

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

### **SCOPE AND GENERAL INFORMATION**

It is the intent of the FORT WORTH FIRE DEPARTMENT to secure an emergency apparatus to withstand the continuous use encountered in the emergency service. The apparatus shall be of the latest type, symmetrically proportioned and constructed with due consideration of the load to be sustained.

All parts not specifically mentioned herein, but which are necessary in order to furnish a complete emergency apparatus, shall be furnished and shall conform to the best practices known to the emergency industry.

The apparatus and all major components shall be manufactured in North America. Where the following detailed specifications require specific brand names, model number, dimension or capacities of components such as: axles, brakes, spring suspension, frame, steering gear, drive line, universal joints, engine transmission, alternator, batteries, air brake system, they have been specified for the service because of their reliability/availability of replacement parts on a local basis.

All specifications herein contained are considered as minimum. No exceptions to these minimum standards shall be allowed relating to gauge, alloy, and type of metal, size of compartments and overall design.

The delivered apparatus shall have a certified G.V.W.R. weight sticker applied to vehicle on delivery to assure the apparatus meets all laws pertaining to the weight carrying capacity of the vehicle.

### **GENERAL CONSTRUCTION AND DESIGN**

The design of the equipment shall be in accordance with the best engineering practices. The equipment design and accessory installation shall permit accessibility for use, maintenance and service. All components and assemblies shall be free of hazardous protrusions, sharp edges, cracks or other elements which might cause injury to personnel or equipment. All components shall be designed and protected so that heavy rains or other adverse weather conditions will not interfere with normal servicing or operation.

All oil, hydraulic and air tubing lines, and electrical wiring shall be located in protective positions properly attached to the frame or body structure and shall have protective loom or grommets at each point where they pass through structural members, except where a through frame connector is necessary.

The apparatus shall be designed and the equipment mounted with due consideration to distribution of load between the front and rear axles so that all specified equipment including personnel will be carried without injury to the apparatus. All dimensions are approximate and subject to a plus or minus 1/4" tolerance.

The following specifications describe minimum requirements for an emergency services vehicle designed for severe duty applications.

The materials specified are considered absolute minimum. Subletting any part of the fabrication, painting, or finishing of the apparatus will not be acceptable.

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### **ACCESSIBILITY**

Parts and components shall be located or positioned for rapid and simple inspection and recognition of excessive wear or potential failure. Whenever functional layout of operating components determines that physical or visual interference between items cannot be avoided, the item predicted to require the most maintenance shall be located for best accessibility.

Cover plates which must be removed for component adjustment or part removal should be equipped with quick disconnect fasteners or hinged panels.

Drains, filler plugs, grease fittings, hydraulic lines, bleeders, and check points for all components should be located so that they are readily accessible and do not require special tools for proper servicing. Design practices should minimize the number of tools required for maintenance.

### **MATERIALS**

The materials specifications are considered absolute minimum. Materials shall conform to the specifications listed herein. When not specifically listed, materials shall be of the best quality for purpose of commercial practice. Materials shall be free of all defects and imperfections that might affect the serviceability of finished product.

### **QUALITY AND WORKMANSHIP**

The manufacturing process, including quality control, shall be consistent with present industry standards. All equipment, material, and articles required under these specifications are to be new or fabricated from new materials produced from recovered materials. The term "Recovered Materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this document. The term "Heavy Duty", as used to describe an item, shall mean in excess of the standard, quantity, quality, or capacity and represents the best, most durable, strongest, etc., part, component, system, etc., that is available. The FORT WORTH FIRE DEPARTMENT or their designate shall be the sole judge of quality, construction and stability of the apparatus and equipment being offered.

Welding shall not be employed in the assembly of the apparatus in a manner that will prevent the ready removal of any component part for service or repair. All steel and stainless steel welding shall be done to American Welding Society D1.1-83 recommendations for structural steel welding. All aluminum welding shall be done to American Welding Society and ANSI D1.2-83 requirements for structural welding of aluminum.

Defective components shall not be furnished. Parts, equipment, and assemblies, which have been repaired or modified to overcome deficiencies, shall not be furnished without the approval of the FORT WORTH FIRE DEPARTMENT. Welded, bolted, and riveted construction utilized shall be in accordance with the highest standards of the industry. Component parts and units shall be manufactured to definite standard dimensions with proper fits, clearances, and uniformity. General appearance of the vehicle shall not show any evidence of poor quality of work.

### **INTERNET IN-PROCESS SITE**

The Body Manufacturer shall post and maintain a website where the FORT WORTH 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.

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### 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.

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### **ROADABILITY**

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

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

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

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

### **SERVICEABILITY**

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

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

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

### **CONSTRUCTION DOCUMENTATION**

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

The manufacturer's record of apparatus construction details, including the following information:

- 1) Owner's name and address
- 2) Apparatus manufacturer, model, and serial number
- 3) Chassis make, model, and serial number
  - a) GAWR of front and rear axles and GVWR
  - b) Front tire size and total rated capacity in pounds (kilograms)
  - c) Rear tire size and total rated capacity in pounds (kilograms)
  - d) Chassis weight distribution in pounds (kilograms) with water and manufacturer-mounted equipment (front and rear)
  - e) Engine make, model, serial number, rated horsepower and related speed, and governed speed; and if so equipped, engine transmission PTO(s) make, model, and gear ratio
  - f) Type of fuel and fuel tank capacity
  - g) Electrical system voltage and alternator output in amps

