

Port Moody Fire-Rescue / Safetek Demo

Heavy Rescue (with Bauer Compressor)

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INTERNET IN-PROCESS SITE

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

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 NFPA 1901, 2009 Edition, 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.

WEIGHT DISTRIBUTION

When the fire apparatus is loaded to its estimated in-service weight, the front-to-rear weight distribution shall be within the limits set by the chassis manufacturer.

The front axle loads shall not be less than the minimum axle loads specified by the chassis manufacturer under full load and all other loading conditions.

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LOAD DISTRIBUTION

The apparatus manufacturer shall calculate the load distribution for the apparatus, and that load distribution plan shall be delivered with the fire apparatus.

The manufacturer shall engineer the fire apparatus to comply with the gross axle weight ratings (GAWR), the overall gross vehicle weight rating (GVWR), and the chassis manufacturer's load balance guidelines.

The fire apparatus, when loaded to its estimated in service weight, shall have a side-to-side tire load variation of no more than 7 percent of the total tire load for that axle.

Each tire shall be equipped with a visual indicator or monitoring system that indicates tire pressure.

ROADABILITY

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

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

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

If the combined water tank and foam agent tank capacities on the fire apparatus exceed 1250 gal (4732 L), or the GVWR of the vehicle is over 50,000 lb (22,680 kg), the maximum top speed of the apparatus shall not exceed either 60 mph (85 km/hr) or the manufacturer's maximum fire service speed rating for the tires installed on the apparatus, whichever is lower.

SERVICEABILITY

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

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

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

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CONSTRUCTION DOCUMENTATION

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

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

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- (18) If the apparatus is equipped with an air system, air tank certificates, the SCBA fill station certification (see 24.9.7), and the results of the testing of the air system installation
- (19) Any other required manufacturer test data or reports

OPERATIONS AND SERVICE DOCUMENTATION

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

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

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

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

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

NFPA REQUIRED DOCUMENTATION FORMAT - CD-ROM

The vehicle construction details and the operations and service documentation as required per NFPA 901 latest edition shall be provided on a CD-ROM. These manuals shall be divided into sections for ease of reference. There shall be two (2) copies of the CD-ROM provided with the completed vehicle.

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CARRYING CAPACITY

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

The estimated in-service weight shall include the following:

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

The Body Manufacturer shall engineer and design the vehicle such that the completed unit, when loaded to 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 Body Manufacturer's certification of the GVWR or GCWR, along with a certification of each GAWR, shall be supplied on a label affixed to the vehicle.

		Equipment Allowance		
Apparatus Type	Equipt. Storage Area	Apparatus Size	lb.	kg.
Special Service Fire Apparatus	Minimum of 120 cu ft (3.4 cu mt) of enclosed compartmentation.	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

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TESTING

ROAD TEST

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

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

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

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

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

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

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

LOW VOLTAGE - ELECTRICAL SYSTEM PERFORMANCE TEST

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

TEST SEQUENCE

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

1. RESERVE CAPACITY TEST

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

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

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2. ALTERNATOR PERFORMANCE TEST

TEST AT IDLE

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

TEST AT FULL LOAD

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

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

3. LOW VOLTAGE ALARM TEST

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

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

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

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

LOW VOLTAGE - ELECTRICAL SYSTEM PERFORMANCE TEST

DOCUMENTATION

The manufacturer shall deliver the following with the fire apparatus:

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

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UL 120/240 VAC CERTIFICATION

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

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

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

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

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

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

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

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

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

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

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

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

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

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

DOCUMENTATION

The manufacturer shall deliver the following with the fire apparatus:

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

Port Moody Fire-Rescue / Safetek Demo

Heavy Rescue (with Bauer Compressor)

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DIELECTRIC VOLTAGE WITHSTAND TEST

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

The test shall be conducted as follows:

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

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

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

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

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

WARRANTY

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

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

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

GENERAL LIMITED WARRANTY - ONE (1) YEAR

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

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

LOW VOLTAGE ELECTRICAL WARRANTY - FIVE (5) YEARS

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

STRUCTURAL WARRANTY - TEN (10) YEARS

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

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PAINT LIMITED WARRANTY - TEN (10) YEARS

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

CONSTRUCTION PERIOD

The completed vehicle shall be delivered within one hundred eighty (180) days after receipt of a purchase order, or contract.

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

OVERALL HEIGHT

The overall height (OAH) of the vehicle shall be approximately 130" (10' - 10") from the ground. This measurement shall be taken on flat ground with the tires properly inflated, in the unloaded condition, at that highest point of the vehicle.

OVERALL LENGTH

The overall length (OAL) of the vehicle shall be approximately 384" (32' - 0").

DELIVERY AND DEMONSTRATION

The contractor shall be responsible for the delivery of the completed unit to the Port Moody Fire Departments 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 Port Moody Fire Department regarding the operation, care, and maintenance of the apparatus and equipment supplied at the Port Moody Fire Departments location.

The delivery engineer shall set delivery and instruction schedule with the person appointed by Port Moody Fire Department.

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

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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 (METRIC)

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

The label shall show the height of the completed fire apparatus in meters, the length of the completed fire apparatus in meters, and the GVWR in kilograms.

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.

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ACCIDENT PREVENTION

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

PERSONNEL CAPACITY

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

ACCIDENT PREVENTION

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

WEARING HELMET WARNING

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

FRONT BUMPER EXTENSION

The front bumper of the chassis shall be extended approximately 24" ahead of the cab using Junior I-beams.

The bumper mounting plate shall be welded to the Junior I-beam for mounting of the chassis bumper. After fabrication of the bumper extension, the panels shall be removed and the unit shall be primed and painted black.

BUMPER GRAVEL SHIELD

The front bumper extension shall have a 3/16" NFPA compliant aluminum tread plate gravel shield. The gravel shield shall cover the full width of the front bumper to the front of the cab and the full height of the bumper on each end.

BUMPER COMPARTMENTS

The bumper extension shall have two (2) tool compartments each located outboard of the chassis frame rail and as large as possible. The compartment lids shall be 1/8" NFPA compliant aluminum tread plate with stainless steel hinges and chrome push release type latches. Each compartment lid shall have a gas shock type hold open device.

If the bumper compartment is greater than 4 cu.ft. in volume and has an opening greater than 144 sq.in. it shall have sufficient compartment lighting to provide a minimum of 2 fc (20 lx) at any location on the floor of the compartment without any equipment in the compartment. If light is required, light shall be an OnScene LED type light.

A flashing warning light signal shall be provided indicating when a compartment door is not in a closed position as required by NFPA 1901.

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BUMPER COMPARTMENT

The bumper extension shall have one (1) winch compartment in center of bumper extension. The compartment shall be as large as possible. Compartment door shall be 1/8" NFPA compliant aluminum tread plate with stainless steel hinges and chrome push release type latches. Each compartment lid shall have a gas shock type hold open device.

If the bumper compartment is greater than 4 cu.ft. in volume and has an opening greater than 144 sq.in. it shall have sufficient compartment lighting to provide a minimum of 2 fc (20 lx) at any location on the floor of the compartment without any equipment in the compartment. If light is required, light shall be an OnScene LED type light.

A flashing warning light signal shall be provided indicating when a compartment door is not in a closed position as required by NFPA 1901.

A Port Moody Fire Department supplied Warn 9,000 lb. portable winch shall be stored in the front bumper in a steel 2" type receiver assembly. The winch shall be capable of being used within the front bumper with additional 4-way roller assembly mounted to center of bumper. In addition the winch shall be re-movable from front bumper location and used at specified side and rear locations. The Warn winch receiver must be modified for this mounting location.

AIR HORNS

Two (2) Grover 24" Stuttertone chrome plated air horns shall be recess mounted in the front bumper, one (1) on each side outboard of the frame rails. An emergency air shut off valve shall be provided in the cab.

AIR HORN ACTIVATION

The air horn(s) shall be operated by a foot switch on the cab floor located at the driver position.

MOTOR DRIVEN SIREN

There shall be a motor driven, streamlined, rotary siren with chrome plated grill and housing pedestal, mounted on the extended front bumper. The siren shall be properly wired with heavy copper cable for minimum voltage drop. Make: Federal, Model: Q2BP.

- The siren shall be located at 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

The siren shall be activated by a foot switch on the cab floor located at the driver position.

GROUND LIGHTS

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

FRONT TOW EYES

There shall be two (2) heavy duty cast tow eyes securely mounted to the chassis frame below the front bumper. The front tow eyes will be chrome plated.

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Production Specification

EXHAUST

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

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

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

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

CHROME TIP ON EXHAUST

There shall be a chrome tip furnished and installed on the chassis exhaust system.

RADIO

A Jensen JHD3510 radio with weather band, AM/FM stereo receiver, CD player, rear iPod input pigtail connector, satellite radio capability, and a front panel mini stereo input jack, and four (4) speakers shall be installed in the cab. The CD player shall be compatible with CD-R, CD-RW and MP3 format discs. The receiver shall be installed in the left hand overhead position.

The speakers shall also be installed inside the cab with two (2) speakers recessed within the headliner of the front of the cab just behind the windshield and two (2) speakers in the upper rear corners of the cab. The CD receiver shall cut-out with the activation of the master warning system.

RADIO/ANTENNA INSTALLATION

There shall be one (1) Port Moody Fire Department supplied radio(s) with antenna installed in the cab within easy reach of driver. The location of radio shall be determined by the Port Moody Fire Department at the pre-construction meeting.

Radio shall be installed per manufacturers requirements and wired for proper 12 volt power and ground.

SCBA BRACKETS

Six (6) Zico Rol-Loc SCBA air pack bracket(s) provided in specified SCBA seats. Storing your SCBA has never been easier. With the new Rol-Loc just push the air pack into position and you are done. No straps or levers to deal with when putting the SCBA away. Releasing it is just as simple as one pull on the release cord.

