall be a two-point rotary slam, double-catch latch, recessed inside the double panel door with striker plate.
- The hinged door(s) shall have a pair of tailgate style mechanisms to stop the door at 90 degrees. Each door shall be capable of being closed without unlatching.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior door track to activate compartment lighting and door ajar signal in cab when door is opened.

### **COMPARTMENT LAYOUT**

- There shall be vertically mounted aluminum Shelf-Trac welded to compartment walls for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be one (1) adjustable shelf/shelves approximately 24" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edge.
  - The above component(s) shall have a smooth un-painted finish.
- One (1) OnScene Access white LED mounted at the top of the compartment toward the door opening.
- One (1) 6" x 7-1/16" large air vent shall be provided in lower compartment wall for air displacement.

## **CURBSIDE COMPARTMENT - AHEAD OF REAR WHEEL (C2)**

The interior useable compartment width shall be approximately 49.5" wide.

- This compartment shall have a flush fitting horizontally hinged, drop-down style compartment door. The door exterior shall be painted job color.
- The compartment door opening shall be approximately 42.0" wide.
- The interior door panel shall have a smooth un-painted aluminum panel.
- The hinged door(s) shall have a stainless steel 6" offset bent D-ring non-locking handle. A gasket shall be placed between handle and door. Door latches shall be a two-point rotary slam, double-catch latch, recessed inside the double panel door with striker plate.
- The hinged door(s) shall have a pair of tailgate style mechanisms to stop the door at 90 degrees. Each door shall be capable of being closed without unlatching.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior door track to activate compartment lighting and door ajar signal in cab when door is opened.

## **COMPARTMENT LAYOUT**

- There shall be vertically mounted aluminum Shelf-Trac welded to compartment walls for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be one (1) adjustable shelf/shelves approximately 24" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edge.
  - The above component(s) shall have a smooth un-painted finish.
- One (1) OnScene Access white LED mounted at the top of the compartment toward the door opening.
- One (1) OnScene Solutions Rough-Service 9" white LED light(s) shall be provided below the body. Each light shall be mounted in an extruded aluminum housing to protect against damage from personnel or equipment. Light(s) shall be switchable but activated automatically when the park brake is set.
- One (1) 6" x 7-1/16" large air vent shall be provided in lower compartment wall for air displacement.

### **CURBSIDE COMPARTMENT - AHEAD OF REAR WHEEL (C3)**

The interior useable compartment width shall be approximately 49.5" wide.

- This compartment shall have a flush fitting horizontally hinged, drop-down style compartment door. The door exterior shall be painted job color.
- The compartment door opening shall be approximately 42.0" wide.
- The interior door panel shall have a smooth un-painted aluminum panel.
- The hinged door(s) shall have a stainless steel 6" offset bent D-ring non-locking handle. A gasket shall be placed between handle and door. Door latches shall be a two-point rotary slam, double-catch latch, recessed inside the double panel door with striker plate.
- The hinged door(s) shall have a pair of tailgate style mechanisms to stop the door at 90 degrees. Each door shall be capable of being closed without unlatching.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior door track to activate compartment lighting and door ajar signal in cab when door is opened.

### **COMPARTMENT LAYOUT**

- There shall be vertically mounted aluminum Shelf-Trac welded to compartment walls for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be one (1) adjustable shelf/shelves approximately 24" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edge.
  - The above component(s) shall have a smooth un-painted finish.
- One (1) OnScene Access white LED mounted at the top of the compartment toward the door opening.
- One (1) 6" x 7-1/16" large air vent shall be provided in lower compartment wall for air displacement.

## **SIDE ENTRY DOOR**

Access shall be provided to the interior through a single side entry door with a clear door opening width of approximately 28.5".

Construction of the side entry door shall be with 1/8" aluminum exterior smooth plate and painted exterior body color choice. The interior door pan shall be constructed from 1/8" aluminum treadplate.

The door shall be hung on full height 14 gauge stainless steel hinge, with a 1/4" stainless steel pin. The hinge shall be bolted to the door and body with stainless steel machine screws at offset 5" centers. A polyester barrier film gasket shall be placed between the stainless steel hinge and door.

Full width padded foam cushion head bumper shall be provided above door opening. The head bumper shall be covered with matching interior vinyl and bolted to interior of door way.

The door latch mechanism shall include a stainless steel paddle type handle on interior. A polyester barrier film gasket shall be placed between the stainless steel handles and the aluminum door panels. The door latch shall be a double catch two-point safety slam latch recessed inside the double panel door with strike plate mounted top and bottom of door frame complying with FMVSS requirements.

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

## **WINDOW(S)**

There shall be one (1) 18" wide x 22" high, double-paned insulated, non-sliding window(s) installed in the entrance door. Each window shall have tinted automotive type safety glass mounted in an extruded aluminum frame. The frame shall have a black anodized finish.

## **WINDOW(S)**

There shall be one (1) 18" wide x 22" high, double-paned insulated, vertical sliding window(s) installed in the entrance door. Each window shall have tinted automotive type safety glass mounted in an extruded aluminum frame. The frame shall have a black anodized finish.

- One (1) OnScene Solutions Rough-Service 9" white LED light(s) shall be provided below the body. Each light shall be mounted in an extruded aluminum housing to protect against damage from personnel or equipment. Light(s) shall be switchable but activated automatically when the park brake is set.

## **ENTRY HANDRAILS**

There shall be two (2) handrails provided at entry door; one (1) 24" vertical on exterior of body on door handle side, and one (1) 30" on inside of door. The interior handrail shall be angled for optimum use when entering or exiting the interior body area.

Handrails shall be NFPA compliant 1-1/4" knurled 304 stainless steel with welded end stanchions.

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.

### **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. sq. (62,000 mm<sup>2</sup>) of retroreflective material affixed to the inside of the door.

The stripe material shall be 3M Scotchlite 680 series graphic film.

- This reflective stripe shall be white in color.

### **CURBSIDE COMPARTMENT - REAR (C5)**

The interior useable compartment space shall be approximately 70.5" wide.

- This compartment shall have an Amdor roll-up door.
- The compartment door opening shall be approximately 64.0" wide.
- The roll-up door slats and the door track components shall be painted to match the single tone exterior color. The painted roll-up doors shall be equipped with Extended Slat Shoe (ESS) feature which eliminates abrasion on the door finish.
- The Amdor door shall be equipped with an integral switch in the lower door handle retainer block to activate compartment lighting and door ajar signal in cab when door is opened.
- There shall be NO keyed lock on this roll-up compartment door.
- 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.

### **COMPARTMENT LAYOUT**

- There shall be vertically mounted aluminum Shelf-Trac welded to compartment walls for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be two (2) adjustable shelf/shelves approximately 24" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edge.

#### **NOTE: Shelves located on right side of partition**

- The above component(s) shall have a smooth un-painted finish.
- There shall be one (1) vertical compartment partition(s) provided dividing the compartment into fore and aft sides. The vertical partition(s) shall be 3/16" (.188) 3003H-14 alloy smooth aluminum sheet.

#### **NOTE: Partition located in center of compartment**

- Partition shall be bolted in position at base and top of partition.
- The above component(s) shall have a smooth un-painted finish.
- A clay absorbent (or similar weight material) storage hopper shall be provided in this compartment for approximately 75 pounds of material. The storage hopper shall be filled from an upper side door on unit. A manual 3" PVC 1/4-turn ball valve with flexible hose shall be provided on bottom of hopper storage. The bottom of absorbent hopper and valve shall be spaced off floor to allow for a 5 gallon pail to be stored under valve.
- Two (2) OnScene Access white LED, full height compartment light, vertically mounted.



- One (1) OnScene Solutions Rough-Service 9" white LED light(s) shall be provided below the body. Each light shall be mounted in an extruded aluminum housing to protect against damage from personnel or equipment. Light(s) shall be switchable but activated automatically when the park brake is set.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

### **REAR ENTRY DOORS**

Access shall be provided to the interior through double doors with a clear door opening width of approximately 36" (without interior door handles) x full height and drop down door for ramp to be deployed and allow the doors to be opened or closed.

Construction of the rear entry doors shall be with 1/8" aluminum exterior smooth plate, the interior door pan shall be constructed from 1/8" aluminum treadplate.

The door shall be hung on full height 14 gauge stainless steel hinge, with a 1/4" stainless steel pin. The hinge shall be bolted to the door and body with stainless steel machine screws at offset 5" centers. The hinge shall be slotted horizontally and vertically for ease of adjustment. A polyester barrier film gasket shall be placed between the stainless steel hinge and door.

Full width padded foam cushion head bumper shall be provided above door opening. The head bumper shall be covered with matching interior vinyl and bolted to interior of door way.

The active latching door shall overlap the non-latching door. The latch mechanism shall include a stainless steel paddle handle on the inside. A polyester barrier film gasket shall be placed between the stainless steel handles and the aluminum door panels. The door latch shall be a double catch two-point safety slam latch recessed inside the double panel door with strike plate mounted top and bottom of door frame complying with FMVSS requirements.

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

### **BI-FOLDING LOADING RAMP**

There shall be a Link Manufacturing model LB20-30 or equal, 30" wide bi-folding loading ramp vertically mounted inside the door opening. **Hand railing is provided by SVI** with folding ramp design. Ramp shall have a 1,000 load rating with the following features:

- Flat surface mount
- Stores vertically inside the vehicle
- Reduces dangerous lifting
- Increases efficiency
- Reduces equipment damage
- High strength aluminum extrusion
- Takes seconds to position for use
- Super non-slip surface

### **WINDOW(S)**

There shall be two (2) 12" wide x 22" high non-sliding window(s) installed. Each window shall have tinted automotive type safety glass mounted in an extruded aluminum frame. The frame shall have a black anodized finish.

## **BODY OPTIONS AND UPGRADES**

### **PLASTIC FLOOR AND SHELF TILE**

Dri-Dek 12" x 12" x 9/16", self-draining plastic inter-locking material shall be cut to size and cover all compartment floors, shelves, and trays.

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

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

OnScene Solutions rub rails shall be provided below the compartment door openings on both the streetside and curbside.

The rub rail shall be fabricated from 6063 extruded aluminum, measuring approximately 2-3/4" high x 1-3/8" thick with tapered aluminum end caps. The rub rail shall be bolted to the body using stainless steel bolts and 1-1/2" diameter x 5/8" thick rubber mount isolators to prevent damage to the body.

The rails shall incorporate LED clearance marker lighting recessed into the rail fascia to avoid damage to the light in case of impact. The rub rail shall have an accessory mounting track integrated into the backside of the rail to allow mounting of accessories such as ground lighting.

- Six (6) warning lights shall be provided in lower rub rail, evenly distributed per side of apparatus; Warning light models, colors and etc. are specified in warning lights section.
  - The forward warning lights shall be located:
    - So as to divide the length of the rub rail(s) evenly.
  - The rearward warning lights shall be located:
    - So as to divide the length of the rub rail(s) evenly.