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- h) Battery make, model, and capacity in cold cranking amps (CCA)
- i) Chassis transmission make, model, and serial number; and if so equipped, chassis transmission PTO(s) make, model, and gear ratio
- 4) Pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
- 5) Pump transmission make, model, serial number, and gear ratio
- 6) Auxiliary pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
- 7) Water and Foam tank certified capacity in gallons or liters
- 8) Paint manufacturer and paint number(s)
- 9) Company name and signature of responsible company representative
- 3) If the apparatus is a mobile foam fire apparatus, the certification of foam tank capacity
- 4) Certification of compliance of the optical warning system
- 5) Siren manufacturer's certification of the siren
- 6) Written load analysis and results of the electrical system performance tests
- 7) Certification of slip resistance of all stepping, standing, and walking surfaces
- 8) If the apparatus has a fire pump, the pump manufacturer's certification of suction capability
- 9) 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
- 10) If the apparatus has a fire pump, a copy of the apparatus manufacturer's approval for stationary pumping applications
- 11) If the apparatus has a fire pump, the engine manufacturer's certified brake horsepower curve for the engine furnished, showing the maximum governed speed
- 12) If the apparatus has a fire pump, the pump manufacturer's certification of the hydrostatic test
- 13) If the apparatus has a fire pump, the certification of inspection and test for the fire pump
- 14) If the apparatus is equipped with an auxiliary pump, the apparatus manufacturer's certification of the hydrostatic test
- 15) When the apparatus is equipped with a water tank, the certification of water tank capacity
- 16) 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
- 17) If the system has a CAFS, the documentation of the manufacturer's pre delivery tests
- 18) If the apparatus has a line voltage power source, the certification of the test for the power source
- 19) If the apparatus is equipped with an air system, air tank certificates, the SCBA fill station certification, and the results of the testing of the air system installation
- 20) 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)

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

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

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

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

### **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.

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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.

Apparatus Type	Equip. Storage Area	Apparatus Size	Equipment Allowance	
			lb.	kg.
Special Service Fire Apparatus	Minimum of 120 cu ft (3.4 cu mt) of enclosed compartmentation.	10,000 lb to 15,000 lb (4,500 kg to 7,000 kg) GVWR	2,000	910
		15,001 lb to 20,000 lb (7,001 kg to 9,000 kg) GVWR	2,500	1,135
		20,001 lb to 30,000 lb (9,001 kg to 14,000 kg) GVWR	3,000	1,350
		30,001 lb to 40,000 lb (14,001 kg to 18,000 kg) GVWR	4,000	1,800
		40,001 lb to 50,000 lb (18,001 kg to 23,000 kg) GVWR	6,000	2,700
		50,001 lb to 60,000 lb (23,001 kg to 27,000 kg) GVWR	8,000	3,600
		60,001 lb and up (27,001 kg) GVWR	10,000	4,500

### **TESTING**

#### **ROAD TEST**

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

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

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

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

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

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

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

### **LOW VOLTAGE - ELECTRICAL SYSTEM PERFORMANCE TEST**

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

### **TEST SEQUENCE**

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

#### **1. RESERVE CAPACITY TEST**

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

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

#### **2. ALTERNATOR PERFORMANCE TEST**

##### **TEST AT IDLE**

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

##### **TEST AT FULL LOAD**

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

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



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### **3. LOW VOLTAGE ALARM TEST**

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

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

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

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

### **LOW VOLTAGE - ELECTRICAL SYSTEM PERFORMANCE TEST**

#### **DOCUMENTATION**

The manufacturer shall deliver the following with the fire apparatus:

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

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

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

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

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

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

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

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

- 1) The power source output voltage, frequency and amperes

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

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

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

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

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

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

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

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

### **DOCUMENTATION**

The Body Manufacturer shall deliver the following with the fire apparatus:

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

### **DIELECTRIC VOLTAGE WITHSTAND TEST**

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

The test shall be conducted as follows:

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

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

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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 proposed. 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 FORT WORTH FIRE DEPARTMENT on all warranty work.

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

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

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

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

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

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

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

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

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

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### **GRAPHICS LIMITED WARRANTY**

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

### **CONSTRUCTION PERIOD**

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

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

### **OVERALL HEIGHT REQUIREMENT**

The overall height (OAH) of the vehicle shall be approximately 96" (8' - 0") from the ground. This measurement shall be taken on flat ground with the tires properly inflated, in the unloaded condition, at that highest point of the vehicle.

### **OVERALL LENGTH**

The overall length (OAL) of the vehicle shall be approximately 307" (25' - 7").

### **OVERALL WIDTH**

The overall width (OAW) of the body at drip rails shall be 102" (8' - 6"), and body shall be 100" (8' - 4").

### **ANGLE OF APPROACH**

The angle of approach for this vehicle shall not be less than eight (8) degrees as specified by the current edition of NFPA 1901.

### **ANGLE OF DEPARTURE**

The angle of departure for this vehicle shall not be less than eight (8) degrees as specified by the current edition of NFPA 1901.

### **MID-CONSTRUCTION CONFERENCE**

A mid-construction conference shall be required at the Contractor's factory for one (1) personnel from the FORT WORTH FIRE DEPARTMENT to finalize all construction details prior to finishing the apparatus.

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

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### **FINAL INSPECTION CONFERENCE**

A final inspection conference shall be required at the Contractor's factory for one (1) personnel from the FORT WORTH FIRE DEPARTMENT to inspect the vehicle and construction details prior to shipment of the completed vehicle. This inspection shall take place after any specified striping and lettering is installed.

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

### **DELIVERY AND DEMONSTRATION**

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

The Delivery Engineer shall set delivery and instruction schedule with the person appointed by FORT WORTH FIRE DEPARTMENT.

After delivery of the apparatus, the FORT WORTH 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.