SEAT BELT COLOR

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

SEAT BELT WEB LENGTH - CUSTOM CAB

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

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

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SEAT BELT MONITORING AND VEHICLE DATA RECORDER (VDR) SYSTEMS

SEAT BELT MONITORING

A Fire Research SBA200 series system shall be provided and installed to allow the driver and officer 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. System shall include following features;

VEHICLE DATA RECORDER (VDR)

- All data collected is stored with a date and time stamp
- Data collected includes vehicle speed, vehicle acceleration and deceleration, engine RPM and throttle position, ABS event, seat occupied with seat belt status, and master optical warning device switch
- The VDR data is sampled once per second in a 48 hour loop
- The VDR summary data is sampled minute by minute for 100 engine hours
- All data stored in the VDR can be uploaded and saved on a computer
- All data is secured and can only be accessed with the correct password

DISPLAY MODULE IN CAB

The display mounted in cab shall include the following;

- Green fasten seat belt icon indicates person is properly seated and buckled
- Red icon indicates person seated is not buckled
- Message display will show vehicle speed and other system data for the officer to monitor
- Modify system parameters
- Mounting brackets provided for either pedestal and surface mount

DATA ACQUISITION & STORAGE

All data collected by the system is stored with a date and time stamp. Data collected includes:

- Vehicle speed
- Engine RPM and throttle position
- ABS event
- Seat occupied with seat belt status

Data is capable of being uploaded from memory via wireless technology to portable, handheld data collector or laptop computer for viewing, sorting, and printing.

DATA COLLECTOR

There shall be NO data collector provided with the completed vehicle.

SIX (6) - TIRE PRESSURE VISUAL INDICATORS

Each tire shall be equipped with an Accu-Pressure Safety Cap (or equal) visual indicator that indicates proper tire pressure.

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HELMET STORAGE

Six (6) OnScene Solutions Talon model helmet storage bracket(s) shall be provided and installed in the cab driving or crew area. The helmet mounting will comply with the 9G NFPA requirements. Helmet brackets shall be mounted on the completed unit, locations as per the Port Moody Fire Department.

TRANSMISSION SHIFTER

The existing push pad style transmission shifter shall be removed and replaced with a "T" style shifter mounted on top of engine doghouse in standard Spartan location. A cover shall be provided to cover opening left in panel from push pad style shifter.

BRAKE APPLICATION PRESSURE GAUGE

Within the dash panel, a brake application pressure gauge shall be installed which shall measure the application air pressure when the brakes are applied.

HUB AND NUT COVERS

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

MUDFLAPS

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

AIR BRAKE SYSTEM QUICK BUILD-UP

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

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.

AUTOMATIC TIRE CHAINS

The apparatus chassis shall be provided with "ONSPOT" air operated automatic tire chains at the rear driving axle. Tire chains shall offer the traction of a single set of conventional snow chains at the touch of a button on the dash, without having to stop the vehicle.

ROAD EMERGENCY SAFETY KIT

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

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

FUEL FILL

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

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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 Port Moody Fire Department 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 Port Moody Fire Department from such repair and shall NOT be used.

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

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

EXTERIOR ALUMINUM BODY

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

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

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

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

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

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

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

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

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

ROOF CONSTRUCTION

The roof shall be integral with the body and shall be all welded construction. The roof of the body shall not be less than 3/16" aluminum 3003H-14 alloy tread plate, fully and continuously welded. The roof shall be reinforced with 2" x 2" x 1/4" aluminum tubing running the full width of the body. A 2" rounded radius shall be provided along the body sides.

BODY SUBFRAME

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

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

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

These crossmembers shall extend the full width of the body to support the compartments. Crossmembers shall be located at front and rear of the body, below compartment divider walls, and in front and rear of wheel well opening. Additional aluminum crossmembers shall be located as necessary to support walkways or heavy equipment.

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

BODY MOUNTING

The body subframe shall be fastened to the chassis frame with a minimum of six (6) spring loaded body mounts. Each mount shall be configured using a two-piece encapsulated slide bracket. The two (2) brackets shall be fabricated of heavy duty 1/4" thick steel and shall have a powder coat finish to prevent any corrosion. Each mounting assembly shall 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 chassis frame and mounted below the apparatus body. The tow eyes shall be fabricated from 3/4" thick steel plate and shall have a black powder coat paint finish.

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TRAILER HITCH

A Class III, 7,500 lbs. weight carrying capacity (gross trailer weight) rear hitch receiver shall be provided below the rear bumper. The receiver shall be attached to the apparatus body frame.

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

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

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

TRAILER ELECTRICAL RECEPTACLE

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

TRUCK AUXILIARY ELECTRICAL RECEPTACLE

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

GROUND LIGHTS

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

WHEEL WELL EXTERIOR PANEL

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

STAINLESS STEEL BODY FENDERS

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

WHEEL WELL LINERS

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

SCBA BOTTLE COMPARTMENTS

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

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ALUMINUM BODY PAINT SPECIFICATIONS

BODY PAINT PREPARATION

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

The exterior 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. If the compartment interior is to be painted the interior shall be acid etched as described above then primed with an epoxy primer and all seams caulked.

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 an eight-stage paint process;

1. Clean bare metal using a solvent base wax & grease remover.
2. Finish all exterior body seams as necessary, followed by a thorough sanding of all bare metal to be painted.
3. Re-clean bare metal using a solvent base wax & grease remover.
4. Bare Metal Epoxy Primer Coat - PPG Delfleet® Evolution corrosion resistance epoxy primer to be applied at 1.0-2.0 mils DFT over clean abraded bare metal.
5. Primer Filler Coat - PPG Delfleet® Evolution urethane build primer to achieve total thickness of 3.0-6.0 mils DFT after sanding.
6. Base coat (Color) - PPG Delfleet® Evolution High Solids Polyurethane Base coat. Apply 1.0-3.0 mils DFT of base coat color to achieve full hiding.
7. Clear coat PPG Delfleet® Evolution polyurethane premium quality clear coat with improved mar resistant finish. The clear coat shall be applied to achieve a total dry film thickness of 2.0-3.0 mils.
8. Curing process of the painted body shall go through a force dry/bake cycle process. The painted components shall be baked 180 degrees for 2 hours to achieve a complete coating cure on the finished product.

MACHINE POLISHED

After the force dry/bake cycle and ample cool down time, the coated surface shall be sanded using 1,000, 1,500, and or 3,000 grit sandpaper to remove surface defects. In the final step, the surface shall be buffed then polished to an extra high gloss smooth finish. Total dry film thickness of paint will average between 8.0-12.0 mils.

PAINT - ENVIRONMENTAL IMPACT

The contractor shall meet or exceed all current State (his) regulations concerning paint operations. Pollution control 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.

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Heavy Rescue (with Bauer Compressor)

Production Specification

PAINT FINISH - SINGLE COLOR

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

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

Touch-up paint shall be provided with completed vehicle.

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

BODY UNDERCOATING

The entire underside of 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.

COMPARTMENT INTERIOR FINISH

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

ROOF COMPARTMENT INTERIOR FINISH

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

REFLECTIVE STRIPE

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

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

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

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Heavy Rescue (with Bauer Compressor)

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REFLECTIVE STRIPE - CAB SIDE

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

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

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

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

REFLECTIVE STRIPE - CAB FRONT

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

A retroreflective stripe(s) shall be affixed to at least 25 percent of the width of the front of the apparatus.

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

REFLECTIVE STRIPE - CAB DOOR INTERIOR

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

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

REFLECTIVE STRIPE - BODY SIDES

A 4" minimum reflective stripe shall be affixed to the sides of the body.

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

The stripe shall remain in a straight line from the front of the vehicle to the rear.

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CHEVRON REFLECTIVE STRIPE - REAR SIDES PANELS

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

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

- The stripe material shall be 3M Diamond Grade.

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

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

LETTERING

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

SIDE CAB DOOR LETTERING

There shall be thirty (30) 4" high reflective letters furnished and installed on the cab doors as follows;

"CITY OF" - Front cab doors
"PORT"
"MOODY"

- This reflective lettering shall be gold in color.

There shall be twenty (20) 3" high reflective letters furnished and installed on the cab doors as follows;

"FIRE -RESCUE" - Rear cab doors

- This reflective lettering shall be gold in color.

UPPER BODY SIDE LETTERING

There shall be twenty two (22) 10" high reflective letters furnished and installed on the upper body sides as follows;

"HEAVY RESCUE"

- This reflective lettering shall be gold in color.

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EXTERIOR COMPARTMENT DOORS

ROLL-UP DOOR CONSTRUCTION - ROBINSON (ROM)

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

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

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

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

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

ABOVE REAR AXLE

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

BEHIND REAR AXLE

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

GENERAL

	<u>Description</u>	<u>Dimension</u>
G	Bottom of Drip Rail to Top of Body	33.5"

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

FIVE (5) UPPER BODY COMPARTMENTS

The forward transverse compartment shall be 90.0" long x 27.0" wide x 28.5" deep. There shall be four (4) compartments parallel to the sides of the body, two (2) on each side. Each of these compartments shall be 52.0" long x 28.0" wide x 28.5" deep. The side compartments shall be open under each door sill to allow for long equipment. Each compartment shall be integral with the body construction, and will not be bolted or add-on modules. The outside walls of each compartment will be double walled to prevent equipment from denting the outside painted surface.

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

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

Each roof compartment door shall have a chrome 7" handle bolted to center of each door.

Each compartment shall have a horizontally mounted OnScene Solutions LED Night Stik on the underside of the door. The light will be automatically activated by a gravity-driven, sealed, ball-style tilt switch mounted to one of the pneumatic cylinders and also wired to the NFPA required hazard warning light in cab.

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TRANSVERSE ROOF COMPARTMENT - SHELF TRAC

There shall be one (1) roof compartment(s) provided with horizontally mounted Shelf Trac on front and rear walls for vertical partition installation.

SIDE ROOF COMPARTMENT - SHELF TRAC

There shall be one (1) roof compartment(s) provided with horizontally mounted Shelf Trac on front and rear walls for vertical partition installation.

ROOF COMPARTMENT - VERTICAL PARTITION

There shall be four (4) vertical partition(s) provided in the roof compartment(s). The partitions shall be designed for holding equipment in place during travel. Each partition shall be fabricated from 3/16" smooth aluminum and bolted to specified Shelf Trac for ease of adjustment.

UPPER BODY WALKWAY

A 34" wide, upper body walkway shall be provided at the center of body and recessed into the roof structure. The walkway shall be finished with NFPA compliant 3/16" aluminum tread plate with continuously welded seams to prevent moisture penetration into apparatus body. Drains shall be installed at front of walkway to allow water to drain to the ground through flexible drain hose.