### **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.

## **ACCESS LADDER**

The top of the body shall be accessible from the ground by a folding style ladder. The ladder design shall have a main pivoting ladder section with a fixed bolt-on upper hand rail section that extends just above top surface. The lower step section of ladder shall fold-out creating an angled ladder that brings the first step closer to ground for easier step height access and a comfortable climbing angle. The ladder shall fold-up and store in vertical position for better angle of departure.

Each cast aluminum step shall be 4-1/2" deep x 16" wide. Hand railing shall be 2-1/8" oval shaped aluminum tubing with a ribbed gripping surface.

The ladder shall be wired to the door ajar warning light in cab to warn the driver that the ladder is in the down position. Ladder shall be mounted to body with stainless steel bolts.

Ladder shall be located on rear curbside of the body.

## **WALKWAY/STEP LIGHTS**

There shall be two (2) OnScene Solutions Rough-Service 9" LED lights provided to illuminate the walkway or step area.

Each light shall be mounted in an extruded aluminum housing to protect against damage from personnel or equipment.

Lighting shall provide illumination at a minimum level of 2 fc (20 lx) on all work surfaces, steps, and walkways. Lighting shall be switchable but activated automatically when the vehicle park brake is set.

## **WALK-IN INTERIOR FINISH DETAILS**

### **DESK, CABINET, CONSOLE FINISH**

All specified interior desks, cabinets, overhead cabinets, or consoles shall be fabricated from formed 1/8" 3003 H14 alloy smooth aluminum.

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

### **MAGNETIC WHITEBOARD**

There shall be one (1) magnetic whiteboard(s), approximately 30" wide x 36" tall located **on front wall above pass through**, location per South Metro Fire Rescue.

### **INTERIOR COMPONENT FINISH**

After fabrication is completed all specified desk(s) or cabinet(s) shall be painted with a hammer tone powder coat paint finish for a hard durable surface.

Powder coat shall be quartz grey. Cardinal T243-GR301

## **CAB/BODY PASS THROUGH CONNECTION**

The front center of rescue body shall be interconnected with the commercial cab through a flexible weather-tight walk-through connection. The opening shall be approximately 28" wide x **14" high**.

The back of the cab shall be cut out to match the body opening. The cab opening shall be heavily reinforced with metal angle or tubing on all sides so that the rear of cab is not weakened with the walk-through connection. The back of cab shall be re-painted, as necessary.

The connection shall be completely weatherproof, yet provide the cab and body to move independent of each other. A flexible rubber bellowed collar shall be mounted to the metal angle and tubing framework of the body and cab. The edges of the opening shall be protected with aluminum angle moldings with stainless steel sheet metal screws. The collar and rubber liner shall be easily replaceable in future years if necessary. A drip rail shall be provided on front of body above the opening to channel water to both sides of opening.

The base of the opening shall be covered with two (2) 3/16" aluminum tread plate full width panels, which will overlap from the cab and body so that the rubber liner cannot be damaged.

Full width padded foam cushion head bumpers shall be provided on both sides of opening. Head bumpers shall be covered with matching interior vinyl and bolted to each side of walk.

## **INTERIOR SPECIFICATIONS**

### **INTERIOR INSULATION**

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

### **INTERIOR FINISH**

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

The interior panels shall be installed with sheet metal screws with gray plastic plugs covering the screws. The seams between FRP panels, interior corners, and exterior corners shall be trimmed with gray plastic molding.

The interior finish shall be pearl gray pebble grain FRP.

## **INTERIOR WALKWAY FLOOR**

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

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

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

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

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

## **INTERIOR SUB-FLOOR**

Above the body sub frame walk in areas shall be an isolation sheet to prevent outside elements from permeating the acoustic and thermal barrier. The isolation sheet shall be fabricated from the same type of material as is used in the subframe, and flanged on sides with a 1" high vertical break.

3/4" thick plywood shall be placed between the isolation sheet and finished floor for its structural, acoustic and thermal values.

## **AIR CONDITIONER - HEATER**

Three (3) Dometic Penguin II low profile, 120 VAC, 60 cycle, single phase air conditioner(s) shall be provided and installed on roof of vehicle. The unit shall be a roof top contemporary contoured integral evaporator/condenser type with built-in heating elements.

Each unit shall be rated at minimum of 13,500 BTU cooling capacity with a heating element rated at 5,600 BTU. A three-speed fan shall supply a maximum/minimum of 320/250 cfm air flow capacity. Air conditioner(s) shall be controlled by a wall mounted Comfort Control II LCD thermostat.

The roof mounted air conditioner shall be approximately 9.5" high x 29" wide x 40" long and weigh approximately 99 lbs.

- The above rooftop Air Conditioning units shall be powered by generator only.
- The thermostat(s) for the above rooftop Air Conditioning units shall be located above the interior light switch panel.

## **HEATER(S)**

The interior body or compartments shall be heated with one (1) Espar D5LC air heaters with up to 18,800 BTU. The heater(s) shall be connected to the chassis diesel fuel tank with a thermostat controlled 12 volt blower. Each heat unit can use from .04 gallons on low, and up to .18 gallons of diesel per hour during maximum output and blower output from 80 to 137 CFM.

If the heater unit(s) are located to heat compartments, high temperature flexible ducting shall be used from both return air and the outlet through upper compartment walls. In addition, each upper compartment dividing wall shall have large openings to allow ducting and/or air to circulate through all compartments.

## **FRONT INTERIOR AREA (IF1)**

- The interior deck area over the top of the exterior side compartments shall be un-painted smooth aluminum.

## **STREETSIDE INTERIOR AREA (IS1)**

- There shall be one (1) approximately 34" wide x 14" high x 14" deep overhead cabinet(s) provided on interior. Cabinet(s) shall be constructed of 1/8" smooth finish aluminum, and painted with a hammer tone powder coat paint finish for a hard durable surface.
- The above cabinet(s) shall have lift-up type door(s) with dry-erase outer surface.
- The compartment light(s) shall be controlled by a switch actuated by the compartment door.

Each cabinet door shall have one (1) winged cam latch mechanism to hold door in closed position. Cabinet door latch required per NFPA 1901 in occupied areas while vehicle is in motion.

## **INTERIOR UNDER CABINET LED LIGHTS**

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

## **INTERIOR DESK**

The interior of body shall be provided with a desk top which shall be 24" deep and located approximately 30" from floor.

The desk top surface shall be fabricated of 3/16" smooth finish aluminum. There shall be 2-1/2" diameter holes with plastic edge grommet provided at each rear corner for wiring of future equipment located on the desk top. The desk top shall be painted dark gray with a hammer tone powder coat paint finish for a hard and durable surface.

## **PENCIL DRAWER**

The desk shall be provided with one (1) Hafele model HA-429.59.340, or equal 3 compartment pencil drawer(s) with steel ball bearing slides, and both hold-in and hold-out detents. Drawer will be 15" wide x 13" deep x 1 3/4" high.

## **COMMUNICATION AND ELECTRONICS CONSOLE**

There shall be one (1) 34" wide communication and electronics console(s) provided at back of specified desk or counter top. The console(s) shall provide mounting locations for any specified radios, phones, network jacks, 120 VAC outlets, 12 VDC power points, or any required control switches. A six (6) circuit 12 VDC fuse block with cover shall be provided inside console for wiring needs.

Each console shall be rectangular in shape with a sloped hinged access cover constructed of 1/8" smooth finish aluminum and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray.

A hinged access cover shall be provided on front to access equipment mounting and wiring with ¼ turn knobs to secure cover closed.

The following communications and/or electrical equipment shall be provided for;

The following options shall be provided in specified desktop console;

- There shall be one (1) 12 VDC power plug(s) provided in specified console.
- There shall be two (2) 120 VAC, 20 amp, duplex straight-blade receptacle (NEMA 5-20R) outlet(s) provided in specified console.
  - Outlet(s) shall be powered through the on-board generator system.
- There shall be two (2) Blue Sea 12 VDC USB dual port(s) provided in specified console.
  - Intercom headset jack shall be located on center console/engine cover.

## **INTERIOR PEDESTAL SEAT, 3-POINT ABTS**

One (1) Bostrom Sierra high back reclining ABTS seat(s) shall be provided. Seat(s) shall have swivel pedestal base with 3 locking positions, and 5" fore/aft adjustment. Seat(s) shall be securely mounted to the reinforced floor structure.

The Bostrom seat(s) shall include a covering of extra high strength, wear resistant fabric made of durable Durawear Plus™ ballistic polyester. A PVC coating shall be bonded to the back side of the material to help protect the seats from UV rays and from being saturated or contaminated by fluids. The material meets FMVSS 302 flammability requirements. Seats material color shall **black**.

The seat(s) shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. Belts shall be red in color. The buckle portion of the seat belt shall extend from the seat base towards the occupants position within easy reach of the occupant. The ABTS feature shall also include the RiteHite™ shoulder adjustment feature to provide enhanced comfort and safety by allowing customized seat belt fit.

Each seat shall be wired to the on-board seat belt indicator, and Vehicle Data Recorder (VDR) systems per NFPA 1901.

## **STREETSIDE INTERIOR AREA (IS2)**

### **SLIDING POCKET DOOR**

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

### **WINDOW**

There shall be one (1) small non-sliding window provided in upper pocket door.

- There shall be one (1) full height cabinet(s) provided on interior. Cabinet(s) shall be constructed of 1/8" smooth finish aluminum. Each cabinet shall be approximately (insert actual dimensions) x 75" high x 24" deep.
- Cabinet(s) shall be provided with vertically mounted shallow aluminum Shelf-Trac for specified component installation.
- Two (2) OnScene Access white LED, full height compartment lights, vertically mounted.
- Cargo netting of 1" - 2" nylon webbing shall be provided over cabinet opening with automotive seatbelt style latches.
- The compartment light(s) shall be controlled by a latching, black rocker switch with amber indicator light. The switch shall be labeled as "COMPARTMENT LIGHTS" with a black and chrome label bezel.
- Cabinet(s) shall be provided with vertically mounted shallow aluminum Shelf-Trac for specified component installation.
- There shall be four (4) vertically adjustable shelf in each of the above cabinets. It shall have a 1.25" lip to contain items while minimizing space used.

## **STREETSIDE INTERIOR AREA (IS3)**

- There shall be one (1) full height cabinet(s) provided on interior. Cabinet(s) shall be constructed of 1/8" smooth finish aluminum. Each cabinet shall be approximately (insert actual dimensions) x 75" high x 24" deep.
- Two (2) OnScene Access white LED, full height compartment lights, vertically mounted.
- Cargo netting of 1" - 2" nylon webbing shall be provided over cabinet opening with automotive seatbelt style latches.
- The compartment light(s) shall be controlled by a latching, black rocker switch with amber indicator light. The switch shall be labeled as "COMPARTMENT LIGHTS" with a black and chrome label bezel.
- Cabinet(s) shall be provided with vertically mounted shallow aluminum Shelf-Trac for specified component installation.
- There shall be two (2) vertically adjustable shelf in each of the above cabinets. It shall have a 1.25" lip to contain items while minimizing space used.