### **2014 FORD F-550 CREW CAB CHASSIS SPECIFICATION**

The cab/chassis shall be supplied by FORT WORTH FIRE DEPARTMENT and drop shipped to successful Contractor. The cab/chassis shall be specified as follows;

#### **POWERTRAIN**

Powerstroke 6.7L V-8 OHV direct diesel injection 32 valve intercooled turbo diesel engine \* 357 amp dual alternator \* 750 amp (total) 78 amp hours (Ah) (total) battery dual batteries with run down protection \* Engine block heater \* 6-speed electronic SelectShift automatic transmission with overdrive, lock-up, driver selection \* Part-time four-wheel drive with electronic transfer case shift, auto locking hubs \* Limited slip differential, driveline traction control, power take-off provision \* 4.88 axle ratio \* Stainless steel exhaust

#### **STEERING AND SUSPENSION**

Hydraulic power-assist re-circulating ball steering \* 4-wheel disc brakes with front and rear vented discs \* Firm ride suspension \* Mono-beam non-independent front suspension \* Front anti-roll bar \* HD front coil springs \* HD front shocks \* Rigid rear axle \* Rear leaf suspension \* Rear anti-roll bar \* HD rear leaf springs \* HD rear shocks \* Front and rear 19.5" x 6.00" argent steel wheels \* LT225/70SR19.5 BSW AT front and rear tires

#### **SAFETY**

4-wheel anti-lock braking system \* Dual airbags, seat mounted driver and passenger side-impact airbags, curtain 1st and 2nd row overhead airbags \* Front height adjustable seatbelts \* SecuriLock immobilizer, panic alarm, security system

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

### **COMFORT AND CONVENIENCE**

Air conditioning, underseat ducts \* AM/FM stereo, clock, seek-scan, 2 speakers, fixed antenna \* Power door locks with 2 stage unlock, keyfob (all doors) keyless entry \* 2 12V DC power outlets, retained accessory power \* Analog instrumentation display includes tachometer, engine temperature gauge, turbo/supercharger boost gauge, transmission fluid temp gauge, engine hour meter, exterior temp, systems monitor, trip odometer \* Warning indicators include oil pressure, engine temperature, battery, lights on, key, low fuel, door ajar, service interval, brake fluid \* Steering wheel with tilt and telescopic adjustment \* Power front and rear windows with light tint, driver and passenger 1-touch down \* Variable intermittent front windshield wipers \* Passenger side vanity mirror \* Day-night rearview mirror \* Interior lights include dome light with fade, front and rear reading lights, illuminated entry \* Full overhead console with storage, glove box, front cupholder, instrument panel bin, dashboard storage, driver and passenger door bins, rear door bins \* Upfitter switches

### **SEATING AND INTERIOR**

Seating capacity of 6 \* 40-20-40 split-bench front seat with adjustable head restraints, center armrest with storage \* 4-way adjustable driver seat includes lumbar support \* 4-way adjustable passenger seat \* 60-40 folding rear split-bench seat with FlexFold flip forward cushion/seatback, 3 adjustable rear head restraints \* Vinyl faced front seats with vinyl back material \* Vinyl faced rear seats with carpet back material \* Full cloth headliner, full vinyl/rubber floor covering, urethane gear shift knob, chrome interior accents

### **EXTERIOR FEATURES**

Side impact beams, front license plate bracket, fully galvanized steel body material \* Black fender flares \* Black side window moldings, black front windshield molding \* Black door handles \* Black grille \* 4 doors \* Trailer harness \* Driver and passenger power remote black heated convex spotter folding manual extendable trailer outside mirrors with turn signal indicators \* Front black bumper with front tow hooks \* Aero-composite halogen headlamps \* Additional exterior lights include cab clearance lights, underhood light, remote activated perimeter/approach lights \* Clearcoat monotone paint \* Snow plow provision

### **WARRANTY**

Basic ..... 36 month/36,000 miles Powertrain ..... 60 month/60,000 miles  
Corrosion Perforation ..... 60 month/unlimited mileage Roadside Assistance ..... 60 month/60,000 miles  
Diesel Engine ..... 60 month/100,000 miles

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

### DIMENSIONS AND CAPACITIES

Output ..... 300 hp @ 2,800 rpm Torque ..... 660 lb.-ft. @ 1,600 rpm  
1st gear ratio ..... 3.974 2nd gear ratio ..... 2.318  
3rd gear ratio ..... 1.516 4th gear ratio ..... 1.149  
5th gear ratio ..... 0.858 6th gear ratio ..... 0.674  
Reverse gear ratio ..... 3.128 Curb weight ..... 8,700 lbs.  
GVWR ..... 19,500 lbs. Front ..... 7,000 lbs.  
Rear GAWR ..... 14,706 lbs. Payload ..... 10,882 lbs.  
Front curb weight ..... 5,175 lbs. Rear curb weight ..... 3,525 lbs.  
Front axle capacity ..... 7,000 lbs. Rear axle capacity ..... 14,706 lbs.  
Front spring rating ..... 7,000 lbs. Rear spring rating ..... 15,000 lbs.  
Front tire/wheel capacity ..... 7,500 lbs. Rear tire/wheel capacity ..... 15,000 lbs.  
Towing capacity ..... 16,000 lbs. 5th-wheel towing capacity ..... 16,200 lbs.  
Front legroom ..... 41.1 " Rear legroom ..... 42.1 "  
Front headroom ..... 40.7 " Rear headroom ..... 40.8 "  
Front hiproom ..... 67.6 " Rear hiproom ..... 67.6 "  
Front shoulder room ..... 68.0 " Rear shoulder room ..... 68.0 "  
Passenger area volume ..... 133.5 cu.ft. Length ..... 285.9 "  
Body width ..... 93.9 " Body height ..... 80.8 "  
Wheelbase ..... 200.0 " Cab to axle ..... 84.0 "  
Axle to end of frame ..... 47.6 " Front tread ..... 74.8 "  
Rear tread ..... 74.0 " Turning radius ..... 28.9 '  
Fuel tank ..... 40.0 gal. Rear frame height loaded ..... 28.0 "  
Rear frame height unloaded ..... 33.2 "  
12/20/2013