WALKWAY LIGHTS

There shall be Two (2) OnScene Solutions 9" LED Night Stik lights provided to illuminate the upper body walkway area. The lights shall be activated when the parking brake is set.

Each light shall be mounted in a ball burnished cast aluminum housing to protect against damage from personnel or equipment.

ROOF ACCESS LADDER

The top of the rescue body shall be accessible from the ground by a Zico Quic-Ladder with 6-ring main ladder section and 2-rung fold down landing section. Ladder stores parallel to the body and released with a locking handle and ladder pulls out to a comfortable climbing angle. Ladder automatically latches and will not retract until the scissor lock is raised.

Each cast aluminum step shall be 3" deep x 15 1/2" wide. Hand railing shall be 1-1/4" heavy walled aluminum tubing covered with ribbed black neoprene tubing for a firm 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.

ROOF ACCESS HANDRAIL

There shall be one (1) handrail mounted on top of body to assist in roof access. Handrails shall be NFPA compliant 1-1/4" extruded aluminum tubing with chrome plated end stanchions.

Port Moody Fire-Rescue / Safetek Demo Heavy Rescue (with Bauer Compressor) Production Specification

BODY WIDTH DIMENSIONS

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

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

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

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STREETSIDE COMPARTMENT - FRONT (S1)

The interior useable compartment width shall be approximately 41.0" wide.

The compartment door opening shall be approximately 34.0" wide.

This compartment shall have a Robinson roll-up door.

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

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

COMPARTMENT COMPONENTS

- There shall be vertically mounted aluminum shelf trac for shelving installation.
- There shall be one (1) 1,000 lbs. slide-out tray(s) with a OnScene Solutions base approximately 46" deep and as wide as the compartment layout or door opening permits located above the level of the chassis frame rails.
 - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front and side faces of the tray. The striping shall be 2" wide and red/white in color.
- There shall be one (1) transverse module(s) for the following long tools and equipment:
 - One (1) Port Moody Fire Department supplied Stokes Basket(s). Manufacturer, model number and dimensions of the Stokes Basket(s) shall be provided during the pre-construction meeting.
 - Two (2) Port Moody Fire Department supplied backboard(s). Manufacturer, model number and dimensions of the backboard(s) shall be provided during the pre-construction meeting.
 - There shall be four (4) OnScene Solutions cargo straps provided to secure the stored equipment.
- The floor of the compartment above the frame rails shall be extended to the interior edge of the door. The floor shall have a 2" vertical lip and a 1" return to increase strength.
- Two (2) vertically mounted OnScene Solutions LED Nightstiks.
- The controls for the specified light tower(s).
- The 12 volt electrical distribution panel shall be located in the streetside front lower compartment.

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STREETSIDE COMPARTMENT - AHEAD OF REAR WHEELS (S2)

The interior useable compartment width shall be approximately 41.0" wide.

The compartment door opening shall be approximately 34.0" wide.

This compartment shall have a Robinson roll-up door.

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

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

COMPARTMENT COMPONENTS

- There shall be vertically mounted aluminum shelf trac for shelving installation.
- There shall be one (1) adjustable shelf/shelves approximately 46" deep.
 - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front face of the shelf. The striping shall be red/white in color.
- There shall be one (1) 1,000 lbs. slide-out tray(s) with a OnScene Solutions base approximately 46" deep and as wide as the compartment layout or door opening permits located above the level of the chassis frame rails.
 - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front and side faces of the tray. The striping shall be 2" wide and red/white in color.
- The floor of the compartment above the frame rails shall be extended to the interior edge of the door. The floor shall have a 2" vertical lip and a 1" return to increase strength.
- Two (2) vertically mounted OnScene Solutions LED Nightstiks.
- One (1) OnScene Solutions 9" LED Nightstik ground light shall be provided below the body.

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STREETSIDE COMPARTMENT - ABOVE REAR WHEELS (S3)

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

The compartment door opening shall be approximately 52.0" wide.

This compartment shall have a Robinson roll-up door.

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

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

COMPARTMENT COMPONENTS

- There shall be vertically mounted aluminum shelf trac for shelving installation.
- Two (2) vertically mounted OnScene Solutions LED Nightstiks.
- One (1) 120/240 VAC load center.
- The FRC FROG-D generator gauge panel.
- One (1) BAUER model BP-13H-E3 air compressor with a recharging rate of 13 SCFM at 6,000 PSI.
 - Air storage module consisting of two (2) 6,000 psi, ASME air storage cylinders.

There will be a welded reinforcement above the body frame over the wheel wells to carry the load of all DOT or ASME cylinders. The mounting of the cylinders will be with adjustable track and powder coated steel band straps to securely hold all cylinders in place.

- One (1) Appleton inlet and base for providing shore power to the air compressor.

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STREETSIDE COMPARTMENT - REAR (S4)

The interior useable compartment width shall be approximately 49.0" wide.

The compartment door opening shall be approximately 42.0" wide.

This compartment shall have a Robinson roll-up door.

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

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

COMPARTMENT COMPONENTS

- There shall be vertically mounted aluminum shelf trac for shelving installation.
- There shall be three (3) slide-out smooth aluminum vertical tool board(s) approximately 24" deep.
 - The tool board(s) shall be horizontally adjustable mounted on aluminum shelf trac on compartment floor.
 - 3M™ Diamond Grade™ Conspicuity striping shall be provided on both sides of the toolboard. The striping shall be 2" wide and red/white in color.
- The floor of the compartment above the frame rails shall cover the area directly above the frame rails ONLY (non-extended floor).
- Two (2) vertically mounted OnScene Solutions LED Nightstiks.

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CURBSIDE COMPARTMENT - FRONT (C1)

The interior useable compartment width shall be approximately 38.0" wide.

The compartment door opening shall be approximately 31.0" wide.

This compartment shall have a Robinson roll-up door.

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

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

COMPARTMENT COMPONENTS

- There shall be vertically mounted aluminum shelf trac for shelving installation.
- There shall be one (1) 1,000 lbs. slide-out tray(s) with a OnScene Solutions base approximately 46" deep and as wide as the compartment layout or door opening permits located above the level of the chassis frame rails.
 - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front and side faces of the tray. The striping shall be 2" wide and red/white in color.
- There shall be one (1) transverse module(s) which extends to the opposite side of the body. (Specified in opposite side compartment.)
 - There shall be three (3) OnScene Solutions cargo straps provided to secure the stored equipment.
- The floor of the compartment above the frame rails shall be extended to the interior edge of the door. The floor shall have a 2" vertical lip and a 1" return to increase strength.
- Two (2) vertically mounted OnScene Solutions LED Nightstiks.
- The cab tilt control pendant.

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CURBSIDE COMPARTMENT - AHEAD OF REAR WHEEL (C2)

The interior useable compartment width shall be approximately 41.0" wide.

The compartment door opening shall be approximately 34.0" wide.

This compartment shall have a Robinson roll-up door.

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

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

COMPARTMENT COMPONENTS

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

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- One (1) Hannay ECR1618-17-18 cable reel(s) capable of storing 200' of 10/3 electric cable. The rewind switch for each reel shall be located adjacent to the reel it controls.
 - The cable reel shall be equipped with 200' of 10/3 SEOW yellow cable, a molded plastic ball clamp, and a single heavy duty L5-30 twist-lock female plug at the end.
 - One (1) Akron model EJB, cast aluminum electrical power distribution box with yellow powder coat painted finish shall be provided. The power distribution box shall include:
 - A 12" pigtail that terminates in an L5-30 configuration to match the cable on the cord reel. The outlet configuration shall include:
 - One (1) L5-15 single twist lock receptacle
 - One (1) L5-15 single twist lock receptacle
 - One (1) 5-15 duplex straight-blade receptacle
 - One (1) 5-15 duplex straight-blade receptacle
 - One (1) EJB vertical apparatus mounting bracket - treadplate
- Two (2) vertically mounted OnScene Solutions LED Nightstiks.
- One (1) OnScene Solutions 9" LED Nightstik ground light shall be provided below the body.

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CURBSIDE COMPARTMENT - ABOVE REAR WHEEL (C3)

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

The compartment door opening shall be approximately 52.0" wide.

This compartment shall have a Robinson roll-up door.

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

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

COMPARTMENT COMPONENTS

- There shall be vertically mounted aluminum shelf trac for shelving installation.
- There shall be one (1) SCBA cylinder storage module for 8" OD PVC tubing.
 - The SCBA cylinder module shall be capable of storing twelve (12) SCBA cylinders up to 7.5" diameter.
- Two (2) vertically mounted OnScene Solutions LED Nightstiks.

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CURBSIDE COMPARTMENT - REAR (C4)

The interior useable compartment width shall be approximately 49.0" wide.

The compartment door opening shall be approximately 42.0" wide.

This compartment shall have a Robinson roll-up door.

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

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

COMPARTMENT COMPONENTS

- There shall be vertically mounted aluminum shelf trac for shelving installation.
- There shall be one (1) adjustable shelf/shelves approximately 24" deep.
 - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front face of the shelf. The striping shall be red/white in color.
- The floor of the compartment above the frame rails shall cover the area directly above the frame rails ONLY (non-extended floor).
- Two (2) vertically mounted OnScene Solutions LED Nightstiks.
- One (1) Bauer model CFSII-2S (Containment Type), two (2) position filling station(s) with compressor controls.
 - One (1) refill port shall be located on the front of the right side panel on the filling station.
 - The fill station fill whip(s) shall terminate in a high pressure 4,500 psi, CGA-347 threaded SCBA connectors.

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REAR COMPARTMENT - CENTER (RC1)

The rear center compartment shall be closed to both side rear compartments.

The rear center compartment shall start at the bottom of the body and shall be as high as the body permits. The frame shall extend at least 20" into the Rear Center Compartment to allow for the spring mounts.

The interior useable compartment width shall be approximately 45.0" wide.

The compartment door opening shall be approximately 38.0" wide.

This compartment shall have a Robinson roll-up door.