## **STREETSIDE INTERIOR AREA (IS4)**

### **INTERIOR BENCH SEAT**

The interior body walkway shall be provided with a squad bench seat for three (3) personnel along the side wall. The seat cushion shall be approximately 3" thick with a 3/4" plywood platform for stability. The seat backrest shall be approximately 12" high x 2" thick and constructed the same as the seat cushion.

The cushion and seat back shall be covered with Duraware heavy duty fabric material.

Seat material color shall be black.

### **INTERIOR BENCH SEAT STORAGE**

The bench seat base shall be fabricated of aluminum tread plate to form a under seat storage compartment.

- Above module shall have cargo netting of 1" - 2" nylon webbing to help restrain equipment in module.

The above specified seat(s) shall not be provided with automotive seat belts and therefore will not be considered a riding position.

SCBA brackets shall be recessed into seat back rest,

### **SEAT SCBA BRACKETS**

There shall be three (3) Zico ULLH Load & Lock walkaway type SCBA bracket(s) with ejector spring that meets NFPA 1901 standards mounted in specified SCBA seats. The standard Load & Lock can handle 30 and 45-minute cylinders. To load simply place the SCBA against the seat with the valve resting on the footplate, then wrap the strap around the SCBA and lock it tightly into place. Releasing the SCBA is done by pulling the lanyard straight out, then leaning forward and standing up.

### **120/240 VAC COMPARTMENT OUTLETS**

- There shall be one (1) 120 VAC outlet(s) located in compartment.
  - The outlet receptacle(s) shall be 20 amp, straight-blade (NEMA 5-20R).
  - Outlet(s) shall be powered through the on-board generator system.

## **SLIDE-OUT ROOM EXTENSION**

A slide-out room extension with floor offset approximately 3" from main walk-in floor shall be provided on the streetside. The slide-out room shall extend approximately 32". The slide-out extension shall be up to up to 96" in width depending on body configuration. The interior height shall be approximately 9" less than the interior height of the main walk-in floor. The slide-out room shall have a water resistant seal in both the fully extended and the retracted positions. The flooring specified on main walk-in floor shall be provided on floor of slide-out room.

The slide-out section shall utilize two (2) PowerGear smooth operating, quiet gear and rack system. Systems using hydraulic components will NOT BE ACCEPTABLE. There shall be only two (2) serviceable items - the 12 VDC motor and the electric control switch. The system shall use a heavy duty, positive, 100% synchronized gear and rack system to prevent binding during the extend or retract cycle. The rack system shall be rated for up to 1,500 pounds. A manual override shall be provided in the event of a system failure. The touch pad control for slide-out system shall be mounted on wall near main entry door.

The slide-out section shall be framed with 2" x 2" x 1/4" 6061-T6 alloy aluminum. The frame structure shall be covered with no less than 1/8" thick 3003-H14 smooth aluminum.

A full width padded foam cushion head bumper shall be provided along ceiling of slide-out. Head bumper shall be covered with matching interior vinyl.

There shall be two (2) flashing LED warning lights with red lenses, one (1) at each end of the slide-out section. The lights shall activate and be visible when the unit is extended.

All electrical wiring installed in the slide-out wall shall run through a boxed type conduit at the lower corner of the system. All wiring shall be enclosed in a flexible, moisture resistant, reinforced conduit, with proper seal tight connectors and hardware. Access shall be provided for inspection of all wiring and the slide-out mechanisms.

The slide-out room extension must be able to withstand years of rugged service and wear. For this reason, this design, metal thickness and attachments must be strictly adhered to. RV type slide-outs using light weight metal or fiberglass shall not be acceptable.

## **SLIDE-OUT AWNING**

A Carefree SlideOut Kover III shall be provided and work automatically with slide-out for increased protection of the slide-out from the elements. Helps keep leaves, debris and rain off the roof and out of the vehicle and keeps the roof cooler by blocking the sun from the roof.

The SlideOut Kover III comes with a built-in wind deflector to prevent the billowing of the slide out fabric. The full-enclosure aluminum case protects the slide out fabric from dirt and debris while traveling.

- The Firesist HUV awning fabric color shall be ~~crimson red~~ <sup>Black per PCM Co</sup> (#88003-000).

### **SLIDE-OUT KOVER**

The SlideOut Kovers standard white housing color shall be re-painted to match upper body color.

- There shall be two (2) approximately 42" wide x 14" high x 14" deep overhead cabinet(s) provided on interior. Cabinet(s) shall be constructed of 1/8" smooth finish aluminum, and painted with a hammer tone powder coat paint finish for a hard durable surface.
- Cargo netting of 1" - 2" nylon webbing shall be provided over cabinet opening with automotive seatbelt style latches.

### **STREETSIDE INTERIOR AREA (IS5)**

- There shall be one (1) approximately 34" wide x 14" high x 14" deep overhead cabinet(s) provided on interior. Cabinet(s) shall be constructed of 1/8" smooth finish aluminum, and painted with a hammer tone powder coat paint finish for a hard durable surface.
  - The above cabinet(s) shall have sliding Clear Lexan doors.
- The compartment light(s) shall be controlled by a latching, black rocker switch with amber indicator light. The switch shall be labeled as "COMPARTMENT LIGHTS" with a black and chrome label bezel.
- Cabinet(s) shall be provided with vertically mounted shallow aluminum Shelf-Trac for specified component installation.
- There shall be three (3) vertically adjustable shelf in each of the above cabinets. It shall have a 1.25" lip to contain items while minimizing space used.

### **INTERIOR UNDER CABINET LED LIGHTS**

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

- The interior deck area over the top of the exterior side compartments shall be un-painted smooth aluminum.

### **GALLEY REFRIGERATOR**

There shall be one (1) Norcold DE-0041R 120 VAC/12 VDC refrigerator/freezer(s) furnished and installed in the galley. The unit shall be a flush mount style box with body manufacturer fabricated custom enclosure. Refrigerator shall operate from both 12 VDC and 120 VAC power. The built-in dimensions are 30-7/8" high x 23-1/4" wide x 23-1/2" deep.

### **120 VAC INTERIOR OUTLETS**

- There shall be one (1) 120 VAC outlet(s) located in the interior area of the body.
  - The outlet receptacle(s) shall be 20 amp, straight-blade (NEMA 5-20R).
- There shall be one (1) approximate 4' long 120 VAC outlet strip(s) with straight blade household type outlets provided.

- Outlet(s) shall be powered through the on-board generator system.
- The outlet shall be located on rearward wall, upper left area.
- Outlet(s) shall be powered through the on-board generator system.
- The outlet location shall be determined prior to fabrication.

## **CURBSIDE INTERIOR AREA (IC1/IC2)**

### **SLIDE-OUT ROOM EXTENSION**

A slide-out room extension with floor offset approximately 3" from main walk-in floor shall be provided on the curbside. The slide-out room shall extend approximately 32". The slide-out extension shall be up to up to 96" in width depending on body configuration. The interior height shall be approximately 9" less than the interior height of the main walk-in floor. The slide-out room shall have a water resistant seal in both the fully extended and the retracted positions. The flooring specified on main walk-in floor shall be provided on floor of slide-out room.

The slide-out section shall utilize two (2) PowerGear smooth operating, quiet gear and rack system. Systems using hydraulic components will NOT BE ACCEPTABLE. There shall be only two (2) serviceable items - the 12 VDC motor and the electric control switch. The system shall use a heavy duty, positive, 100% synchronized gear and rack system to prevent binding during the extend or retract cycle. The rack system shall be rated for up to 1,500 pounds. A manual override shall be provided in the event of a system failure. The touch pad control for slide-out system shall be mounted on wall near main entry door.

The slide-out section shall be framed with 2" x 2" x 1/4" 6061-T6 alloy aluminum. The frame structure shall be covered with no less than 1/8" thick 3003-H14 smooth aluminum.

A full width padded foam cushion head bumper shall be provided along ceiling of slide-out. Head bumper shall be covered with matching interior vinyl.

There shall be two (2) flashing LED warning lights with red lenses, one (1) at each end of the slide-out section. The lights shall activate and be visible when the unit is extended.

All electrical wiring installed in the slide-out wall shall run through a boxed type conduit at the lower corner of the system. All wiring shall be enclosed in a flexible, moisture resistant, reinforced conduit, with proper seal tight connectors and hardware. Access shall be provided for inspection of all wiring and the slide-out mechanisms.

The slide-out room extension must be able to withstand years of rugged service and wear. For this reason, this design, metal thickness and attachments must be strictly adhered to. RV type slide-outs using light weight metal or fiberglass shall not be acceptable.

### **SLIDE-OUT AWNING**

A Carefree SlideOut Kover III shall be provided and work automatically with slide-out for increased protection of the slide-out from the elements. Helps keep leaves, debris and rain off the roof and out of the vehicle and keeps the roof cooler by blocking the sun from the roof.

The SlideOut Kover III comes with a built-in wind deflector to prevent the billowing of the slide out fabric. The full-enclosure aluminum case protects the slide out fabric from dirt and debris while traveling.

- The Firesist HUV awning fabric color shall be black (#82008).

### **SLIDE-OUT KOVER**

The SlideOut Kovers standard white housing color shall be re-painted to match upper body color.

### **WINDOW(S)**

There shall be two (2) 32"wide x 22" high, double-paned insulated, horizontal sliding window(s) installed. The window shall slide open towards the front of the vehicle such that wind pressure would tend to shut the window. Each window shall have tinted automotive type safety glass mounted in an extruded aluminum frame. The frame shall have a black anodized finish. Sliding style windows shall be complete with a sliding screen.

- There shall be two (2) approximately 34" wide x 14" high x 14" deep overhead cabinet(s) provided on interior. Cabinet(s) shall be constructed of 1/8" smooth finish aluminum, and painted with a hammer tone powder coat paint finish for a hard durable surface.
- The above cabinet(s) shall have lift-up type door(s) with dry-erase outer surface.
- The compartment light(s) shall be controlled by a switch actuated by the compartment door.

Each cabinet door shall have one (1) winged cam latch mechanism to hold door in closed position. Cabinet door latch required per NFPA 1901 in occupied areas while vehicle is in motion.

### **INTERIOR UNDER CABINET LED LIGHTS**

Two (2) OnScene Solution model #70152, 10" x 6" x 7/8", 10-30 VDC, surface mount dual red and white LED light(s) with clear lens shall be provided under cabinet. Each light shall be individually switched with a high/low intensity setting. In addition light(s) will be capable of a five (5) second delay after switching off.

### **SLIDE-OUT AREA - FULL WIDTH DESK**

The slide-out area shall be provided with a full width desk which shall be 24" deep and located approximately 30" from floor.