### VEHICLE SNAPSHOT

**Engine:** 6.7L 4V OHV Power Stroke Diesel V8 B20  
**Transmission:** TorqShift 6-Speed Auto w/OD  
**Rear Axle Ratio:** Limited Slip w/4.88  
**GVWR:** 19,500 lb Payload Plus Upgrade Package

### PACKAGES

660A **Order Code 660A** OPT  
(99Y) *Engine: 6.8L 3-Valve SOHC EFI NA V10; (44T) Transmission: TorqShift 5-Speed Auto w/OD : Includes SelectShift.; (X48) 4.88 Axle Ratio; (STDGV) GVWR: 18,000 lbs Payload Package; (TFB) Tires: 225/70Rx19.5G BSW AS (6); (64Z) Wheels: 19.5" Argent Painted Steel (6); (A) HD Vinyl 40/20/40 Split Bench Seat : Includes driver side manual lumbar support, center armrest, cupholder and storage.; (587) Radio: AM/FM Stereo w/Digital Clock : Includes 2 speakers.*

### EMISSIONS

425 **50 State Emissions System** OPT

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

### POWERTRAIN

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

*200 Amp Extra Heavy Duty Alternator; (X41) 4.10 Axle Ratio; Dual 78 AH Batteries. Includes clean idle decal and intelligent oil life minder. Torque: 660 ft.lbs. @ 1600 rpm.*

**44W Transmission: TorqShift 6-Speed Auto w/OD OPT**

*Includes SelectShift.*

**X8L Limited Slip w/4.88 Axle Ratio OPT**

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

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

*NOTE: See Order Guide Supplemental Reference for further details on GVWR.*

### WHEELS AND TIRES

**TGB Tires: 225/70R19.5G BSW Max Traction OPT**

*Includes 4 traction tires on the rear and 2 traction tires on the front. Not recommended for over the road applications; could incur irregular front tire wear and/or NVH. Optional spare is traction. 64Z*

**Wheels: 19.5" Argent Painted Steel (6) INC**

### SEATS AND TRIM

**A HD Vinyl 40/20/40 Split Bench Seat INC**

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

### OTHER OPTIONS

**PAINT Monotone Paint Application STD**

**200WB 200" Wheelbase/84" Cab to Axle STD**

**90L Power Equipment Group OPT**

*Accessory Delay; Power Locks; Remote Keyless Entry; Perimeter Anti-Theft Alarm; Power Front & Rear Side Windows : Includes 1-touch up and down power driver and passenger window.; MyKey : Includes owner controls feature.; Manual Telescoping Trailer-Tow Mirrors : Includes power heated glass, heated convex spotter mirror and integrated clearance lights/turn signals.; SecuriLock Passive Anti-Theft System (PATS). Deletes passenger-side lock cylinder. Includes upgraded door-trim panel.*

**473 Snow Plow Prep Package OPT**

*Includes pre-selected springs (see Order Guide Supplemental Reference for springs/FGAWR of specific vehicle configurations). NOTE 1: Restrictions apply; see Supplemental Reference or Body Builders Layout Book for details. NOTE 2: Also allows for the attachment of a winch.*

**213 4x4 Electronic-Shift-On-The-Fly (ESOF) OPT**

*Includes manual locking hubs and auto rotary control on instrument panel.*

**41H Engine Block Heater OPT**

**62R Transmission Power Take-Off Provision OPT**

**98R Operator Commanded Regeneration (OCR) OPT**

**67A Dual Alternators (Total 357-Amps) OPT**

**587 Radio: AM/FM Stereo w/Digital Clock INC**

*Includes 2 speakers.*

### INTERIOR COLORS

**AS Steel OPT**

### PRIMARY COLORS FOR: PRIMARY W/XL (SUPER, CREW)

**Z1 Oxford White OPT**



# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

### **ACCESSORIES AND AFTERMARKET OPTIONS**

#### **S3Z ALUMINUM WHEELS - SPECIAL ORDER**

#### **IM5 Intermotive 5 Position Seat Belt Monitoring System w/ VDR**

5 Seat Sensors [2 Front and 3 Rear]

1 Interface Module Mounted under dash

1 Intermotive Display

1 Fire Research Corp vdr

1 Harness Kit

[5] 110" + Red Seat Belts w/o KISI using OEM Hardware

### **WARRANTY: 2014 FORD F-550 CHASSIS: 4x4 SD CREW CAB 200" WB DRW XL (W5H)**

#### **DESCRIPTION: MONTHS/DISTANCE**

Basic .....	36 month/36,000 miles
Powertrain .....	60 month/60,000 miles
Corrosion Perforation .....	60 month/unlimited mileage
Roadside Assistance .....	60 month/60,000 miles
Diesel Engine .....	60 month/100,000 miles

### **CAB TO AXLE DIMESION**

Cab to axle will be 84".