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

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

COMPARTMENT COMPONENTS

- There shall be vertically mounted aluminum shelf trac for shelving installation.
- 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.
 - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front face of the tray. The striping shall be 2" wide and red/white in color.
- There shall be one (1) 1,000 lbs. slide-out tray(s) with a OnScene Solutions base approximately 48" deep and as wide as the compartment layout or door opening permits located above the level of the chassis frame rails.
 - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front and side faces of the tray. The striping shall be 2" wide and red/white in color.
- Two (2) vertically mounted OnScene Solutions LED Nightstiks.

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PLASTIC FLOOR AND SHELF TILE

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

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

ROPE TIE-OFF OR PORTABLE WINCH RECEIVERS

The completed unit shall have an integrated receiver system for use with rope rescue accessories and/or electric winch components. Each receiver shall have the following load rating:

	<u>STRAIGHT PULL</u>	<u>SAFETY FACTOR</u>
Rope Tie Off:	600 LBS.	15:1
Winch:	1,000 LBS	4:1

The following items shall be provided to accomplish rope rescue or portable winch operations:

- Two (2) rope tie off anchor accessories shall be provided with the completed vehicle. Each accessory shall include a hitch pin to lock it in place. The tie off accessories shall have an eyelet for use with a rope rescue carabineer. A mounting bracket shall be provided to store each rope tie off accessory in a body compartment as close to receiver as possible.
- Warn winch shall be supplied by Port Moody Fire Department.
- There shall be one (1) receiver tube(s) located at the front bumper for use with a portable winch or tie-off point accessory.
 - There shall be one (1) 12 volt plug with a quick connect used to power the portable winch.
 - There shall be one (1) rubber cover / plug for the receiver.
- There shall be one (1) receiver tube(s) located on the streetside of the body in the forward portion of the wheel well panel for use with a portable winch or tie-off point accessory.
 - There shall be one (1) 12 volt plug with a quick connect used to power the portable winch.
 - There shall be one (1) rubber cover / plug for the receiver.
- There shall be one (1) receiver tube(s) located on the curbside of the body in the forward portion of the wheel well panel for use with a portable winch or tie-off point accessory.
 - There shall be one (1) 12 volt plug with a quick connect used to power the portable winch.
 - There shall be one (1) rubber cover / plug for the receiver.
- The rear center mounted trailer hitch shall be compatible with a pinnable rope tie-off accessory or a portable winch.
 - There shall be one (1) 12 volt plug with a quick connect used to power the portable winch.
 - There shall be one (1) rubber cover / plug for the receiver.

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SIDE BODY PROTECTION - RUB RAIL

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

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

FRONT GRAVEL GUARDS

Gravel guards shall be fabricated of brushed stainless steel. Gravel guards shall be installed on the front lower body corners and shall wrap around the corners to the front compartment door hinge on each side.

COMPARTMENT COMPONENTS DESCRIPTIONS

All interior compartment components shall be fabricated as follows:

ADJUSTABLE SHELVING HARDWARE

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

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

ADJUSTABLE SHELF/SHELVES

Adjustable shelf/shelves shall be provided in exterior compartment as indicated in the numbered compartment list.

Shelves shall be fabricated from 3/16" (.188) aluminum 3003H-14 alloy smooth plate with a 2" vertical flange along the front and rear edges. Shelves shall be designed to be used with flanges either in the upward position to hold various equipment on shelf, or in the downward position for sweep-out shelf surface.

All shelves shall be fully adjustable, from top to bottom of the compartment. There shall be at least four (4) vertical mounting channels and shelving hardware, two (2) each side of compartment. Shelving hardware shall be of heavy duty quality with unlimited vertical adjustment settings.

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

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

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

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

SLIDE-OUT TOOL BOARD (SMOOTH ALUMINUM)

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

Tool boards shall be fabricated of 3/16" (.188) aluminum 3003H-14 alloy smooth plate with double 90 degree formed edge to provide an easy grip handle. The top and bottom of tool board shall be provided with Accuride 502 series slide tracks. The length shall be per numbered compartment list and the extension shall be 100% of the slide length. Slide tracks shall be constructed from formed steel with ball bearings in triple track rails. The board shall be rated for a maximum 200 lbs. evenly distributed load.

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

TRANSVERSE STORAGE MODULE

Transverse storage module for long equipment shall be provided as indicated in the numbered compartment list.

The module shall be fabricated from 1/8" (.125") thick smooth aluminum. Exact size and layout shall be approved prior to construction.

SCBA CYLINDER STORAGE MODULE

An SCBA cylinder storage module shall be provided and located as indicated in the numbered compartment list.

The module shall have an exterior shell fabricated from 1/8" (.125) smooth aluminum. The module shall have a 2" slope, front to back to prevent cylinders from sliding out. The SCBA cylinder storage tubing shall be fabricated from PVC pipe to prevent damage or abrasion to cylinders. In addition there shall be rubber matting provided in base of each storage tube for bottle protection and prevent slipping

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COMPARTMENT LIGHTING

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

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

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

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

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

ELECTRIC CORD REEL

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

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

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

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

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

Cord Reel General Requirements

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

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

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

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Rewind Provision

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

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

Cord

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

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

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

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

POWER DISTRIBUTION BOX

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

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

The distribution box shall be as follows:

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

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

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

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

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

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MOBILE BREATHING AIR COMPRESSOR

It is the intent of this specification to describe a modular mobile breathing air system designed so that major components are built in individual modules. This concept will allow for the greatest flexibility when installing the system in a truck body. All modules shall interconnect by means of a factory built wiring harness for ease of electrical installation. All pneumatic interconnections shall be clearly marked and coded for high pressure hose interconnection.

The unit shall be designed and built specifically for truck installations. The use of a standard stationary unit shall not be acceptable. The main compressor frame shall contain the compressor, electric motor, electric controls, gauges and monitors pertaining to the compressor operation. The total skid must not exceed 52 1/2" L X 35" W X 32 1/2" H.

The system shall consist of a Bauer Model BP-13H-E3 air compressor. There shall be **NO EXCEPTIONS** to the air section of this bid.

COMPRESSOR REQUIREMENTS

The compressor shall be an air-cooled, oil lubricated, four stage, three cylinders, reciprocating piston compressor. The three cylinders shall be arranged in a "W" configuration. The first and second stages shall be housed in one common, stepped cylinder, which shall be the center of the "W". The 3rd and 4th stages shall be opposite each other, and form the outer legs of the "W". All stages shall be equipped with piston rings. The first and fourth stage rings shall be constructed of synthetic polymer material for extended ring life and anti-abrasion properties. The fourth stage piston shall be a free-floating piston with synthetic piston rings running in a cylinder liner. The free-floating piston principle minimizes the side loads exerted upon the piston. The compressor shall be lubricated by a full flow low pressure oil pump driven directly off the crankshaft, and shall incorporate a replaceable full flow oil filter.

COMPRESSOR STANDARD FEATURES

- 5 micron inlet particulate filter
- Stainless steel air-cooled intercoolers between each stage
- Stainless steel air-cooled aftercooler
- Safety relief valve for each stage of compression
- Final oil and moisture separator
- V-belt driven fan wheel for cooling air
- Integrated oil filler and sight glass
- Automatic condensate drain (A.C.D.) complete with combination separator-muffler, drain solenoid, and timer and collection system.
- Stage pressure gauges for each stage of compression. (Silicone filled safety type)

The compressor module shall have the ability to compress ambient air to a final pressure of 6,000 PSI. System shall be designed, built and tested by a recognized breathing air compressor manufacture. Not a compressor packager or distributor.

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COMPRESSOR DATA

Maximum Operating Pressure	6,000 PSIG
Charging Rate	13.0 SCFM
Free Air	10.17 SCFM
Running Speed	1420 RPM
Number of Stages	4
Number of Cylinders	3
Cylinder Bore	
- 1st Stage	105 MM
- 2nd Stage	88 MM
- 3rd Stage	28 MM
- 4th Stage	12 MM
Length of Stroke	40 MM
Crankcase Material	Aluminum Alloy
Crankcase Oil Capacity	3 US Quarts
Lubrication	Pressure / Splash
Ambient Operating Range	32° F to 113° F

PRIME MOVER AND CONTROLS

The electric motor shall be of open drip-proof design (ODP), 10 Hp, 230 VAC, three (3) phase. The electric motor shall be mounted on a common vibration isolated inner frame. All electric controls and automatic shutdowns shall be controlled and monitored by a solid state PLC control unit. Motor starting shall be accomplished using a solid-state motor starter allowing for a Soft Start effect on the generator. The entire electrical control panel shall be UL approved, **NO EXCEPTION.** The electric motor shall get its power from the trucks on-board generator system. Compressor shall be supplied with an automatic condensate drain system, which will automatically drain the interstage and final oil/moisture separators to drain at 15 minute intervals. All condensation shall be plumbed to a collection system for safe disposal.

Compressor unloading at shutdown shall be provided by the automatic drain system. Compressor intercoolers and aftercooler shall be of such a size that a cool down cycle will not be necessary.

Standard supply shall include:

- Open drip proof motor
- Solid-state motor starter in NEMA 122 enclosure
- Inlet particulate filter
- Hi temperature shutdown
- Low oil pressure shutdown
- Final pressure switch
- Stage pressure gauges on compressor
- Pressure maintaining valve
- Discharge check valve
- Final oil/moisture separator

The compressor system shall be base mounted, frame enclosed, complete with belt guard. The frame shall also contain the electrical control box, purification system, all compressor controls, and compressor gauges along with fault lamps.

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PURIFICATION

Installed after the compressor and the final oil and water separator shall be a Bauer P5 air purification system. The system shall be capable of processing 150,000 cu. ft. of breathing air between cartridge changes, based on a 70-degree inlet temperature, **NO EXCEPTION**. The purification system shall utilize vacuum packed, aluminum, replaceable filter elements with a minimum 3 year shelf life, **NO EXCEPTION**. The high pressure cartridge chambers shall have a working pressure of 6,000 PSIG with a 4 to 1 safety factor. They shall be designed to ASME code, tested and certified. A nametag shall be attached to each chamber giving the serial number, year of manufacture, volume of cylinder and test date, **NO EXCEPTION**. The design of the cartridge pressure chamber shall eliminate the possibility of operating the system without purification cartridges installed or with improperly installed cartridges. Thus, there shall be no means of filling the SCBA or storage vessels with impure air.