The desk top surface shall be fabricated of 3/16" smooth finish aluminum. There shall be 2-1/2" diameter holes with plastic edge grommet provided at each rear corner for wiring of future equipment located on the desk top. The desk shall be painted with a dark gray hammer tone powder coat paint finish for a hard and durable surface.

### **PENCIL DRAWER**

The desk shall be provided with two (2) Hafele model HA-429.59.340, or equal 3 compartment pencil drawer(s) with steel ball bearing slides, and both hold-in and hold-out detents. Drawer will be 15" wide x 13" deep x 1 3/4" high.

## **COMMUNICATION AND ELECTRONICS CONSOLE**

There shall be two (2) 34" wide communication and electronics console(s) provided at back of specified desk or counter top. The console(s) shall provide mounting locations for any specified radios, phones, network jacks, 120 VAC outlets, 12 VDC power points, or any required control switches. A six (6) circuit 12 VDC fuse block with cover shall be provided inside console for wiring needs.

Each console shall be rectangular in shape with a sloped hinged access cover constructed of 1/8" smooth finish aluminum and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray.

A hinged access cover shall be provided on front to access equipment mounting and wiring with 1/4 turn knobs to secure cover closed.

The following communications and/or electrical equipment shall be provided for;

The following options shall be provided in specified desktop console;

- There shall be one (1) communications radio and/or siren 3" recess mount(s) with black powdercoat paint finish in specified console.

### **NOTE: Located right side of left seated position**

- There shall be four (4) 120 VAC, 20 amp, duplex straight-blade receptacle (NEMA 5-20R) outlet(s) provided in specified console.
  - Outlet(s) shall be powered through the on-board generator system.
- There shall be two (2) Blue Sea 12 VDC USB dual port(s) provided in specified console.
  - Intercom headset station shall be located on center console/engine cover.

## **INTERIOR PEDESTAL SEAT, 3-POINT ABTS**

Two (2) Bostrom Sierra high back reclining ABTS seat(s) shall be provided. Seat(s) shall have swivel pedestal base with 3 locking positions, and 5" fore/aft adjustment. Seat(s) shall be securely mounted to the reinforced floor structure.

The Bostrom seat(s) shall include a covering of extra high strength, wear resistant fabric made of durable Durawear Plus™ ballistic polyester. A PVC coating shall be bonded to the back side of the material to help protect the seats from UV rays and from being saturated or contaminated by fluids. The material meets FMVSS 302 flammability requirements. Seats material color shall **black**.

The seat(s) shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. Belts shall be red in color. The buckle portion of the seat belt shall extend from the seat base towards the occupants position within easy reach of the occupant. The ABTS feature shall also include the RiteHite™ shoulder adjustment feature to provide enhanced comfort and safety by allowing customized seat belt fit.

Each seat shall be wired to the on-board seat belt indicator, and Vehicle Data Recorder (VDR) systems per NFPA 1901.

There shall be a side entry door located in this area.

### **CURBSIDE INTERIOR AREA (IC3)**

- 120/240 VAC load center location.

### **MAGNETIC WHITEBOARD ICS 208**

There shall be one (1) ICS 2018 Command magnetic whiteboard(s), approximately 27.5" wide x 25.5" tall located on wall, location per South Metro Fire Rescue.

The ICS 208 Command Board shall be an All Hands Fire Equipment SAL-CCB-2

- There shall be one (1) full height cabinet(s) provided on interior. Cabinet(s) shall be constructed of 1/8" smooth finish aluminum. Each cabinet shall be approximately (insert actual dimensions) x 75" high x 24" deep.
- Two (2) OnScene Access white LED, full height compartment lights, vertically mounted.
- Cargo netting of 1" - 2" nylon webbing shall be provided over cabinet opening with automotive seatbelt style latches.
- The compartment light(s) shall be controlled by a latching, black rocker switch with amber indicator light. The switch shall be labeled as "COMPARTMENT LIGHTS" with a black and chrome label bezel.
- Cabinet(s) shall be provided with vertically mounted shallow aluminum Shelf-Trac for specified component installation.
- There shall be one (1) vertically adjustable shelf in each of the above cabinets. It shall have a 1.25" lip to contain items while minimizing space used.

### **CURBSIDE INTERIOR AREA (IC4)**

#### **SLIDE-OUT ROOM EXTENSION**

A slide-out room extension with floor offset approximately 3" from main walk-in floor shall be provided on the curbside. The slide-out room shall extend approximately 32". The slide-out extension shall be up to up to 96" in width depending on body configuration. The interior height shall be approximately 9" less than the interior height of the main walk-in floor. The slide-out room shall have a water resistant seal in both the fully extended and the retracted positions. The flooring specified on main walk-in floor shall be provided on floor of slide-out room.

The slide-out section shall utilize two (2) PowerGear smooth operating, quiet gear and rack system. Systems using hydraulic components will NOT BE ACCEPTABLE. There shall be only two (2) serviceable items - the 12 VDC motor and the electric control switch. The system shall use a heavy duty, positive, 100% synchronized gear and rack system to prevent binding during the extend or retract cycle. The rack system shall be rated for up to 1,500 pounds. A manual override shall be provided in the event of a system failure. The touch pad control for slide-out system shall be mounted on wall near main entry door.

The slide-out section shall be framed with 2" x 2" x 1/4" 6061-T6 alloy aluminum. The frame structure shall be covered with no less than 1/8" thick 3003-H14 smooth aluminum.

A full width padded foam cushion head bumper shall be provided along ceiling of slide-out. Head bumper shall be covered with matching interior vinyl.

There shall be two (2) flashing LED warning lights with red lenses, one (1) at each end of the slide-out section. The lights shall activate and be visible when the unit is extended.

All electrical wiring installed in the slide-out wall shall run through a boxed type conduit at the lower corner of the system. All wiring shall be enclosed in a flexible, moisture resistant, reinforced conduit, with proper seal tight connectors and hardware. Access shall be provided for inspection of all wiring and the slide-out mechanisms.

The slide-out room extension must be able to withstand years of rugged service and wear. For this reason, this design, metal thickness and attachments must be strictly adhered to. RV type slide-outs using light weight metal or fiberglass shall not be acceptable.

### **SLIDE-OUT AWNING**

A Carefree SlideOut Kover III shall be provided and work automatically with slide-out for increased protection of the slide-out from the elements. Helps keep leaves, debris and rain off the roof and out of the vehicle and keeps the roof cooler by blocking the sun from the roof.

The SlideOut Kover III comes with a built-in wind deflector to prevent the billowing of the slide out fabric. The full-enclosure aluminum case protects the slide out fabric from dirt and debris while traveling.

- The Firesist HUV awning fabric color shall be black (#82008).

### **SLIDE-OUT KOVER**

The SlideOut Kovers standard white housing color shall be re-painted to match upper body color.

- There shall be two (2) approximately 42" wide x 14" high x 14" deep overhead cabinet(s) provided on interior. Cabinet(s) shall be constructed of 1/8" smooth finish aluminum, and painted with a hammer tone powder coat paint finish for a hard durable surface.
- Cargo netting of 1" - 2" nylon webbing shall be provided over cabinet opening with automotive seatbelt style latches.

### **INTERIOR BENCH SEAT**

The interior body walkway shall be provided with a squad bench seat for three (3) personnel along the side wall. The seat cushion shall be approximately 3" thick with a 3/4" plywood platform for stability. The seat backrest shall be approximately 12" high x 2" thick and constructed the same as the seat cushion.

The cushion and seat back shall be covered with Duraware heavy duty fabric material.

Seat material color shall be black.



### **INTERIOR BENCH SEAT STORAGE**

The bench seat base shall be fabricated of aluminum tread plate to form a under seat storage compartment.

- Above module shall have cargo netting of 1" - 2" nylon webbing to help restrain equipment in module.

The above specified seat(s) shall not be provided with automotive seat belts and therefore will not be considered a riding position.

SCBA brackets shall be recessed into seat back rest,

### **SEAT SCBA BRACKETS**

There shall be three (3) Zico ULLH Load & Lock walkaway type SCBA bracket(s) with ejector spring that meets NFPA 1901 standards mounted in specified SCBA seats. The standard Load & Lock can handle 30 and 45-minute cylinders. To load simply place the SCBA against the seat with the valve resting on the footplate, then wrap the strap around the SCBA and lock it tightly into place. Releasing the SCBA is done by pulling the lanyard straight out, then leaning forward and standing up.

- There shall be one (1) 120 VAC outlet(s) located in compartment.
  - The outlet receptacle(s) shall be 20 amp, straight-blade (NEMA 5-20R).
  - Outlet(s) shall be powered through the on-board generator system.

## **CURBSIDE INTERIOR AREA (IC5)**

### **INTERIOR CABINET - COUNTER HEIGHT**

- There shall be one (1) interior counter height cabinet(s) provided on interior. Cabinet(s) shall be constructed of 1/8" smooth finish aluminum approximately (insert actual dimensions).
- Cabinet(s) shall be provided with vertically mounted shallow aluminum Shelf-Trac for specified component installation.
- One (1) OnScene Access white LED, full height compartment light, vertically mounted.
  - The above cabinet(s) shall have a 4" x 4" toe kick area at the base to allow for the top surface to be used as a working surface.
  - Cargo netting of 1" - 2" nylon webbing shall be provided over cabinet opening with automotive seatbelt style latches.
- The compartment light(s) shall be controlled by a latching, black rocker switch with amber indicator light. The switch shall be labeled as "COMPARTMENT LIGHTS" with a black and chrome label bezel.
  - Each cabinet shall be provided with vertically mounted shallow aluminum Shelf-Trac for specified component installation.
  - There shall be three (3) vertically adjustable shelf in each of the above cabinets. It shall have a 1.25" lip to contain items while minimizing space used.

**NOTE: Shelves shall be approximately 11" deep**

- The interior deck area over the top of the exterior side compartments shall be un-painted smooth aluminum.

### **120 VAC INTERIOR OUTLETS**

- There shall be one (1) 120 VAC outlet(s) located in the interior area of the body.
  - The outlet receptacle(s) shall be 20 amp, straight-blade (NEMA 5-20R).
- There shall be three (3) approximate 4' long 120 VAC outlet strip(s) with straight blade household type outlets provided.
  - Outlet(s) shall be powered through the on-board generator system.
  - The outlet shall be located **on each shelf**.
  - Outlet(s) shall be powered through the on-board generator system.
  - The outlet location shall be determined prior to fabrication.

## **REAR INTERIOR AREA (IR1)**

There shall be a rear entry door located in this area.