### **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

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

### **VEHICLE DATA PLATE**

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

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

### **OVERALL HEIGHT, LENGTH DATA PLATE (US)**

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

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

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

### **ACCIDENT PREVENTION**

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

### **PERSONNEL CAPACITY**

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

### **ACCIDENT PREVENTION**

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

### **WEARING HELMET WARNING**

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

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

### **FINAL STAGE MANUFACTURER VEHICLE CERTIFICATION**

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

### **FRONT BUMPER & GRILL GAURD**

A Ranch Hand front bumper/grill guard combo shall be bolted in place of the OEM bumper. The Grill Guard Combo kit shall be provided in a black powder coat paint finish. The bumper kit provided shall be for the specified chassis model and year.

### **FRONT TOW PROVISIONS**

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

### **AIR INTAKE SYSTEM**

An air filter shall be provided in the engine's air intake system.

Air inlet restrictions shall not exceed the engine manufacturer's recommendations.

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

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

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

### **EXHAUST**

The existing exhaust tailpipe shall be modified from the stock location by cutting the pipe and adding a connector and band clamp.

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.

### **GROUND CLEARANCE**

A 2" Level Kit suspension lift shall be installed to increase ground clearance. The components shall be readily available, and not custom built. Payload must not be adversely affected by any changes in the suspension. Drive lines must not be adversely affected by any changes in the suspension.

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

### **PORTABLE RADIO INSTALLATION**

There shall be four (4) FORT WORTH FIRE DEPARTMENT supplied portable radio(s) installed on the cab console within easy reach of driver.

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

### **SEAT BELT COLOR AND MOUNTING**

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.

Per FORT WORTH FIRE DEPARTMENT specification for a commercial chassis, this emergency vehicle may not have the required seat belt webbing colors or buckle in an accessible location. These belts may not provide visibility to driver that seat belts are on or buckle is easily accessible. This specifications for an emergency fire apparatus for these seat belts shall be non-compliant to NFPA 1901 standards, effective at the time of the bid opening.

### **SEAT BELT WEB LENGTH - COMMERCIAL 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 commercial chassis manufacturer shall be compliant to NFPA Standards 14.1.3.2 and 14.1.3.3.

Per FORT WORTH FIRE DEPARTMENT specification for a commercial chassis, this emergency vehicle may not have seat belts of this required length. These belts may not provide sufficient length for large firefighters in bunker gear. This specification for an emergency fire apparatus for these seat belts shall be non-compliant to NFPA 1901 standards, effective at the time of the bid opening.

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

Section 14.1.3.10 of the NFPA 1901 Standards, 2009 edition, requires that a seat belt warning system be provided. The seat belt warning device is intended to assist the driver or officer in determining whether all occupants are seated and belted before the vehicle is driven.

Per FORT WORTH FIRE DEPARTMENT specification for a commercial chassis, this emergency vehicle may not have a seat belt monitoring system. Without this device, the driver must manually determine that all occupants are seated and belted before the apparatus is placed in motion. This specification for an emergency fire apparatus for the seat belt monitoring system shall be non-compliant to NFPA 1901 standards, effective at the time of the bid opening.

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

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

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

### **HELMET STORAGE**

No helmet storage is required in the cab driving or crew area.

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

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

### **CAB ELECTRIC STEPS**

The chassis shall be provided with AMP electric steps one each side, below the cab doors.

### **MUDFLAPS**

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

### **ROAD EMERGENCY SAFETY KIT**

One (1) set of three (3) dual faced triangular warning flares with fold away base complete with storage case per DOT requirements shall be provided with the completed apparatus.

One (1) 2.5 lb. ABC type vehicle fire extinguisher with bracket per DOT requirements shall be provided with the completed apparatus.

### **FUEL FILL**

There shall be one (1) fuel fill door located on the streetside rear wheel panel of the body, behind the rear wheel. The open face, fuel fill port will be furnished by the chassis manufacturer. There shall be a permanent label with the text "DIESEL FUEL ONLY" located adjacent to the fuel fill access.

### **DEF FLUID FILL**

There shall be one (1) DEF fluid fill port located in the streetside exterior wheel well panel, ahead of the rear axle. The open face DEF fill port shall have a permanent label with the text "DEF ONLY".

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

### **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 FORT WORTH 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 FORT WORTH 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 1/8" (.125) aluminum 3003H-14 smooth plate. Interior compartment dividing walls shall be constructed with not less than 1/8" (.125) aluminum 3003H-14 smooth plate. Lighter gauge sheet metal will not be acceptable in these areas.

The front and rear corners of body shall be formed as part of the front or rear body panels. This provides a stronger body corner and finished appearance. The use of extruded corners, or caps will not be acceptable, No Exceptions.

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.

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

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

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

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

Only stainless steel bolts, nuts, 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.

### **DRIP RAILS**

The body shall have drip rails over the side full height compartments. The drip rails shall be formed into the upper body panels providing a ridged lower panel and a flat upper body panel surface. The use of mechanically fastened, taped or glued on drip rails will not be acceptable, No Exceptions.

### **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 1/8" aluminum 3003H-14 alloy smootplate, fully and continuously welded

All seams in the roof area shall be welded to the radius and supports prior to paint to prevent entry of moisture. All roof seams shall be continuously welded.

### **BODY SUBFRAME**

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

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

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

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

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

### **BODY MOUNTING**

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

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

### **8" REAR BUMPER**

The full width rear bumper shall be constructed from minimum 2" x 2" x 1/4" aluminum tubing and covered with minimum of 1/8" thick aluminum NFPA tread plate. The bumper shall extend from the rear vertical body panel 8" with a minimum of 1/2" space between the body and bumper for water drainage.

### **REAR TOW EYES**

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

### **TRAILER HITCH**

A Class 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 and a maximum tongue weight of 500 lbs.

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. Receptacle shall be a 7-Way Blade Type socket, the same as used on most Light Duty Trucks and RV's.



# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

### **TRAILER AUXILIARY ELECTRICAL RECEPTACLE**

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

### **GROUND LIGHTS**

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

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

### **WHEEL WELL EXTERIOR PANEL**

The exterior panel of the body wheel well enclosure shall be constructed from 1/8" aluminum smooth plate.

### **RUBBER BODY FENDERS**

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

### **WHEEL WELL LINERS**

The wheel wells shall be constructed by the compartment walls that surround the wheel well area. The interior wheel well area shall be designed so that it does not accumulate dirt or water.

### **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.

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

### **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 mills 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 mills DFT after sanding.
- 6) Base coat (Color) - PPG Delfleet® Evolution High Solids Polyurethane Base coat. Apply 1.0-3.0 mills 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 mills.
- 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.

### **FASTENERS**

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

### **ELECTROLYSIS CORROSION CONTROL**

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

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

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

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

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

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. **Pro-rated warranties will not be acceptable.**

### **COMPARTMENT INTERIOR FINISH**

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

### **REFLECTIVE STRIPE REQUIREMENTS**

#### Material

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.

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

### Minimum Requirements

A retroreflective stripe(s) shall be affixed to at least 50 percent of the cab and body length on each side, excluding the pump panel areas, and at least 25 percent of the width of the front of the apparatus.

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.

### **GRAPHICS PROOF**

A color graphics proof of the reflective striping layout shall be provided for approval by FORT WORTH FIRE DEPARTMENT prior to installation. The graphics proof shall be submitted to FORT WORTH FIRE DEPARTMENT on 8.5" x 11" sheets with front, sides, rear and plan views, each on one (1) sheet. In addition if there is any special art work an additional sheet shall be provided showing all details.

### **REFLECTIVE STRIPE - CAB SIDE**

The reflective stripe material shall be 4" wide, 3M Scotchcal 680 series.

- This reflective stripe shall be blue in color.

There shall be a 1" Scotchcal reflective stripe located 1" above and a second 1" Scotchcal reflective stripe located 1" below the main stripe.

- This reflective stripe shall be blue in color.

### **REFLECTIVE STRIPE - CAB FRONT**

The reflective stripe material shall be 4" wide, 3M Scotchcal 680 series.

- This reflective stripe shall be blue 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 blue in color.

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

### **REFLECTIVE STRIPE - BODY SIDES**

The reflective stripe material shall be 4" wide, 3M Scotchcal 680 series.

- This reflective stripe shall be blue in color.

There shall be a 1" Scotchcal reflective stripe located 1" above and a second 1" Scotchcal reflective stripe located 1" below the main stripe.

- This reflective stripe shall be blue in color.

The stripe shall extend from the front of cab in a straight line, then just ahead of the rear wheels the stripe shall angle up and extend straight back to the rear of the body.

### **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 Scotchcal 680 series.

This reflective chevron stripe shall alternate fluorescent blue-white in color.

### **LETTERING**

#### **GRAPHICS PROOF**

A color graphics proof of the lettering layout shall be provided for approval by FORT WORTH FIRE DEPARTMENT prior to installation. The graphics proof shall be submitted to FORT WORTH FIRE DEPARTMENT on 8.5" x 11" sheets with front, sides, rear and plan views, each on one (1) sheet. In addition if there is any special art work an additional sheet shall be provided showing all details.

The following lettering shall be provided and installed on the completed unit as follows;

#### **SIDE CAB DOOR LETTERING**

There shall be eighteen (18) 3" high reflective letters furnished and installed on the vehicle.

- This reflective lettering shall be blue in color.

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

### **UPPER BODY SIDE LETTERING**

There shall be thirty eight (38) 5" high reflective letters furnished and installed on the vehicle.

- This reflective lettering shall be blue in color.

There shall be four (4) 22" high reflective letters furnished and installed on the vehicle.

- This reflective lettering shall be blue in color.

### **CAB ROOF LETTERING**

There shall be two (2) 22" high, non-reflective numbers furnished and installed on the vehicle.

- This reflective lettering shall be blue in color.

### **FORT WORTH FIRE DEPARTMENT'S "MOLLY" DECAL LOGO**

Two (2) FORT WORTH FIRE DEPARTMENT's furnished, Scotchcal type retroreflective "Molly" logos shall be installed, one (1) on each front cab door.

### **EXTERIOR COMPARTMENT DOORS**

#### **ROLL-UP DOOR CONSTRUCTION - ROBINSON (ROM)**

The apparatus shall be equipped with Robinson ROM 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
- 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

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

- Will be free from manufacturing defects for a period of up to 7 years from date of purchase provided that the Product is used under conditions of normal use, that regular periodic maintenance and service is performed and that the product was installed in accordance with R•O•M's instructions.

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.

### **BODY HEIGHT MEASUREMENT**

The overall vertical body height measurement is 59", matching the chassis cab height.

### **BODY WIDTH DIMENSIONS**

The body shall be 95.0" wide, not including drip rail or non-permanent fixtures. Interior compartment depth dimensions shall be approximately:

<u>Area Description</u>	<u>Dimension</u>
Transverse Area above Subframe	90.0"
Compartment Depth below Subframe	18.0"

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

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

The interior useable compartment width shall be approximately 57.0" wide outside the chassis frame and 42.50" over chassis frame in the forward portion of the compartment.

The compartment door opening shall be approximately 42.50" wide.

The useable compartment height shall be approximately 42.50"

This compartment shall have a ROM roll-up door.