A Securus electronic purification monitor shall constantly monitor the quality of the air and visually indicate to the operator the status of the Securus cartridge. The Securus electronic sensor shall be built in into the purification cartridge itself, **NO EXCEPTION**. Securus shall warn the operator in advance, of any impending expiration of the Securus purification cartridge. Securus shall automatically shutdown the compressor if the operator fails to change the cartridge within the warning period. The electronic display monitor shall indicate compressor shutdown by Securus. The compressor shall not be able to restart until the used cartridge is replaced with a new one. Securus shall also discern an electrical contact failure or a broken electrical connection and advise the operator of the type failure (Cartridge saturation or electrical failure). For absolute safety, no manual override shall be provided for the purification monitor.

A check valve shall be installed after the oil and moisture separator and before the purification system, and a pressure-maintaining valve (PMV) shall be installed after the purification system. The pressure-maintaining valve, set to open a 4,000 PSIG, shall serve two functions. One function of the PMV, in conjunction with the check valve, shall be to maintain a positive pressure in the purification system when the compressor shuts down. This shall prevent leakage of unprocessed air into the purification system, which in turn, shall assist in maintaining purification efficiency. The second function of the PMV shall be to provide a means to quickly build system pressure. A bleed valve shall be provided to facilitate venting the purification system for cartridge maintenance.

The final processed air delivered by the purification system shall meet or surpass the standards for grade E as detailed in compressed gas association, Inc. pamphlets G-7-1976 compressed air for human respiration and G-7.1-1989 commodity specification for air.

The purification system shall be mounted directly on the compressor skid and in the path of the compressor cooling air. The purification shall be attached to the compressor skid and be able to swing, pull or tilt out of compartment to allow for change out of cartridges when installed with limited overhead space.

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CARBON MONOXIDE MONITOR

The unit shall be equipped with an electronic carbon monoxide monitoring system. The system shall be designed to provide continuous monitoring of the carbon monoxide levels in the processed breathing air and shall shut the compressor system down if the monitor detects trace elements of carbon monoxide in excess of 10 ppm. Along with the system shutdown, the panel mounted fault indicator shall illuminate upon high CO. The instruments electronics shall be encased within a NEMA 4X polycarbonate enclosure. The case is corrosion resistant, positively pressurized by the compressor air supply line, and sealed except for a bleed hole to exhaust the compressor's processed air. The unit shall operate on system voltage. Along with a built-in flow meter, the system shall include an illuminated display and internal switches to check the system circuitry.

There shall be no calibration adjustments or controls as the system functions are managed by the system microprocessor. The chemical cell shall have a life expectancy of approximately two to three years with a calibration period recommendation of every 30 days. The system shall include two cylinders of test gas; 20 ppm carbon monoxide and zero test gas. Additional, a regulator shall be provided. Recalibration shall only require the following:

- Shut-off the compressor supply line. If the operator fails to close the valve a prompt on the monitor display shall indicate "Supply Off"
- Connect the test gas to the cal port connector on the instrument panel
- The monitor display will read "Cal Gas" and shall automatically initiate a 60-second countdown.

After the unit has automatically calibrated itself, a message shall appear "CO G Set" indicating that the CO adjustment has been set for 20 ppm.

TESTING AND PREPARATION FOR SHIPMENT

Prior to shipment, the manufacture shall test the complete system including the filling station as an assembled unit. A copy of the manufactures test report shall accompany the units shipment. An operators instruction and maintenance manual shall be supplied with the unit. The manuals shall be as detailed as possible, outlining all operation and maintenance instructions. The manual shall include detailed illustrated drawings along with a complete parts listing for all illustrated components. Warning and safety precautions shall be included in the manual. A manufactures nameplate shall be securely affixed to all major modules in a conspicuous location.

All equipment shall be new and of current tested design and manufacture. Used and/or refurbished equipment is unacceptable. The manufacturer of the high pressure compressor shall also be the manufacturer of the breathing air purification system and the cartridge monitoring system.

All standard features shall be factory installed and tested as a complete unit, and a copy of the factory test report shall accompany the unit at shipment. The compressor, purification system and storage system shall be rated for 6,000-PSI service, **NO EXCEPTION.**

Air system shall be supplied with interconnecting wiring harness, manufactured by Bauer Compressors for ease of operation by truck builder.

All interconnecting lines from one module to the other shall be clearly marked and tagged for ease of installation by the truck builder.

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BREATHING AIR STORAGE SYSTEM

Breathing air system shall be provided with a air storage module consisting of:

- Two (2) 6,000 psi, ASME air storage cylinders shall be provided which comply with 49 CFR 178.37, "Specification 3AA and 3AAX seamless steel cylinders," or 29 CFR 1910.169, "Air receivers". Each cylinder shall be permanently stamped or identified in accordance with DOT or ASME regulations.

Each cylinder shall have a working pressure of 6,000 psi with a 3:1 safety factor and nominal capacity of 491 cu. ft. at 6,000 psi.

If the air storage was cascaded the system would be capable of filling approximately twenty (20) 45 cu.ft. 2,216 psi, or nine (9) 45 cu.ft. 4,500 psi SCBA bottles (based on residual pressure of 500 psig).

There shall be a label which reads, "HIGH PRESSURE - 6,000 psi BREATHING AIR".

The air tank manufacturer shall provide a copy of either the U.S. Department of Transportation (DOT) certificate Report of Inspection of Gas Cylinders or the ASME certificate Manufacturers Data Report for Pressure Vessels, and the certificate shall be delivered with the fire apparatus.

Relief valves on transportable air tanks shall be of the ASME type on ASME cylinders and of the DOT type on DOT cylinders or equal for the rated pressure.

Valves installed on air tanks shall meet the requirements of the Compressed Gas Association regarding pressure and usage with compressed air.

If the installation utilizes cylinders that require periodic testing, a label shall be placed on or near the operators panel that provides the following:

- (1) The original cylinder test date stamped on the cylinders
- (2) The recommended testing interval
- (3) Five additional open spaces, appropriately labeled, for the user to enter actual retesting dates

The manufacturers test date (month and year) on each air tank shall be current within 12 months of the apparatus delivery date.

Air Tank Mounting

Air tanks shall be mounted in an arrangement that will hold the tanks in all types of mobile use.

A protective device(s) shall be provided to protect the air tank valve(s) and associated piping from damage as a result of accidental impact. The protective device(s) shall not prevent access for operation and inspection.

The air tank mounting shall facilitate removal of air tanks for inspection, testing, or service.

Air tanks shall be installed so that all air tanks, control valves, and associated piping are readily accessible.

Air tanks shall be mounted in such a fashion to permit visual inspection of external surfaces and emergency access to shutoff of tank valves.

The air tank location shall be away from any heat producing devices such as the generator engine or exhaust.

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BREATHING AIR SYSTEM TESTING AND DELIVERY

The complete air system shall be tested by the final system installer after its installation on the fire apparatus is complete, using the testing procedure prescribed by the system manufacturer.

The following items shall be tested or verified on all air systems:

- (1) Pressure test the system to its maximum operational pressure and check all connections made as a part of the installation for leaks with a leak detection device, which could include bubble fluid or electronic means.
- (2) Verify that any leaks detected during the testing are repaired.
- (3) Visually verify the relief valve set points and working pressure of the air tank.
- (4) Verify the accuracy of all pressure gauges.
- (5) Fully test the operational capabilities of the fill station as established by the manufacturer of the fill station.
- (6) Seal all fill adapter connections to eliminate the introduction of contaminants prior to shipment.

If the system's air supply includes a compressor/ purification system, the following additional items shall be tested or verified:

- (1) Confirm that the fluid levels are at the manufacturer's recommended levels, including the lubricant and coolant if the system is liquid cooled.
- (2) Verify the expiration date of the purification filters and cartridges and that they have been installed as required by the manufacturer of the system.
- (3) Operate the air compressor for a minimum of 2 hours or the period required to completely fill the onboard air tanks, whichever is longer.
- (4) Confirm that all compressor interstage pressures are within guidelines as established by the compressor manufacturer.
- (5) Confirm the operation of the compressor shutdown switch at the pressure requested by the purchaser

PROVISIONS APPLYING TO ALL AIR SYSTEMS

Compressor and booster supplied systems shall be capable of storage and operation in any ambient temperature between 32°F and 110°F (0°C and 43°C). Cascade and bulk air systems shall be capable of storage and operation in any ambient temperature between 0°F and 110°F (18°C and 43°C).

The air system shall be designed so that it can be stored and operated in environments with relative humidity up to and including 100 %.

All materials used in the air system shall be corrosion resistant or treated to resist corrosion unless the finished product will be in continual contact with a non corrosive lubricant.

Assembly and Installation Practices

Installation of low voltage and line voltage electrical components shall meet the requirements of NFPA 1901.

Hot Surfaces

Surfaces over 142°F (61°C) shall be covered with a thermal insulating material or shall be mechanically guarded to protect the operator. If covering or guarding the surface affects the operation of the component, a label shall be provided that states "Caution: Hot Surfaces When Operating."

The air system shall be designed and constructed to withstand the stresses, vibrations, and other conditions incident to being mounted on a fire apparatus and being used in mobile service.

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Locking Devices

All screws, pins, bolts, and other fasteners whose failure would create a hazardous condition for personnel or equipment shall be equipped with locking devices. Safety wire, self-locking nuts, cotter pins, lock washers, and liquid-locking compounds shall be acceptable.

Breathing Air Systems

All pneumatic fittings, tubing, and hose shall be rated for the maximum allowable working pressure that could be encountered, with a test safety factor of not less than 4:1. All pneumatic fittings, tubing, and hose shall be corrosion resistant or treated to resist corrosion. No threaded close nipples shall be used. Plugs shall be bar stock type with Allen head or hexheads. All piping and tubing shall be blown clean with clean, dry air before being installed.

When making up threaded piping joints, the sealant shall be applied to the thread in a manner that will prohibit entry of the sealant into the piping system.

Pipes or tubes installed but not connected shall have the ends closed with threaded caps or plugs to prevent the entry of foreign material.

Air connections on equipment or panels shall be provided with a threaded dust cap on a safety chain or shall be a quick disconnect type fitting.