## **LOW VOLTAGE ELECTRICAL SYSTEM- 12 VDC**

### **General**

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

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

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

### **Wiring**

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

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

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

### **Wiring and Wire Harness Construction**

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

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

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

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

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

Circuits shall be provided with properly rated low voltage 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:

- 1) SAE J156, *Fusible Links*
- 2) SAE J553, *Circuit Breakers*
- 3) SAE J554, *Electric Fuses (Cartridge Type)*
- 4) SAE J1888, *High Current Time Lag Electric Fuses*
- 5) SAE J2077, *Miniature Blade Type Electrical Fuses*

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

#### Power Supply

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

#### Minimum Continuous Electrical Load

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

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

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

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

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

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

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

#### Electromagnetic Interference

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

#### Wiring Diagram

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

#### Low Voltage Electrical System Performance Test

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

### **12 VOLT MULTIPLEX CONTROL CENTER**

The apparatus shall 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.

### **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, POSITIONS**

## **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...

### **NOTE: Located on cab dash**

- 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;

## **ELECTRONIC SIREN**

One (1) Whelen model 295SLSA1 electronic siren control with selectable 100 or 200 watt output, hands-free operation, user selectable siren tones, park kill, and standard hard wired microphone shall be provided and installed in cab within easy reach of Driver. Siren power shall be wired through the master warning light switch.

- There shall be one (1) communications radio and/or siren 3" recess mount(s) with black powdercoat paint finish in specified console.

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

- Cab console, panel position center 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.
- Cab console, panel position rearward shall include;
- Cab console, center position forward shall include;
- Cab console area provided with open storage area.
  - The open storage area shall be provided with one (1) adjustable dividers.
- Cab console, center position center shall include;
- Cab console area provided with open storage area.
- Cab console, center position rearward shall include;
- Cab console area provided with open storage area.

## **BATTERY SYSTEM**

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

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

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

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

An onboard battery conditioner or charger or a polarized inlet shall be provided for charging all batteries. Where an onboard conditioner or charger is supplied, the associated line voltage electrical power system shall be installed in accordance with Chapter 22.

One of the following master disconnect switches shall be provided:

- 1) A master body disconnect switch that disconnects all electrical loads not provided by the chassis manufacturer
- 2) A master load disconnect switch that disconnects all electrical loads on the apparatus except the starter

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

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

A green “battery disconnect on” indicator light that is visible from the driver’s position shall be provided.

Rechargeable hand lights, radios, and other similar devices shall be permitted to be connected to the electrical system ahead of the master disconnect switch.

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

### **BATTERY SWITCH**

One (1) battery disconnect switch shall be provided in cab located within easy reach of driver with green indicator light that is visible from the driver’s position. The switch and indicator light shall be supplied and installed by the cab/chassis manufacturer.

### **BATTERY SOLENOID**

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

### **BATTERY CHARGER**

One (1) Newmar model PT-80 battery charger shall be provided ideal for charging multiple battery bank systems. The Newmar Phase Three “Smart” battery charging technology provides significant benefits over traditional float chargers whose output voltage droops under heavy loads, and fails to attain proper voltage levels recommended by battery manufactures as part of a proper charge cycle. These issues are particular significant in Emergency Vehicle applications where rapid recharge is required while powering DC loads, and reliable service life of batteries is critical. PT Series chargers feature multiple isolated outputs to charge independent battery banks.

Features;

- “Smart” circuitry provides three stage charging—bulk, absorption, float
- Gel-Cell/Flooded Lead-acid/AGM battery type switch selects optimum charge/float voltages
- Multiple isolated outputs - charge independent battery banks\*
- Optional sensor adjusts output voltage based on battery temperature\*
- Current limiting - charges dead batteries without overload



- Use as a power supply; can power Radios/MDT's without a battery in line
- Built to last—rugged stainless steel case with circuitry hardened for hostile environments
- Remote meter included

### **SHORE POWER INLET**

One (1) Kussmaul 120 VAC, 30 amp Super Auto-Eject shore power inlet(s) shall be provided. The shore power connection shall automatically disengage from vehicle when chassis ignition is engaged.

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

- The outlet cover shall be yellow.
- 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.

### **ENGINE COMPARTMENT LIGHT**

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

### **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.

## **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.

**NOTE: Add cut off switch to VMUX**

## **SEON INVIEW 360 CAMERA SYSTEM**

An FRC powered by SEON, model SNB100-B00 inView™ 360 Video system kit shall include (4) four cameras, an Electronic Control Unit (ECU), required harnesses and a manual camera switch. The system kit shall provide split video feed with bird's-eye view and individual camera views. It shall be capable of integrating with an existing vehicle system for an automatic camera view, which seamlessly switches from front/left/right/rear views based on turn signal and reverse activation. The system shall have a built-in DVR that individually records all connected cameras and shall save the footage to the SD cards for future review. It shall have GPS tracking built into the system. The system shall feature user selectable on-screen overlays for setting the width, length and position of the apparatus; it shall come preloaded with (8) eight vehicle overlays. Covered by a (2) two year warranty from the manufacture date code under normal use and service

### **Operational Requirements:**

- 1 The cameras shall have dimensions of 1.3" L (34mm) x 1.9" H (48mm) x 2.4" W (61mm). The cameras shall have a 190-degree horizontal lens view angle, a relative aperture (F-stop) 2.0, and an HD resolution of 1920 x 1080 at 30 FPS (frames per second). The indoor/outdoor camera housing shall be aluminum die cast and be waterproof, rated to IP67.
- 2 The ECU shall feature HD video inputs from the cameras. The system shall have (2) two video outputs, (1) one HD (1920 x 1080) and (1) one CVBS (SD) 720 x 480. It shall also feature a switch that allows the operator to override the default camera view, a second event switch to flag an event, so the video footage can be located easily at a later time and a third switch to activate a vehicle specific overlay. The ECU shall have dimensions of 6.8" L (173mm) x 1.5" W (38mm) x 4.9" H (123mm). The system operating voltage shall be from 10 to 32 VDC, and shall consume no more than 2.2 amps. The ECU shall feature built-in recording to record each camera input separately and support (4) four SD card slots (64 GB each) for a maximum capacity of 256GB (*SD cards sold separately*), or 1TB maximum system storage.
- 3 The systems shall support (6) six different view modes.
- 4 Configure & customize set up shall be supported via monitor and IR remote control
- 5 Shall support configurable on-screen parking markers.
- 6 Complete package shall weigh less than 9 lbs.
- 7 Operating temperatures shall be between -22°F (-30°C) and 158°F (70°C), and storage temperatures shall be between -40°F (-40°C) and 185°F (85°C), Relative Humidity: 0–85%, non-condensing.

Systems Hardware shall include:

- (1) ECU (Electronic Control Unit)
- (1) Power, Video and Trigger Interface Harness
- (4) Cameras: (1) Front-view, (1) Rear-view, (2) Side-view (and metal camera mount)
- (4) Camera Extension Cables
- (3) Toggle Button
- (8) Screw Cover

System shall be calibrated and fully functional upon delivery.

The camera(s) shall be wired to the cab/chassis supplied single multiplex display. The rear camera shall activate when the transmission is placed in reverse. If a right camera is provided it shall activate with the right side turn signal and if a

left camera is provided it shall activate with the left side turn signal. All camera(s) shall also be activated by a button on the display(s).

### **INTERIOR LED LIGHTS**

Fourteen (14) OnScene Solution model #70154, 10" x 10" x 7/8", 10-30 VDC, surface white LED light(s) with clear lens shall be provided throughout the vehicle. In addition light(s) will be capable of a five (5) second delay after switching off.

The light(s) shall be switched with high/low intensity setting at the entry door(s). An Innovative Controls black back-lit switch panel shall be provided to control specified lighting or other control switching.

**NOTE: Two switch panel locations. One at pocket door forward for front and rear zone activation. One at streetside of rear entry doors for rear zone activation only.**

### **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 provided;

- Two (2) Whelen C6T amber LED sequential arrow turn signal lights, amber lens
- Two (2) Whelen C6BTT red LED brake and tail lights, red lens
- Two (2) Whelen C6LCC white LED back-up lights, clear lens

Each light shall have a chrome flange.

### **MIDSHIP MARKER/TURN SIGNAL**

Two (2) Whelen model T0A00MAR 2" round amber LED midship body clearance marker/turn signal lights shall be provided and installed, one (1) light on each side of the body, in forward wheel well of rear axle. Midship marker/turn lights shall be wired to the headlight circuit of the chassis.

### **MARKER LIGHTS**

The body shall be equipped with all necessary side and rear clearance lights and reflectors in accordance with Federal Motor Vehicle Safety Standards (FMVSS) and Canadian Motor Vehicle Safety Standards (CMVSS). Clearance lights on body shall be connected to the clearance light circuit of the chassis.

### **REAR BUMPER MARKER LIGHTS**

Two (2) Britax style dual face flexible mounted rear bumper markers shall be located, one (1) each side lower rear corner of body visible from driver mirrors.

### **LICENSE PLATE MOUNTING BRACKET**

A license plate mounting bracket shall not be provided on completed unit.

### **SIDE SCENE LIGHTS**

There shall be six (6) Whelen model C9SL Super-LED® , 9" x 7" surface mounted scene lights provided on the upper body. Light quantity shall be divided equally per side. The C9SL configuration shall consist of 36 white Super-LEDs and a clear non optic polycarbonate lens with metalized SurfaceMax reflector with integrated optic collimators for maximum output. The C9SL scene light shall have 6,500 useable lumens each. Each light shall have a chrome flange. The scene light is covered by a five year factory warranty.

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

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

### **REAR LED SCENE LIGHTS**

Two (2) Whelen model C9SL Super-LED®, 9" x 7" surface mounted scene lights shall be provided on the upper rear body to light the work area immediately behind the vehicle. The C9SL shall consist of 36 white Super-LEDs and a clear non optic polycarbonate lens with metalized SurfaceMax reflector with integrated optic collimators for maximum output. The C9SL light shall have 6,500 useable lumens each. Each light shall have a chrome flange. The scene light is covered by a five year factory warranty.

The above scene lights shall light to a level of at least 3 fc (30 lx), measured at 25 equally spaced points on a 2.5 ft (750 mm) grid with in a 10 ft x 10 ft (3 m x 3m) square to the rear of vehicle.

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

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

## **DAVID CLARK INTERCOM SYSTEM**

The following David Clark intercom system shall be provided and installed to improve the safety of firefighters and rescue professionals through enhanced communication and hearing protection. System shall have the following major components as minimum;

- Intercom Master Station, 3800
- Radio interface unit model U3805 for single radio.

## **INTERCOM SYSTEM INSTALLATION**

The above listed intercom system headset jacks shall be installed in the cab locations as follows;

- Driver's – Intercom & radio PTT provided at driver position.
  - Position provided with dual ear, flexible boom headset model H3442
  - Intercom headset jack shall be located overhead right shoulder.
  - Headset hook provided overhead right shoulder.
- Officer's – Intercom & radio PTT provided at officer position.
  - Position provided with dual ear, flexible boom headset model H3442
  - Intercom headset jack shall be located overhead left shoulder.
  - Headset hook provided overhead left shoulder.
- Body Walk-In Area - (3) Intercom & radio PTT provided body walk-in area.
  - Position provided with dual ear, flexible boom headset model H3442
  - Intercom headset jack shall be located on center console/engine cover.
  - Headset hook provided overhead right shoulder.