- The roll-up door shall have an unpainted satin aluminum finish on the door slats and the door trim components.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) aluminum drip pan/door finish guard shall be provided with the rollup door.
- A 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 LAYOUT**

- There shall be one (1) OnScene Solutions 83 series aluminum tray base with 70% extension, and rating of 1,000 lbs. Slide-out tray(s) base shall be approximately 94" deep and as wide as the compartment layout or door opening permits, capable of extending out either side of the body located above the level of the chassis frame rails. Each slide base shall have a cable operated, spring loaded latch complimented by a large hand opening and red pull handle (Pull to Release) which will lock the tray in the closed, 40% extended and 70% extended positions. Each tray top shall be fabricated from 3/16" 3003 aluminum sheet shall have welded corners to form a box type tray surface with an internal depth of approximately 3 1/2".
  - There shall be one (1) vertical partition(s) installed on tray dividing the tray into left and right sides. Each vertical partition shall be horizontally adjustable; mounted on aluminum shelf trac on tray floor.
- The compartment will have a bolt-in, removable rear wall panel constructed from 3/16" smoothplate aluminum to allow mounting of loose equipment on the rear compartment wall.
- The floor of the compartment above the frame rails shall cover the area directly above the frame rails ONLY (non-extended floor).
- Two (2) OnScene 64" Access LED compartment lights, vertically mounted.
- One (1) OnScene 9" Access LED ground light shall be provided below the body.
- The 12 volt electrical distribution panel shall be located in the front lower compartment.



# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

### **STREETSIDE COMPARTMENT - ABOVE REAR WHEELS (S2)**

The interior useable compartment width shall be approximately 46.5" wide.

The compartment door opening shall be approximately 41.0" wide.

The useable compartment height shall be approximately 22.5"

This compartment shall have a ROM roll-up door.

- The roll-up door shall have an unpainted satin aluminum finish on the door slats and the door trim components.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) aluminum drip pan/door finish guard shall be provided with the rollup door.
- A 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 LAYOUT**

- Two (2) OnScene 36" Access LED compartment lights, vertically mounted.

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

### **STREETSIDE COMPARTMENT - REAR (S3)**

The interior useable compartment width shall be approximately 21.5" wide.

The compartment door opening shall be approximately 17.0" wide.

The useable compartment height shall be approximately 39.50"

This compartment shall have a ROM roll-up door.

- The roll-up door shall have an unpainted satin aluminum finish on the door slats and the door trim components.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) aluminum drip pan/door finish guard shall be provided with the rollup door.
- A 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 LAYOUT**

- There shall be vertically mounted aluminum Shelf-Trac for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be one (1) adjustable shelf/shelves approximately 18" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges.
- The compartment will have a bolt-in, removable rear wall to allow access to the apparatus pump system.
- The floor of the compartment above the frame rails shall cover the area directly above the frame rails ONLY (non-extended floor).
- Two (2) OnScene 64" Access LED compartment lights, vertically mounted.
- One (1) OnScene 9" Access LED ground light shall be provided below the body.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

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

The interior useable compartment width shall be approximately 57.0" wide outside the chassis frame and 42.50" over chassis frame in the forward portion of the compartment.

The compartment door opening shall be approximately 42.50" wide.

The compartment useable compartment height shall be approximately 42.50"

This compartment shall have a ROM roll-up door.

- The roll-up door shall have an unpainted satin aluminum finish on the door slats and the door trim components.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) aluminum drip pan/door finish guard shall be provided with the rollup door.
- A 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 LAYOUT**

- There shall be vertically mounted aluminum Shelf-Trac for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be one (1) OnScene Solutions 83 series aluminum tray base with 70% extension, and rating of 1,000 lbs. Slide-out tray(s) base shall be approximately 94" deep; capable of extending out either side of the body located above the level of the chassis frame rails. (Specified in opposite side compartment.)
  - There shall be one (1) vertical partition(s) installed on tray dividing the tray into left and right sides. Each vertical partition shall be horizontally adjustable; mounted on aluminum shelf trac on tray floor.
- The compartment will have a bolt-in, removable rear wall panel constructed from 3/16" smoothplate aluminum to allow mounting of loose equipment on the rear compartment wall.
- The floor of the compartment above the frame rails shall cover the area directly above the frame rails ONLY (non-extended floor).
- Two (2) OnScene 64" Access LED compartment lights, vertically mounted.
- One (1) OnScene 9" Access LED ground light shall be provided below the body.

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

### **CURBSIDE COMPARTMENT - ABOVE REAR WHEEL (C2)**

The interior useable compartment width shall be approximately 46.5" wide.

The compartment door opening shall be approximately 41.0" wide.

The useable compartment height shall be approximately 22.50"

This compartment shall have a ROM roll-up door.

- The roll-up door shall have an unpainted satin aluminum finish on the door slats and the door trim components.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- There shall be NO keyed lock on this roll-up compartment door.
- A 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 LAYOUT**

- One (1) OnScene 36" Access LED compartment light, vertically mounted.

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

### **CURBSIDE COMPARTMENT - REAR (C3)**

The interior useable compartment width shall be approximately 21.5" wide.

The compartment door opening shall be approximately 17.0" wide.

The useable compartment height shall be approximately 39.50"

This compartment shall have a ROM roll-up door.

- The roll-up door shall have an unpainted satin aluminum finish on the door slats and the door trim components.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- There shall be NO keyed lock on this roll-up compartment door.
- A 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 LAYOUT**

- There shall be vertically mounted aluminum Shelf-Trac for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be one (1) adjustable shelf/shelves approximately 18" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges.
- The compartment will have a bolt-in, removable rear wall to allow access to the apparatus pump system.
- The floor of the compartment above the frame rails shall cover the area directly above the frame rails ONLY (non-extended floor).
- Two (2) OnScene 64" Access LED compartment lights, vertically mounted.
- One (1) OnScene 9" Access LED ground light shall be provided below the body.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

### **REAR COMPARTMENT - CENTER (RC1)**

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

The rear center compartment shall start at the top of the frame and be as high as the body permits.