All rigid piping compressed air lines shall be clamped to a rigid body or chassis component at a minimum of every 16 in. (400 mm) and within 4 in. (100 mm) on each side of a coupling or elbow. Rigid piping shall run in an orderly manner with a minimum of bends and elbows. The piping installation shall provide room for maintenance and repairs with access panels provided where applicable.

Any rigid piping or flexible lines that run through a compartment shall be protected with removable mechanical protection to prevent wear and damage from equipment stored in the compartment.

Flexible Hose

Flexible hose shall be installed in such a manner as to prevent cuts, abrasions, exposure to damage, excessive temperatures, damage from loose equipment, and excessive bending.

The hose shall be installed in a manner that permits removal of the hose without removal of major vehicle components or vehicle-mounted equipment.

Operators Panel and Controls

The air operators panel containing gauges, instruments, and valves shall face the operators position and shall be lighted. Any instrument that is to be used as a basis for manual control shall be visible and controlled from the operators position. Accessory gauges or controls that are not critical to the mission of the air system shall be permitted to be mounted remotely from the operators panel or at another location where they can be monitored.

Pressure gauges or other devices shall not be mounted directly on lines where excessive vibration is likely to occur. With the exception of direct connected process instruments (e.g., pressure gauges), instruments shall not use instrument piping or electrical conduit for support.

Any gauge shall be capable of reading at least 110 % but not greater than 200 % of maximum working air pressure.

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Maintainability

The design of the air system shall provide for maintainability by including, but not necessarily being limited to, the following maintainability objectives and technical and operational constraints:

- (1) The design shall be such that faults can be isolated to allow access to removable assemblies or components.
- (2) Electrical panels, junction boxes, circuit breakers, and fuses shall be readily accessible.
- (3) The physical arrangement of components shall be such that they can be inspected, serviced, calibrated, and, if necessary, adjusted without being removed and with minimum disturbance to other parts.
- (4) The design shall be such that inspection, service, and replacement can be accomplished using a minimum of special tools and support equipment.
- (5) Test points shall be provided to facilitate malfunction isolation and the connection of calibration instrumentation.
- (6) If equipment requires oil or other liquid drainage, it shall be provided with a remote drainage system that is equipped with a control valve, threaded plug or cap, and a label to note usage.

If special tools are required to service or maintain the air system, those tools shall be supplied by the manufacturer.

Labels and Plates

All major components and accessories shall be identified with a label. Caution and warning signs shall be affixed where necessary.

Instruction plate(s) shall be installed, as applicable, to advise the operator on the proper adjustment or setting of controls for safe operation.

Controls, gauges, valves, and other equipment shall be marked with a label indicating their function. All controls and valves shall have a label to indicate movement direction.

The major component manufacturers and installers of the air system shall provide electrical diagrams and air piping drawings that document the system and its operation. All symbols used shall be described in key charts on the drawings. All diagrams and drawings shall be delivered with the fire apparatus.

The following information shall be shown:

- (1) The general arrangement of the air system, including air storage, air compressor (if provided), air panel, SCBA fill station (if provided), and air inlets and outlets
- (2) The electrical wiring arrangement and controls, denoting shore power equipment, low voltage equipment, and line voltage equipment
- (3) The air operators control panel surface showing all controls, gauges, valves, outlets, and other specified equipment, including the labeling on the panel and controls
- (4) The air piping arrangement with airflow direction indicated and showing all valves, gauges, controls, air tanks, and furnished equipment

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Documentation

Two (2) complete sets of documentation that cover the operation and maintenance of the system shall be delivered with the fire apparatus. The documentation shall be permitted to be in printed format, electronic format, audiovisual format, or a combination thereof.

Nomenclature for switches, controls, and indicators shall be consistent with that used on the diagrams and on equipment nameplates.

The manuals shall include, but not necessarily be limited to, the following:

- (1) An illustrated parts lists
- (2) A schedule of maintenance and adjustment checks
- (3) A lubrication schedule
- (4) Troubleshooting information to enable a technician to locate trouble and to make repairs or adjustments to the equipment
- (5) Step-by-step procedures for starting, operating, and stopping the equipment

Breathing Air Compressor

The purchaser shall determine the working pressure and capacity required from the compressor and state those requirements in the purchase specifications.

Compressor Intake

The air intake shall be located where it will not be contaminated by the exhaust of the fire apparatus or the exhaust of the gasoline or diesel engines used to power the compressor or other components on the apparatus.

If an extended air intake pipe is used, it shall be installed in accordance with the compressor manufacturers specifications.

Cooling

The final installer shall assemble and install all components in accordance with the component manufacturers instructions and shall test the final assembled system in accordance with this standard and the operating parameters of the component manufacturers.

Provisions shall be made by the final installer to ensure there is adequate cooling to keep the air compressor within the compressor manufacturers operating temperature range while it is operating in an ambient temperature range between 32°F and 110°F (0°C and 43°C).

The final stage installer of the air compressor shall submit air system arrangement drawings, airflow schematic drawings, body drawings, and other pertinent data to the air compressor assembler for written approval.

A copy of this approval shall be retained by the final assembler in apparatus documentation.

The temperature of the compressed air shall not exceed 20°F (11°C) above ambient when measured at the discharge nozzle of the compressor aftercooler.

The air compressor compartment shall be equipped with a temperature sensing device that will actuate an audible and visual alarm at the fill station operators panel when the ambient temperature in the compartment exceeds 140°F (60°C).

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The final stage installer shall provide a warning label(s) cautioning: "Do not obstruct airflow path with equipment mounting."

If inter stage condensate traps are provided by the compressor manufacturer, they shall be plumbed with the final separator and to an automatic condensate drain system, which shall be plumbed to a reservoir to collect the discharged liquids.

TRAINING AND INSTRUCTION

If a breathing air system without a compressor/ purification system is provided, the final installer of the air system shall supply a qualified person to provide operational training to fire department personnel that includes the following:

- (1) A complete system component familiarization/walk around
- (2) A complete review of the system and its safety features
- (3) A review of all operation, service, and maintenance documentation
- (4) Hands-on familiarization of the safe operation of the fill station and air management panel, including actual SCBA filling, air reel operations, and other pertinent operations of the system

If a breathing air system that includes a compressor/ purification system is provided, a person certified by the breathing air compressor manufacturer in the operation of the specified air compressor system shall provide training to fire department personnel.

The training shall include the items listed above and include the following:

- (1) A review of the compressor/purification system operations and maintenance, including the operations and maintenance documentation and the name, address, and phone number of the local distributor
- (2) Procedures to change purification cartridges
- (3) Hands-on familiarization of the safe operation of the compressor and purification system

The fire department shall designate one (1) or two (2) individuals to be the resource persons for all the breathing air system training and equipment indoctrination. The fire department shall designate where the training is to take place.

BREATHING AIR QUALITY TEST

Prior to delivery of the apparatus equipped with a breathing air compressor to the end user, the final system installer shall draw an air sample from the breathing air system at each SCBA or SCUBA fill station and at the end of each air hose on an air reel and submit the sample(s) to be tested in accordance with NFPA 1989.

The breathing air shall meet the air quality standards defined in NFPA 1989.

The results of all tests, including the air quality analysis, shall be documented and shall be delivered with the fire apparatus.

The contractor shall deliver the apparatus with all air tanks, piping, hose, reels, and other fixed equipment charged with breathing air to a gauge pressure of at least 40 psi (275 kPa).

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CONTAINMENT TYPE FILLING STATION - TWO (2) POSITION

There shall be one (1) Bauer model CFSII-2S containment type, two (2) position filling station(s) with compressor controls provided and located per the itemized compartment list.

Filling station shall be 35 ½" wide (inc. side panel) x 57 ¼" high (inc. top panel) x 21 ¼" deep (at handle) and weight 532 pounds.

The filling station shall incorporate the primary compressor control panel located on the right side of the filling station and shall not add more than 6" to the overall width of the filling station. The fill station shall contain the cylinder and any fragments of the cylinder in the unlikely event of a cylinder exploding during the refilling process. The filling station shall vent the expanding air away from the operator and out the bottom of the truck compartment. The filling station shall be designed for a maximum working pressure of 6,000 PSIG, and shall be built and tested to conform to NFPA 1901.

CONTAINMENT FILLING STATION

The front-loading, two (2) position containment fill station shall totally enclose the SCBA or SCUBA cylinders during the refilling process.

The fill stations outer enclosure and door assemblies shall be constructed of formed ¼" thick plate steel. Venting shall be provided in the bottom of the fill station to allow the rapidly expanding air from a cylinder rupture to escape from the filling station. The fill station shall be ergonomically designed for maximum operator convenience and safety during the refilling of cylinders. The fill station door and cylinder holder assembly shall tilt out towards the operator at an 89-degree angle, providing unobstructed access to the cylinder holder to load and unload cylinders. A handle and heavy-duty gas spring shall be incorporated into the design of the filling station to assist the operator in opening and closing the fill station door. It shall take approximately no more than eighteen pounds of effort to open or close the fill station door, thereby eliminating operator fatigue.

Each cylinder holder shall be lined to prevent scuffing the outer surface of the cylinders being filled. For complete operator protection, the filling station shall include a safety interlock system that will prevent the refilling of cylinders unless the door is closed and secured in the lock position. The automatic interlock shall require no actuation of secondary latching mechanism on the outside of the filling station.

Two (2) 6,000-PSI fill hoses shall be located inside each filling station. Each fill hose shall be equipped with a bleed valve and CGA-347, or CGA-346 fill adapter. Fill hose retainers shall be provided to anchor the fill hose when not in use.

INSTALLATION

Installation of the fill station shall require four (4) high pressure connections from the above mentioned fill panel; one (1) high pressure connection to each fill position, one (1) from the panel mounted regulated outlet to the fill stations air actuated door interlock system and one (1) return line to the panel to supply air to the fill position valves.

A blow-out patch must be installed in the floor of the fill station compartment to allow expanding air to escape from the fill station in the event of an SCBA cylinder rupture.

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FILLING CONTROL PANEL

The fill control panel shall be installed on top of the filling station. The control panel shall be factory piped and designed to fill SCBA or SCUBA cylinders either independently or simultaneously and shall not add more than 6" to the overall height of the filling station.