## **WEATHER SYSTEM**

An Orion™ vehicle-mounted weather station **pre-wire** shall be provided and installed on completed unit. This compact, all-in-one sensor module is very durable and has no moving parts. A single cable attaches through an external connector mounted on the vehicle. Inside, the Orion Interface Module provides power to the sensor transmitter and communication ports for both computer and weather display console. A permanent “snap-on” mounting adapter allows you to quickly remove and reinstall the sensor head.

NOTE: deployment requires north orientation for proper wind direction designation.

### **Sensor Specifications:**

Wind Speed: Ultrasonic  
Range: 0-134mph

Relative Humidity: Capacitance  
Range: 0 - 100%

Wind Direction: Ultrasonic  
Azimuth: 0-360°

Barometric Pressure: Capacitance  
Range: 17.72 to 32.48 InHg

Temperature: Capacitance  
Range: -61.6 to 140°F

Precipitation: Impact  
Range: cumulative

### **Standard System Includes:**

Sensor Module housed in a Self-Aspirating Radiation Shield with:

- Temperature Sensor
  - Relative Humidity Sensor
  - Digital Barometer
  - Ultrasonic Wind Direction/Speed Sensor
  - Impact Rain Sensor
- Orion Interface Module with Dual Communication Ports
  - Comprehensive User Manual
  - RS-232 Computer Cable, 6 feet

## **WEATHER SYSTEM MOUNTING**

The weather system shall be mounted on a Fire Research model 530 series side mount push up telescopic pole. The pole shall be anodized aluminum and have a knurled twist lock mechanism to secure the extension pole in position. The extension pole shall rotate 360 degrees. The outer pole shall be a grooved aluminum extrusion and qualify as an NFPA compliant handrail. The pole mounting brackets shall have a 2 3/4" offset. Pole shall be supplied with hazard switch option and wired to door ajar circuit to warn when pole is in the up position. The weather system quick release wiring connector shall be located near pole location. Overall length with Weatherpack mounted unit is approx. 90".

## **WEATHER SYSTEM SOFTWARE**

The standard Orion Data Manager Software shall be provided.

## **VIDEO SYSTEM**

Video System: No Network

### **EXTERIOR VIDEO SYSTEM**

No exterior body mounted video monitoring system shall be required on completed unit.

### **INTERIOR VIDEO SYSTEM**

No interior wall or ceiling mounted video monitoring system shall be required on completed unit.

### **TV SATELLITE ANTENNA**

No Satellite TV system shall be required with completed unit.

### **LCD VIDEO DISPLAYS**

Two (2) Samsung 32" flat panel, 4 Series (or equal) LED commercial grade, display(s) shall be provided and installed on completed unit.

#### **Inputs/Outputs:**

- (2) HDMI
- (1) USB
- (1) Component
- (1) Composite In (AV)
- (1) RF In (Terrestrial/Cable Input)
- (1) RS232C
- (1) Digital Audio Out (Optical)

Display(s) shall be complete and fully operational, including all miscellaneous coax or CAT 6 cable, HDMI to CAT6 extenders (if required), 120 volt AC wiring, and cable connections.

### **MONITOR MOUNT**

Specified monitor(s) shall be mounted to wall using a heavy duty mount with adjustable tilt for ideal viewing. Wall mount bracket shall support TVs with VESA mounts.

### **LCD VIDEO DISPLAY**

One (1) Samsung 43" flat panel, 5 Series (or equal) LED commercial grade, display(s) shall be provided and installed on completed unit.

#### **Inputs/Outputs:**

- (2) HDMI
- (1) USB
- (1) Component
- (1) Composite In (AV)
- (1) RF In (Terrestrial/Cable Input)
- (1) RS232C
- (1) Digital Audio Out (Optical)

Display(s) shall be complete and fully operational, including all miscellaneous coax or CAT 6 cable, HDMI to CAT6 extenders (if required), 120 volt AC wiring, and cable connections.

### **MONITOR MOUNT**

Specified monitor(s) shall be mounted to wall using a heavy duty mount with adjustable tilt for ideal viewing. Wall mount bracket shall support TVs with VESA mounts.

### **VIDEO/AUDIO RECORDER**

No video/audio recording system shall be required on completed unit.

### **HELICOPTER DOWNLINK SYSTEM**

No helicopter downlink system shall be required on completed unit.

### **ENTRYLINK SYSTEM PRE-WIRE**

No Con-Space EntryLink system pre-wire shall be required on completed unit.

### **RADIO AND COMMUNICATION SYSTEM**

#### **FIVE (5) POSITION ANTENNA RAIL**

One (1) radio antenna rail(s) shall be provided and installed on roof of vehicle. Each rail be constructed of aluminum, forming a two piece box design. The top section shall be removable for easy access to the individual antenna wiring. Five (5) antenna bases shall be provided and installed in each rail. Each antenna base shall include enough cable to reach radio location plus a service loop of at least 10' of LMR195 flexible communications cable. The antenna wiring shall enter the vehicle roof at a single point under the end of the rail. The end of each radio antenna shall be routed to radio mounting locations, or as determined by the South Metro Fire Rescue.

Due to the various configurations of antennas, the contractor shall provide the antenna base only, and South Metro Fire Rescue shall provide the antennas, unless radios are specified with completed vehicle.

**NOTE: All cable will be routed to curbside slideout**

#### **PAINT ANTENNA RAIL**

Antenna rail shall be provided with a powder coat paint finish, black color.



## **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.

## **UPPER LEVEL OPTICAL WARNING DEVICES**

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

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

There shall be one (1) Whelen Justice JE0NFPA LED 62" lightbar permanently mounted to the cab roof.

The lightbar configuration (streetside to curbside) shall be:

<u>SECTION</u>	<u>INTERNAL COMPONENTS</u>	<u>LENS COLOR</u>
1	Red Rear Corner Linear LED	Clear
2	Red Front Corner Linear LED	Clear
3	Red Linear LED	Clear
4	Clear Linear LED	Clear
5	Red Linear LED	Clear
6	Blank	Clear
7	Blank	Clear
8	Red Linear LED	Clear
9	Clear Linear LED	Clear
10	Red Linear LED	Clear
11	Red Front Corner Linear LED	Clear
12	Red Rear Corner Linear LED	Clear

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

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

### **GTT OPTICOM**

A GTT Opticom model 794H Infrared LED emitter light with built-in power supply shall be provided as a stand alone unit (outside of light bar).

- Opticom shall be controlled by a virtual switch, labeled "OPTICOM", and interlocked with the parking brake (transmission park position) same as other clear warning.

## **GTT GPS BASED TRAFFIC PREEMPTION**

A GTT Opticom model 2100 hi priority GPS enabled traffic pre-emption system with antenna and interface cable shall be **pre-wired**.

- Opticom shall be controlled by a virtual switch, labeled "OPTICOM", and interlocked with the parking brake (transmission park position) same as other clear warning.

## **ZONES B AND D - SIDE WARNING LIGHTS**

### **UPPER REAR CORNER WARNING LIGHTS**

There shall be two (2) Whelen C9 SurfaceMax, 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. Component shall be covered by a five year Whelen factory warranty.

Each light shall have:

- Red LEDs
- Clear Lens

Each light shall have a chrome flange.

- Flash Pattern shall be (factory default) Action Scan.

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

### **UPPER FORWARD CORNER WARNING LIGHTS**

### **ZONE C - REAR WARNING LIGHTS**

There shall be two (2) Whelen C9 SurfaceMax, 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. Component shall be covered by a five year Whelen factory warranty.

Each light shall have:

- Red LEDs
- Clear Lens

Each light shall have a chrome flange.

- Flash Pattern shall be (factory default) Action Scan.

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

## **LOWER LEVEL OPTICAL WARNING DEVICES**

To define the clearance lines of the apparatus, the optical center of the lower-level optical warning devices in the front of the vehicle shall be mounted on or forward of the front axle centerline and as close to the front corner points of the apparatus as is practical.

The optical center of the lower-level optical warning devices at the rear of the vehicle shall be mounted on or behind the rear axle centerline and as close to the rear corners of the apparatus as is practical. The optical center of any lower-level device shall be between 18 in. and 62 in. (460 mm and 1600 mm) above level ground for large apparatus, and 18 in. and 48 in. (460 mm and 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**

There shall be two (2) Whelen C6 SurfaceMax, 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. Component shall be covered by a five year Whelen factory warranty.

Each Light shall have:

- Red LEDs
- Clear Lens

Each light shall have a chrome flange.

- Flash Pattern shall be Whelen Action Scan (Factory Default)

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 surface mount ION Series LED light(s) with wide angle optic provided, one (1) each side. The light head shall include an integral flasher with programmable flash patterns. Component shall be covered by a five year Whelen factory warranty.

Each light shall have:

- Red LEDs
- Clear Lens
- Black Flange

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

## ZONES B AND D - BODY LIGHT (BODY AUXILLARY - RUBRAIL)

### FIRST PAIR FRONT RUB-RAIL LIGHTS

- So as to divide the length of the rub rail(s) evenly.

There shall be two (2) Whelen surface mount ION Series LED light(s) with wide angle optic provided, one (1) each side. The light head shall include an integral flasher with programmable flash patterns.

Each light shall have:

- Red LEDs
- Clear Lens
- Chrome Flange

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

### SECOND PAIR FRONT RUB-RAIL LIGHTS

- Centered under each door opening.

There shall be two (2) Whelen surface mount ION Series LED light(s) with wide angle optic provided, one (1) each side. The light head shall include an integral flasher with programmable flash patterns.

Each light shall have:

- Red LEDs
- Clear Lens
- Chrome Flange

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

### FIRST PAIR REAR RUB-RAIL LIGHTS

- Centered under each door opening.

There shall be two (2) Whelen surface mount ION Series LED light(s) with wide angle optic provided, one (1) each side. The light head shall include an integral flasher with programmable flash patterns.

Each light shall have:

- Red LEDs
- Clear Lens
- Chrome Flange

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

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

There shall be two (2) Whelen C6 SurfaceMax, 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. Component shall be covered by a five year Whelen factory warranty.

Each Light shall have:

- Red LEDs
- Clear Lens

Each light shall have a chrome flange.

- Flash Pattern shall be Whelen Action Scan (Factory Default)

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

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

There shall be two (2) Whelen surface mount ION Series LED light(s) with wide angle optic provided, one (1) each side. The light head shall include an integral flasher with programmable flash patterns. Component shall be covered by a five year Whelen factory warranty.

Each light shall have:

- Red LEDs
- Clear Lens
- Chrome Flange

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

#### ZONE C - REAR WARNING LIGHTS (LOWER REAR CORNERS)

There shall be two (2) Whelen C6 SurfaceMax, 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. Component shall be covered by a five year Whelen factory warranty.

Each Light shall have:

- Red LEDs
- Clear Lens

Each light shall have a chrome flange.

- Flash Pattern shall be Whelen Action Scan (Factory Default)

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

## **LINE VOLTAGE ELECTRICAL SYSTEM**

### **DIESEL GENERATOR**

A Cummins/Onan model CM20-1 diesel driven generator shall be installed on the vehicle. The generator shall be installed so that fumes, vapors, heat, and vibrations do not enter the driving or crew compartment. The generator shall be rated at 20,000 watts continuous at 120/240 VAC, 166/83 amps, single phase. Current frequency shall be stable at 60 hertz.

The engine shall be a Kubota model V2403-CR-TIE4BG, with fuel consumption @ 25% / 50% / 100% Load .44 / .88 / 1.75 (US Gal./hr.). Unit shall be 58" wide x 26.00" deep, x 34" high, and weigh 1,140 lbs.

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

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

Generator shall be equipped with a high temperature automatic shutdown system and a low oil (pressure or level) automatic shutdown system. The generator shall be installed in accordance with the generator manufacturer's requirements for ventilation and service accessibility.

### **GENERATOR BONDING**

A minimum of four (4) 16" x 2 gauge copper ground straps shall be bolted to body sub-frame and chassis sub-frame for proper bonding of high voltage system. The conductor shall have a minimum amperage rating, as defined in 310.15, "Ampacities for Conductors Rated 0–2000 Volts," of *NFPA 70*, of 115 percent of the rated amperage on the power source specification label.

### **WARRANTY PERIOD**

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

### **GENERATOR MOUNTING**

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

### **FUEL SYSTEM**

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

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

## **STARTING SYSTEM**

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

## **COOLING**

Since the generator is radiator cooled, the ventilation of the generator is crucial. The installation shall permit operation of the unit both while the apparatus is stationary and while it is in motion.

The cooling air flow shall be through screened panels in the compartment doors. Two (2) dual Flex-a-lite fans will be installed to help direct the air flow through the compartment; one (1) fan will push the air into the compartment while the other fan pulls the air out.

The additional fans shall provide adequate air flow for operation of the generator in stationary or moving, with the compartment doors in the closed position.

## **EXHAUST SYSTEM**

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

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

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

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

## **MANUALS AND SCHEMATICS**

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

## **GENERATOR COMPARTMENT INSULATION**

The generator compartment shall be provided with heavy duty sound insulation applied to walls and ceiling. Insulation shall have a high temperatures rating with a foil facing and attached to walls with a positive type fasteners, glue type adhesive shall not be acceptable.



## **GENERATOR CONTROLS**

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

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

## **LOADCENTER**

The loadcenter shall be 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

## **120/240 VAC OUTLETS AND CIRCUITS**

The generator and or shore power shall supply the 120/240 volt electrical equipment and outlets outlined below. Proper circuit protection shall be installed as noted:

## **LINE VOLTAGE ELECTRICAL SYSTEM**

### **GENERAL REQUIREMENTS**

#### **Stability**

Any fixed line voltage power source producing alternating current (ac) shall produce electric power at 60 Hz,  $\pm 3$  Hz when producing power at all levels between no load and full rated power. Any fixed line voltage power source shall produce electric power at the rated voltage  $\pm 10$  percent when producing power at all levels between no load and full rated power.

The maximum voltage supplied to portable equipment shall not exceed 275 volts to ground. Higher voltage shall be permitted only when used to operate fixed wired, permanently mounted equipment on the apparatus.

#### **Conformance with National Electrical Code**

All components, equipment, and installation procedures shall conform to *NFPA 70, National Electrical Code*, except where superseded by the requirements of this chapter. Where the requirements of this chapter differ from those in *NFPA 70*, the requirements in this chapter shall apply.

Where available, line voltage electrical system equipment and materials included on the apparatus shall be listed and used only in the manner for which they have been listed. All equipment and materials shall be installed in accordance with the manufacturer's instructions.

#### **Location Ratings**

Any equipment used in a dry location shall be listed for dry locations. Any equipment used in a wet location shall be listed for wet locations.

Any equipment, except a PTO-driven generator, used in an underbody or under chassis location that is subject to road spray shall be either listed as Type 4 or mounted in an enclosure that is listed as Type 4.

If a PTO-driven generator is located in an underbody or under chassis location, the installation shall include a shield to prevent road spray from splashing directly on the generator.

#### **Grounding**

Grounding shall be in accordance with 250.34(A) and 250.34(B) of *NFPA 70*. Ungrounded systems shall not be used.

Only stranded or braided copper conductors shall be used for grounding and bonding.

The grounded current-carrying conductor (neutral) shall be insulated from the equipment-grounding conductors and from the equipment enclosures and other grounded parts.

The neutral conductor shall be colored white or gray in accordance with 200.6, "Means of Identifying Grounded Conductors," of *NFPA 70*.

Any bonding screws, straps, or buses in the distribution panel board or in other system components between the neutral and equipment-grounding conductor shall be removed and discarded.

## Bonding

The neutral conductor of the power source shall be bonded to the vehicle frame. The neutral bonding connection shall occur only at the power source. In addition to the bonding required for the low voltage return current, each body and each driving or crew compartment enclosure shall be bonded to the vehicle frame by a copper conductor.

The conductor shall have a minimum ampere rating, as defined in 310.15, "Ampacities for Conductors Rated 0–2000 Volts," of *NFPA 70*, of 115 percent of the rated ampere on the power source specification label.

A single conductor that is sized to meet the low voltage and line voltage requirements shall be permitted to be used.

## Ground Fault Circuit Interrupters

In special service vehicles incorporating a lavatory, sink, toilet, shower, or tub, 120 V, 15 or 20 A receptacles within 6 ft (1.8 m) of these fixtures shall have ground fault circuit interrupter (GFCI) protection. GFCIs integrated into outlets or circuit breakers or as stand-alone devices shall be permitted to be used in situations.

## Power Source General Requirements

All power source system mechanical and electrical components shall be sized to support the continuous duty nameplate rating of the power source.

The power source shall be shielded from contamination that would prevent the power source from operating within its design specifications.

## Power Source Rating

For power sources of 8 kW or larger, the power source manufacturer shall declare the continuous duty rating that the power source can provide when installed on fire apparatus according to the manufacturer's instructions and run at 120°F (49°C) air intake temperature at 2000 ft (600 m) above sea level.

The rating on the power source specification label shall not exceed the declared rating from the power source manufacturer.

Access shall be provided to permit both routine maintenance and removal of the power source for major servicing. The power source shall be located such that neither it nor its mounting brackets interfere with the routine maintenance of the fire apparatus.

### Instrumentation

If the power source is rated at less than 3 kW, a “Power On” indicator shall be provided. If the power source is rated at 3 kW or more but less than 8 kW, a voltmeter shall be provided.

If the power source is rated at 8 kW or more, the following instrumentation shall be provided at an operator’s panel:

- 1) Voltmeter
- 2) Current meters for each ungrounded leg
- 3) Frequency (Hz) meter
- 4) Power source hour meter

The instrumentation shall be permanently mounted at an operator’s panel. The instruments shall be located in a plane facing the operator. Gauges, switches, or other instruments on this panel shall each have a label to indicate their function.

The instruments and other line voltage equipment and controls shall be protected from mechanical damage and not obstructed by tool mounting or equipment storage.

An instruction plate(s) that provides the operator with the essential power source operating instructions, including the power-up and power-down sequence, shall be permanently attached to the apparatus at any point where such operations can take place.

### Operation

Provisions shall be made for placing the generator drive system in operation using controls and switches that are identified and within convenient reach of the operator.

Where the generator is driven by the chassis engine and engine compression brakes or engine exhaust brakes are furnished, they shall be automatically disengaged for generator operations.

Any control device used in the generator system power train between the engine and the generator shall be equipped with a means to prevent unintentional movement of the control device from its set position in the power generation mode.

If there is permanent wiring on the apparatus that is designed to be connected to the power source, a power source specification label that is permanently attached to the apparatus at the operator’s control station shall provide the operator with the information required.

The power source, at any load, shall not produce a noise level that exceeds 90 dBA in any driving compartment, crew compartment, or onboard command area with windows and doors closed or at any operator’s station on the apparatus.

### Power Supply Assembly

The conductors used in the power supply assembly between the output terminals of the power source and the main over current protection device shall not exceed 12 ft (4 m) in length.

All power supply assembly conductors, including neutral and grounding conductors, shall have an equivalent amperage rating and shall be sized to carry not less than 115 percent of the amperage of the nameplate current rating of the power source.

If the power supply assembly connects to the vibrating part of a generator (not a connection on the base), the conductors shall be flexible cord or other fine-stranded conductors enclosed in metallic or nonmetallic liquid tight flexible conduit rated for wet locations and temperatures not less than 194°F (90°C).

### Over-current Protection

Manually re-settable over current devices shall be installed to protect the line voltage electrical system components.

### Power Source Protection

A main over current protection device shall be provided that is either incorporated in the power source or connected to the power source by a power supply assembly.

The size of the main over current protection device shall not exceed 100 percent of the rated amperage stated on the power source specification label or the rating of the next larger available size over current protection device, where so recommended by the power source manufacturer.

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

### Branch Circuit Over-current Protection

Over current protection devices shall be provided for each individual circuit and shall be sized at not less than 15 amps in accordance with 240.4, "Protection of Conductors," of *NFPA 70*.

Any panel board shall have a main breaker where the panel has six or more individual branch circuits or the power source is rated 8 kW or larger.

Each over current protection device shall be marked with a label to identify the function of the circuit it protects.

Dedicated circuits shall be provided for any large appliance or device (air conditioning units, large motors, etc.) that requires 60 percent or more of the rated capacity of the circuit to which it is connected, and that circuit shall serve no other purpose.

### Panelboards

All fixed power sources shall be hardwired to a permanently mounted panel board unless one of the following conditions exists:

- 1) All line voltage power connections are made through receptacles on the power source and the receptacles are protected by integrated over current devices.
- 2) Only one circuit is hardwired to the power source, which is protected by an integrated over current device.

The panel shall be visible and located so that there is unimpeded access to the panel board controls. All panel boards shall be designed for use in their intended location. The panel(s) shall be protected from mechanical damage, tool mounting, and equipment storage.

Where the power source is 120/240 V and 120 V loads are connected, the apparatus manufacturer or line voltage system installer shall consider load balancing to the extent that it is possible.