The control panel shall include the following standard features:

- Inlet pressure gauge
- Adjustable pressure regulator
- Regulated pressure gauge
- One (1) relief valve for regulated fill pressure
- Provisions for factory or field modification to allow a different fill pressure at each fill position

All piping and tubing shall be properly supported and protected to prevent damage from vibration in a mobile application, operation or maintenance. Piping and tubing shall be installed in a neat and orderly arrangement, adapting to the contours of the station. All instrument tubing shall be 300 series stainless steel.

All control panel mounted pressure gauges shall be 2 ½" diameter and be liquid filled. All valves shall be soft seated metering valves for the safety of the operator. All panel mounted components shall be labeled with an engraved nameplate.

COMPRESSOR CONTROL PANEL

The panel shall be located on the right side of the filling station and not add more than 6" to the overall width of the filling station.

The control panel shall include the following standard features:

- Remote CO monitor display
- Compressor on/off switch
- Emergency stop switch
- Storage inlet CGA fitting with check valve
- High pressure hose reel control valve with regulator and gauge (Optional, only if specified)

STEP / GROUND LIGHTS

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

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

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Production Specification

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.

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

If a mechanical-type device is used, it shall conform to one of the following SAE standards:

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

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

Power Supply

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

Minimum Continuous Electrical Load

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

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

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

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

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

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

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

Electromagnetic Interference

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

Wiring Diagram

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

Low Voltage Electrical System Performance Test

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

12 VOLT DIAGNOSTIC RELAY CONTROL CENTER

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

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

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

ROCKER SWITCH PANEL

The 12 volt control switch panel shall be supplied and installed by the cab/chassis manufacturer.

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ELECTRICAL SYSTEM MANAGER

The chassis shall contain an electrical system manager for:

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

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

The electrical system manager shall be supplied and installed by the cab/chassis manufacturer.

BATTERY SYSTEM

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

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

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

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

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

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

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

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

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

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BATTERY SWITCH

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

BATTERY SOLENOID

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

BATTERY CONDITIONER

One (1) Kussmaul (model 091-9-1000) "Pump-Plus 1000" single battery charger/air compressor, with 120 VAC input and 12 VDC, 15 amp output battery conditioner and a 12 volt, 80 psi air compressor shall be provided. This system shall monitor the condition of battery(s) and provide an electrical current at variable rates to overcome battery failure. The air compressor shall maintain air pressure in the chassis air brake system. A Kussmaul bar graph type indicator panel shall be provided for showing status of battery conditioner.

SHORE POWER INLET

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

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

- The outlet cover shall be yellow.
- The shore power plug shall be located inside the lower Driver door area along with the Indicator panel.

ENGINE COMPARTMENT LIGHT

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

CAB HAZARD WARNING LIGHT

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

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

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

BACK-UP ALARM

The body manufacturer shall furnish and install a automatic sound sensing electronic back-up alarm. The back-up alarm shall actuate automatically when the transmission gear selector is placed in reverse. The alarm automatically adjusts its sound output, maintaining a minimum of five dB(A) above noise level, up to maximum rated output of 112 dB(A).

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TAIL LIGHTS

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

- Two (2) Whelen 900 Series 90A00TAR amber LED turn signal lights
- Two (2) Whelen 900 Series 90R00XRR red LED stop/tail lights
- Two (2) Whelen 900 Series 90J000CR halogen back-up lights with clear lens

Each of the lights above shall be mounted in a 9EFLANGE, chrome finish bezel.

FRONT TURN SIGNALS

The front fascia shall include two (2) Whelen model 600 programmable LED amber turn signals which shall be installed in a polished aluminum housing above and outboard of the front warning and head lamps.

FOG LIGHTS

The front bumper shall include clear Perlux fog lights controlled by a rocker switch inside the cab.

CORNERING LIGHTS

The bumper tail shall include two (2) Whelen model 500 LED steady-on cornering lamps with clear lenses in the upper position, one (1) each side. Lights shall be activated by turn signal switch.

MIDSHIP MARKER/TURN SIGNAL

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

MARKER LIGHTS

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

LICENSE PLATE LIGHT

One (1) Arrow #437 chrome plated LED license plate light shall be installed on the rear of the body. License plate light shall be wired to the headlight circuit of chassis. A fastener system shall be provided for license plate installation.

ELECTRONIC SIREN

One (1) Whelen model 295SLSA1 electronic siren control with standard hard wired microphone and user programmable siren tones shall be provided in cab. Siren to be installed in cab within easy access of Driver.

SIREN SPEAKERS

Two (2) Cast Products Inc. model SA4301, 100 watt siren speakers shall be recess mounted in the front bumper, one (1) on the streetside and one (1) on the curbside.

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SIDE SCENE LIGHTS

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

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

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

REAR SCENE LIGHTS

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

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

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

TRAFFIC DIRECTIONAL LIGHT

One (1) Whelen TA4437L LED eight (8) lights, split two-piece housing, traffic directional warning device with 30' control cable shall be located on upper rear body. The control head shall be located in the cab within easy reach of Driver.

- The traffic directional light shall be surface mounted on upper rear body.

SIGTRONICS INTERCOM SYSTEM

A Sigtronics US-67S emergency vehicle intercom system shall be provided and installed to improve the safety of firefighters and rescue professionals through enhanced communication and hearing protection. The system shall provide intercom communications for seven (7) positions. All positions shall have voice activated intercom and three (3) positions (Driver and Officer and fill station) shall have push-to-talk radio transmit abilities. The system shall interface with the Port Moody Fire Department supplied mobile radio.

Six (6) SE-8 dual ear, behind-the-head style headsets (to use with helmet) with integrated noise canceling electric mic, coiled cord, and flex boom shall be provided. Headsets (with headset hanger hooks) shall be located at driver and officer positions, both rear face crew seats, both outer forward facing crew seats, and the streetside fill station compartment.

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WARNING LIGHT PACKAGE

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

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

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

Each optical warning device shall be installed on the apparatus and connected to the apparatus's electrical system in accordance with the requirements of this standard and the requirements of the manufacturer of the device.

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

The optical warning system on the fire apparatus shall be capable of two separate signaling modes during emergency operations. One mode shall signal to drivers and pedestrians that the apparatus is responding to an emergency and is calling for the right-of-way. One mode shall signal that the apparatus is stopped and is blocking the right-of-way. The use of some or all of the same warning lights shall be permitted for both modes provided the other requirements of this chapter are met.

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

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

UPPER LEVEL OPTICAL WARNING DEVICES

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

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ZONE A - FRONT WARNING LIGHTS

There shall be two (2) Whelen Edge FNMINI LED 24" lightbars permanently mounted at angle on the cab roof.

The streetside (driver) lightbar configuration shall be:

<u>SECTION</u>	<u>INTERNAL COMPONENTS</u>	<u>LENS COLOR</u>
1	Red Linear LED - Side Facing	Clear
2	Red Corner Linear LED	Clear
3	Clear Linear LED	Clear
4	Red Corner Linear LED	Clear

The curbside (passenger) lightbar configuration shall be:

<u>SECTION</u>	<u>INTERNAL COMPONENTS</u>	<u>LENS COLOR</u>
1	Red Linear LED - Side Facing	Clear
2	Red Corner Linear LED	Clear
3	Clear Linear LED	Clear
4	Red Corner Linear LED	Clear

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

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

ZONES B AND D - SIDE WARNING LIGHTS

UPPER REAR CORNER WARNING LIGHTS

There shall be two (2) Whelen 900 series (9" x 7") Red Linear Super-LED lights (90CC5FCR) provided, one (1) each side. Each light shall have a clear lens and chrome flange.

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

UPPER FORWARD CORNER WARNING LIGHTS

There shall be two (2) Whelen 900 series (9" x 7") Red Linear Super-LED lights (90CC5FCR) provided, one (1) each side. Each light shall have a clear lens and chrome flange.

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

ZONE C - REAR WARNING LIGHTS

There shall be two (2) Whelen 900 series (9" x 7") Red Linear Super-LED lights (90RR5FCR) provided, one (1) each side. Each light shall have a clear lens and chrome flange.

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

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LOWER LEVEL OPTICAL WARNING DEVICES

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

The optical center of the lower-level optical warning devices at the rear of the vehicle shall be mounted on or behind the rear axle centerline and as close to the rear corners of the apparatus as is practical. The optical center of any lower-level device shall be between 18 in. and 62 in. (460 mm and 1600 mm) above level ground for large apparatus, and 18 in. and 48 in. (460 mm and 1220 mm) above level ground for small apparatus.

A midship optical warning device shall be mounted right and the left sides of the apparatus if the distance between the front and rear lower-level optical devices exceeds 25 ft (7.6 m) at the optical center. Additional midship optical warning devices shall be required, where necessary, to maintain a horizontal distance between the centers of adjacent lower-level optical warning devices of 25 ft (7.6 m) or less. The optical center of any midship mounted optical warning device shall be between 18 in. and 62 in. (460 mm and 1600 mm) above level ground.

ZONE A - FRONT WARNING LIGHTS

There shall be two (2) Whelen 600 series (6" x 4") red Linear Super-LED lights (60R02FCR) provided, one (1) each side. Each light shall have a clear lens and chrome flange.

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

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

There shall be two (2) Whelen 600 series (6" x 4") red Linear Super-LED lights (60R02FCR) provided, one (1) each side. Each light shall have a clear lens and chrome flange.

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

ZONES B AND D - CAB INTERSECTOR LIGHT (CAB SIDE)

There shall be two (2) Whelen 600 series (6" x 4") red Linear Super-LED lights (60R02FCR) provided, one (1) each side. Each light shall have a clear lens and chrome flange.

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

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

There shall be two (2) Whelen 500 series (5" x 2") red Linear Super-LED lights (50R02ZCR) provided, one (1) each side. Each light shall have a clear lens and chrome flange.

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

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

There shall be two (2) Whelen 600 series (6" x 4") red Linear Super-LED lights (60R02FCR) provided, one (1) each side. Each light shall have a clear lens and chrome flange.