## Wiring Methods

Fixed wiring systems shall be limited to the following:

- 1) Metallic or nonmetallic liquid tight flexible conduit rated at temperatures not less than 194°F (90°C) with stranded copper wire rated for wet locations and temperatures not less than 194°F (90°C)
- 2) Type SOW, SOOW, SEOW, or SEOOW flexible cord rated at 600 V and at temperatures not less than 194°F (90°C)

Electrical cord or conduit shall not be attached to chassis suspension components, water or fuel lines, air or air brake lines, fire pump piping, hydraulic lines, exhaust system components, or low voltage wiring and shall be arranged as follows:

- 1) Separated by a minimum distance of 12 in. (300 mm) from exhaust piping or shielded from such piping
- 2) Separated from fuel lines by a minimum distance of 6 in. (150 mm)

A means shall be provided to allow “flexing” between the driving and crew compartment, the body, and other areas or equipment whose movement would stress the wiring.

Electrical cord or conduit shall be supported within 6 in. (150 mm) of any junction box and at a minimum of every 24 in. (600 mm) of run.

Supports shall be made of nonmetallic materials or of corrosion-resistant or corrosion-protected metal. All supports shall be of a design that does not cut or abrade the conduit or cord and shall be mechanically fastened to the apparatus.

Only fittings and components listed for the type of cord or conduit being installed shall be used.

Splices shall be made only in a listed junction box.

## Additional Requirements for Flexible Cord Installations

Where flexible cord is used in any location where it could be damaged, it shall be protected by installation in conduit, enclosures, or guards.

Where flexible cord penetrates a metal surface, rubber or plastic grommets or bushings shall be installed.

## Wiring Identification

Each line voltage circuit originating from the main panel board shall be identified.

The wire or circuit identification either shall reference a wiring diagram or wire list or shall indicate the final termination point of the circuit.

Where pre-wiring for future power sources or devices exists, the un-terminated ends shall be marked with a label showing their wire size and intended function.

## Wiring System Components

Only stranded copper conductors with an insulation rated for temperatures of at least 194°F (90°C) and wet locations shall be used. Conductors in flexible cord shall be sized in accordance with Table 400.5(A) of *NFPA 70*. Conductors used in conduit shall be sized in accordance with 310.15, "Ampacities for Conductors Rated 0–2000 Volts," of *NFPA 70*. Aluminum or copper-clad aluminum conductors shall not be used.

All boxes shall conform to and be mounted in accordance with Article 314, "Outlet, Device, Pull, and Junction Boxes; Conduit Bodies; Fittings; and Manholes," of *NFPA 70*. All boxes shall be accessible using ordinary hand tools. Boxes shall not be permitted behind welded or pop-riveted panels.

The maximum number of conductors permitted in any box shall be in accordance with 314.16, "Number of Conductors in Outlet, Device, and Junction Boxes, and Conduit Bodies," of *NFPA 70*.

All wiring connections and terminations shall provide a positive mechanical and electrical connection. Connectors shall be installed in accordance with the manufacturer's instructions. Wire nuts or insulation displacement and insulation piercing connectors shall not be used.

Each switch shall indicate the position of its contact points (i.e., open or closed) and shall be rated for the continuous operation of the load being controlled. All switches shall be marked with a label indicating the function of the switch. Circuit breakers used as switches shall be "switch rated" (SWD) or better. Switches shall simultaneously open all associated line voltage conductors. Switching of the neutral conductor alone shall not be permitted.

Line voltage circuits controlled by low voltage circuits shall be wired through properly rated relays in listed enclosures that control all non-grounded current-carrying conductors.

## Receptacles and Inlet Devices

### Wet and Dry Locations

All wet location receptacle outlets and inlet devices, including those on hardwired, remote power distribution boxes, shall be of the grounding type, provided with a wet location cover, and installed in accordance with Section 406.8, "Receptacles in Damp or Wet Locations," of *NFPA 70*.

All receptacles located in a wet location shall be not less than 24 in. (600 mm) from the ground. Receptacles on off road fire apparatus shall be a minimum of 30 in. (750 mm) from the ground. All receptacles located in a dry location shall be of the grounding type and shall be at least 12 in. (300 mm) above the interior floor height. No receptacle shall be installed in a face-up position.

The face of any wet location receptacle shall be installed in a plane from vertical to not more than 45 degrees off vertical.

### Receptacle Label

Each receptacle shall be marked with a label indicating the nominal line voltage (120 volts or 240 volts) and the current rating in amps of the circuit. If the receptacle is DC or other than single phase, that information shall also be marked on the label.

All receptacles and electrical inlet devices shall be listed to UL 498, *Standard for Safety Attachment Plugs and Receptacles*, or other recognized performance standards.

Receptacles used for DC voltages shall be rated for DC service.

### Wiring Schematics

An "As-Built" Wiring diagrams for line voltage systems shall be provided to include the following information;

- (a) Pictorial representations of circuit logic for all electrical components and wiring
- (b) Circuit identification
- (c) Connector pin identification
- (d) Zone location of electrical components
- (e) Safety interlocks
- (f) Alternator–battery power distribution circuits
- (g) Input/output assignment sheets or equivalent circuit logic implemented in multiplexing systems

### **120/240 VAC SCENE LIGHTING**

#### **LIGHT TOWER**

One (1) Command Light Shadow, SL Series light tower(s) shall be provided and installed on the completed unit.

The Command Light shall be covered by a five (5) year limited warranty from defects in materials and workmanship. An operation, maintenance, and parts manual shall be provided with the completed unit.

#### Light Tower Construction and Design

The Command Light assembly shall be of aluminum construction, with stainless steel shafts and bronze bushings for long life and low maintenance.

The electrically controlled unit shall not require usage of the vehicle's air supply for operation, thereby eliminating the chance for air leaks in the vehicle braking system. Hydraulic or pneumatic type floodlights are not acceptable alternatives to the specified all electric light tower.

The light tower shall be tested to in wind conditions of 90 mph (150 kph) minimum. Other type floodlights that have not been tested to these conditions are not acceptable.

The light tower shall be capable of overhanging the side or back of the vehicle to provide maximum illumination to the vicinity adjacent to the vehicle for the safety of emergency personnel in high traffic conditions. Any tower that is only capable of rotations at the top of a pole is not an acceptable alternative to the specified tower.

#### Light Tower Electrical System

The light tower shall be a single-stage device with a lighting capable of 350 degree rotation. The light shall be elevated by an electric linear actuators, the actuator shall adjust the light bank angle from 0 to 110 degrees.

The tower base shall have a light that illuminates the envelope of motion during any movement of the light tower mast per NFPA 1901.

A red flashing or rotating light located in the driving compartment shall be illuminated automatically whenever the vehicles parking brake is not fully engaged, indicating that the light tower is not in stowed position, as required by NFPA 1901.



### Light Tower Floodlights

The Command Light model SL442A-W2 shall be equipped with the following bank of floodlights:

Floodlight manufacturer:	Whelen Engineering
Number of lamp heads:	Four (4) Pioneer Plus PFP2ACB LED
Voltage:	120 volts
Watts of each lamp head:	150 watt
Total watts of light tower:	780 watts
Total lumens of light tower:	81,768
Configuration:	The light heads shall be mounted with two (2) on each side of the light tower, giving two (2) vertical lines of two (2) when the lights are in the upright position.

### Light Tower Camera

- Floodlight tower shall be provided with a top mounted Intec VSC510 (or equal) digital zoom camera.
- Camera shall be controlled by an external Intec Camear Controller VSX351 (or equal) that will provide control the camera as well as outputs to video monitors seperate from the camera System.

### Light Tower Camera Video - Multiple Screens

- The Video signal from the light tower mounted camera shall be displayed on the following Screens.

### Light Tower Camera Video - IC1 Area Monitor

- The Video signal from the light tower mounted camera shall be displayed on the monitor in the IC1 Area.

### Light Tower Camera Video - IR1 Area Monitor

- The Video signal from the light tower mounted camera shall be displayed on the monitor in the IR1 Area.

### Light Tower Camera Video - Exterior Monitor

- The Video signal from the light tower mounted camera shall be displayed on the monitor in the exterior compartment.

Light tower shall be provided with optional 80 inch long articulated arm ILO specified standard. Alters specified light tower nested length.

### Light Tower Paint

The light tower shall be electro-statically powder coated with a hammer tone gray color.

### Light Tower Controls

The light tower(s) shall be operated with a wireless hand-held remote control. The storage station for the remote control unit shall be equipped with a button to activate the "Auto-Park" automatic nesting feature. The remote control shall be located per the itemized compartment list and include;

Three (3) switches, one (1) for each light bank.  
One (1) light bank rotation switch.

One (1) switch for elevating lower and upper stage.  
One (1) indicator light to indicate when light bank is out of the roof nesting position.  
One (1) indicator light to indicate when light bank is rotated to proper nesting position.

**NOTE: Located curbside slideout desk**

Light Tower Mounting

The specified light tower(s) shall be mounted on the roof of the body.

Where the light tower is to be mounted above a finished walk-in area; the roof backing plates and structure shall have threaded holes to allow removal of light tower without removal of the interior paneling.

Where the light tower is mounted in close proximity to other roof mounted items (i.e. antennas, air conditioners, and weather stations) the light tower shall be orientated in order to help prevent a operator driven collision.

**UTILITY AIR COMPRESSOR**

One (1) Speedaire model 1NNF7 or equal, 240 VAC, 3.1 HP electric powered air compressor with 20 gallon storage tank shall be provided on completed unit. Compressor shall be rated at 15.0 free air CFM @ 90 PSI, 10.20 free air CFM @ 135 PSI max. pressure.

One (1) 240 VAC twist lock receptacle with switch shall be provided for turning the compressor On/Off.

- On/Off controls for utility air compressor shall be located near the specified low pressure air hose reel(s).
- The utility air compressor shall be located in compartment.

Results of the NFPA required utility air system test shall be provided with delivered vehicle.

- The utility air compressor shall be located in compartment.

## **EQUIPMENT PAYLOAD WEIGHT ALLOWANCE**

In compliance with NFPA 1901 standards, the special service vehicle shall be designed for an equipment loading allowance of 4,000 lbs. of South Metro Fire Rescue provided equipment based on a 30,001 - 40,000 pound gross vehicle weight rating.

## **EQUIPMENT**

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

- One (1) container of assorted stainless steel nuts, bolts, screws and washers used in the construction of the apparatus shall be provided with the completed apparatus.
- There shall be two (2) Zico SAC-44-E NFPA approved folding aluminum wheel chocks provided for 44" diameter tires that together will hold the vehicle when loaded to its GVWR or GCWR, on a hard surface with a 20 % grade, with the transmission in neutral, and the parking brake released.
  - The wheel chock(s) shall be mounted behind rear wheels, below body on streetside.
- NFPA required flashlight(s) shall be provided by **customer** and installed by manufacturer.

**NOTE: 6 hand lights and 4 box lights.**

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

All other minor equipment not specified above, but required by NFPA 1901 for special service vehicles, section 10.9.3 shall be supplied and mounted by South Metro Fire Rescue before the unit is placed in emergency service.