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

Port Moody Fire-Rescue / Safetek Demo

Heavy Rescue (with Bauer Compressor)

Production Specification

ZONE C - REAR WARNING LIGHTS (LOWER REAR CORNERS)

There shall be two (2) Whelen 600 series (6" x 4") red Linear Super-LED lights (60R02FCR) provided, one (1) each side. Each light shall have a clear lens and chrome flange.

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

LINE VOLTAGE ELECTRICAL SYSTEM

ONAN PTO GENERATOR

The apparatus shall be equipped with an Onan Protec PTO generator system with a capacity of 32,000 watts at 120/240 VAC, 250/125 amps., three phase. Current frequency shall be stable at 60 hertz.

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

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

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

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

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

GENERATOR ENGAGEMENT

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

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

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

WARRANTY PERIOD

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

GENERATOR SPLASH GUARD

A powder coat painted splash cover shall be installed to reduce the amount of road spray on the frame mounted PTO generator. A V-ring seal shall also be installed in the cover to provide additional protection against contaminants reaching the generator front seals.

Port Moody Fire-Rescue / Safetek Demo

Heavy Rescue (with Bauer Compressor)

Production Specification

GENERATOR MOUNTING

The generator shall be mounted between the chassis frame rails. The generator mounting brackets shall be fabricated using heavy duty steel tubing, or structural channel. The generator mounting shall be bolted and removable so that the generator can be lowered from under apparatus for service, if necessary. The generator case shall not extend below the bottom edge of the apparatus body.

MANUALS AND SCHEMATICS

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

POWER-TAKE-OFF GENERATOR DRIVE

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

The engagement of the PTO shall be in the chassis cab with a rocker switch and red pilot light to note engagement of the PTO.

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

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

Model part number shall be Chelsea 277XMFJPB5XD, 129% Ratio.

ENGINE SPEED CONTROL

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

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

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

Port Moody Fire-Rescue / Safetek Demo

Heavy Rescue (with Bauer Compressor)

Production Specification

GENERATOR MONITORING PANEL

To properly monitor the generator performance and load demand during operation, the generator installation shall be equipped with a full instrument monitor panel.

This unit shall be manufactured by FRC model FROG-D and mounted next to the circuit breaker panel. This generator output display shall consolidate five (5) generator monitoring instruments into one device. The display case shall be waterproof and have dimensions not to exceed 4 1/4" high by 4 1/4" wide by 3 1/4" deep.

The following continuous displays shall be provided with super bright LED digits more than 1/2" high:

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

The program shall support the accumulation of elapsed generator hours. Generator hours shall be displayed at the push of a button.

LOADCENTER

The loadcenter shall be a Cutler Hammer, BR Series, specifically designed for protection and distribution of 120/240 volt AC, such as lighting and small motor branch circuits. The loadcenter enclosure shall be made of 16 gauge galvanized sheet steel. The galvanized coating provides corrosion protection and as such does not require paint. All trims used on the BR Loadcenter shall be chromate sealed and finished with electro disposition epoxy paint (ASA61) which exceeds requirements for outdoor and indoor applications. A combination surface/flush cover with integral door shall be supplied.

The loadcenter shall be UL / CSA listed, **NO EXCEPTIONS** will be allowed.

OUTLETS AND CIRCUITS

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

- Two (2) 120 volt exterior outlets, one (1) each side near rear wheel well area.
 - The outlet receptacle shall be 20 amp, straight-blade (NEMA 5-20R).
- Two (2) 120 volt exterior outlets, one (1) each side rear of body.
 - The outlet receptacle shall be 20 amp, straight-blade (NEMA 5-20R).

LINE VOLTAGE ELECTRICAL SYSTEM

GENERAL REQUIREMENTS

Stability

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

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

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Conformance with National Electrical Code

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

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

Location Ratings

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

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

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

Grounding

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

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

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

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

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

Bonding

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

The conductor shall have a minimum 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.

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Production Specification

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.

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Heavy Rescue (with Bauer Compressor)

Production Specification

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

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

Power Supply Assembly

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

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

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

Overcurrent Protection

Manually resettable overcurrent devices shall be installed to protect the line voltage electrical system components.

Power Source Protection

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

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

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

Branch Circuit Overcurrent Protection

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

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

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

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

Port Moody Fire-Rescue / Safetek Demo

Heavy Rescue (with Bauer Compressor)

Production Specification

Panelboards

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

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

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

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

Wiring Methods

Fixed wiring systems shall be limited to the following:

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

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

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

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

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

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

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

Splices shall be made only in a listed junction box.

Additional Requirements for Flexible Cord Installations

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

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

Port Moody Fire-Rescue / Safetek Demo

Heavy Rescue (with Bauer Compressor)

Production Specification

Wiring Identification

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

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

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

Wiring System Components

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

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

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

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

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

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

Receptacles and Inlet Devices

Wet and Dry Locations

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

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

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

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Heavy Rescue (with Bauer Compressor)

Production Specification

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

FRONT CAB-MOUNTED SCENE LIGHT(S)

One (1) quartz floodlight(s) shall be provided on the front of the cab by the cab/chassis manufacturer. Each light shall be mounted in a brow-style mounting flange. Scene lights shall be provided with a lens or a means for preventing damage from water spray and shall be listed for wet location usage.

Each light shall be wired directly to the electrical generator system with Carflex conduit and stranded copper wire. The floodlights shall be protected with circuit breakers rated at the proper amperage and wire size.

- There above lights shall be controlled by one (1) switch(es). The switch(es) shall be located in the cab within reach of the Driver and/or Officer.

SIDE UPPER RECESSED SCENE LIGHTS

Two (2) Fire Research Focus, model FCA200-M12, recessed light(s) shall be installed. They shall be equally divided between the curbside and streetside. The housing shall incorporate internal heat-dissipating fins and have cutout dimensions not to exceed 2" deep by 4 1/4" high by 16 1/8" wide. The lamphead shall protrude no more than 1 1/2" from the housing flange. Wiring shall extend from the bottom of the recessed housing.

The lamp head shall have one (1) quartz halogen 1000 watt 240 volt bulb. The bulb shall draw 4.2 amps and generate 22,000 lumens. The bulb shall be accessible through the front. The lamphead shall direct 50 percent of the light onto the action area while providing 50 percent to illuminate the working area. Lamphead and housing shall be powder coated white. The floodlight shall be UL listed as a scene light for fire service use.

Scene lights shall be provided with a lens or a means for preventing damage from water spray and shall be listed for wet location usage.

- The above lights shall be controlled by two (2) switch(es) in the lower portion of compartment S1.

Port Moody Fire-Rescue / Safetek Demo

Heavy Rescue (with Bauer Compressor)

Production Specification

COMMAND LIGHT - KNIGHT TOWER w/ BACKLIGHT

The apparatus shall be equipped with one (1) all-electric floodlight tower(s). The unit shall not require tapping into vehicle braking system to be operated, eliminating the chance for vehicle brake problems. Hydraulic or pneumatic type floodlights are not acceptable alternatives to the all-electric light tower specified. NO EXCEPTIONS.

The light tower shall have six (6) weatherproof, 750 watt, 120 volt quartz halogen lights. Light heads shall be mounted in three (3) pairs, giving two (2) vertical lines of three (3) when the lights are in the upright position. The light tower shall have slip-rings for a full 360 degree rotation and capable of rotating either direction from a stowed position, NO EXCEPTIONS.

The lower pair of light heads shall be capable of being rotated about a horizontal axis to provide light down on the vehicle or to the opposite side of the vehicle.

The light tower shall be capable of overhanging the side or back of the vehicle (depending on mounting location) to provide maximum illumination and a warming area adjacent to the vehicle, NO EXCEPTIONS.

Positioning of the light bank shall be accomplished with maintenance free, heavy duty 12 volt linear actuators.

The light tower shall be all aluminum construction, with stainless steel shafts and bronze bushings for long life and low maintenance.

Light tower shall be controlled with a hand-held umbilical line remote control. The storage station for the remote control unit shall be equipped with a button to activate the "Auto-Park" automatic nesting feature.

Command Light controls shall include:

- Three (3) switches, one (1) for each light bank.
- One (1) light bank rotation switch.
- One (1) switch for elevating lower stage.
- One (1) switch for elevating upper stage.
- One (1) light to indicate when light bank is out of roof nest position.
- One (1) light to indicate when light bank is rotated to proper nest position.
- One (1) back light rotation switch
- One (1) "On/Off" switch for the top mounted strobe (optional)

The controls shall be located per the itemized compartment list.

The light tower shall have a full extension over 7' from mounted position and extend from nest position to full upright in 15 seconds. The overall size of nested light tower shall be approximately 23" wide x 47" long x 11 3/4" high, and weight approximately 120 lbs.

A flashing warning light shall be provided in cab, indicating when a light tower is not in nested position as required by NFPA 1901. The operational envelope of the mast shall be automatically illuminated whenever the mast assembly is being raised, lowered, or rotated as required by NFPA 1901.

The Command Light shall be covered by a one (1) year limited warranty from defects in materials and workmanship. An operation, maintenance, and parts manual shall be provided with the delivered apparatus.

The light tower shall be mounted to roof of the custom cab which shall be reinforced as necessary to support weight of the light tower.

Port Moody Fire-Rescue / Safetek Demo Heavy Rescue (with Bauer Compressor) Production Specification

LIGHT TOWER BRUSH GUARD

An 1/8" aluminum treadplate brush guard shall be provided for the specified light tower.

EQUIPMENT PAYLOAD WEIGHT ALLOWANCE

In compliance with NFPA 1901 standards, the special service vehicle shall be designed for an equipment loading allowance of 6,000 lbs. of Port Moody Fire Department provided loose equipment based on a 40,001 - 50,000 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) 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.
- Two (2) Streamlight LiteBox Vehicle Mounting Systems shall be provided. Each flashlight shall be orange in color. Each flashlight shall have a 12 volt DC charger and vehicle mount kit. Each flashlight shall have a 20 watt spotlight style bulb and reflector. The flashlights shall be wired to battery direct unless otherwise specified by the customer.
 - The flashlight(s) shall be mounted on the completed unit, locations as per the Port Moody Fire Department.

REMAINING NFPA MINOR EQUIPMENT BY PURCHASER

All other minor equipment not specified above, but required by NFPA 1901 before the unit is placed in service shall be supplied and mounted by Port Moody Fire Department.