The interior useable compartment width shall be approximately 45.0" wide and 104" deep.

### **COMPARTMENT LAYOUT**

The specified Waterous skid pump system and water tank will be located in this compartment area.

- Two (2) specified crosslay(s) or speedlay(s) shall be located transverse to opposite side located above chassis frame rails.

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

### **REAR BODY HANDRAILS**

There shall be two (2) 24" vertical handrails on the rear of the body. Handrails shall be NFPA compliant 1-1/4" knurled 304 stainless steel with welded end stanchions.

### **WATEROUS SKID PUMP SYSTEM**

The fire fighting pump shall be a Waterous 200-100-DS skid system.

The pump system will have the following features and items:

- 300 gal. water with a 20 gal. foam Plasmac Tank
- One (1) 3/4" hose reel capable of holding 200' of 3/4" booster hose (reel shall be and painted white).
- One (1) 1.5" rear CAF discharge, point of discharge NH.
- Two (2) 1.5" rear CAF discharges for left hand and right hand preconnect hose beds with controls across the top of control panel and terminate NH male connections.
- One (1) direct tank fill, 2" with a 2.5" NHF connection with point of use control tank to pump control valve 2.5".
- Overboard suction connection, 2.5" NHM capped to no valve.
- One (1) 1" tank recirculation valve with point of use control.
- All pump inlet and discharge valves shall be Akron brand.
- Pump primer shall be hand operated.
- The pump primer shall be mounted near the main engine control panel, open design.
- The system shall have a main control panel near the pump engine.
- The basic control panel shall have an engine control pressure gauge, water level.
- One (1) Aquis 1.5 foam system with (shipped loose foam pump/motor assembly).
- One (1) Waterous 3/4" foam fill with pick up tube and panel connection (ship loose remote foam pick up and flush valve panel).

The the diesel engine for the pump system shall be plumbed to the chassis fuel tank.

The pump's 12-volt system shall be wired to the chassis 12-volt system.

### **REAR SPEEDLAY(S)**

There shall be two (2) 1-3/4" speedlay(s) located above the pump module, or per the itemized compartment list. The speedlay(s) shall be located in the upper corners of the pump module area with access from the rear.

Removable hose tray(s) shall be formed from 1/8" smooth aluminum with hand hold cut-outs on each end and additional slotted opening the along length to allow for water drainage and ventilation.

The pump module speedlay(s) shall have a hinged aluminum treadplate cover over the top.

The back end of the hose bed cover shall have a nylon cover. The covers will be mechanically fastened at the top of the hose bed cover and the bottom edges shall be secured using elastic cord.

Each speedlay shall have a minimum storage capacity of 150' of 1-3/4" double jacket hose and nozzle.

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT 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.



# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

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.

# FORT WORTH FIRE DEPARTMENT

## ATTACK UNIT SPECIFICATION

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.

### ROCKER SWITCH PANEL

The control of the scene lighting installed on chassis and body shall be centrally located in the cab. The individual rocker style switches shall be located in the cab dash area provided by the chassis manufacturer.

### CAB CONSOLE

A center cab console shall be provided between the Driver's and Officer's seats. Console shall be as large as possible and fabricated of 1/8" smooth aluminum. A textured powder coat paint finish shall be provided for durability and finished appearance.

The forward portion of console shall be slanted for mounting of siren head, radio or 12 volt control panel, and etc, with easy access to both Driver and Officer.

Customer provided flashlights and hand held radio chargers will be mounted on the rear section of the console.

### 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.

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

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

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

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

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

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

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

### **BATTERY SWITCH**

One (1) battery "On/Off" switch in cab located within easy reach of Driver with green "BATTERY ON" pilot light that is visible from the driver's position shall be provided. **Note:** The battery switch will switch ON/OFF the 12-volt system to the body only.

### **BATTERY SOLENOID**

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

### **BATTERY CONDITIONER**

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

### **SHORE POWER INLET**

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

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

- The outlet cover shall be red.
- The shore power inlet shall be located on the streetside end of front bumper.

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### **ENGINE COMPARTMENT LIGHT**

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

### **CAB HAZARD WARNING LIGHT**

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

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

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

- The volume is less than or equal to 4 ft<sup>3</sup> (0.1 m<sup>3</sup>).
- The compartment has an opening less than or equal to 144 in.<sup>2</sup> (92,900 mm<sup>2</sup>).
- The open door does not extend sideways beyond the mirrors or up above the top of the fire apparatus.
- All equipment in the compartment is restrained so that nothing can fall out if the door is open while the apparatus is moving.
- Manually raised pole lights with an extension of less than 5 ft (1.5 m).

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

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

### **BACK-UP ALARM**

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

### **REAR VIEW CAMERA**

There shall be one (1) Pro-Vision 4.3 Pro-Series, 2-channel, rear observation camera system provided and installed on completed apparatus.

The camera image shall be displayed on a interior rear view mirror monitor.

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### **TAIL LIGHTS**

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

- Two (2) Truck-Lite model 4550 LED stop/turn tail lights
- Two (2) Truck-Lite model 4560C LED back-up lights with clear lens

### **MARKER LIGHTS**

The body shall be equipped with all necessary clearance lights and reflectors in accordance with Federal Motor Vehicle Safety Standards (FMVSS) and Canadian Motor Vehicle Safety Standards (CMVSS) regulations. All body clearance lights shall be Truck-Lite Model 30085R and 33050R 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 295HFSA5 6-function electronic siren head with Si-Test function, plug-in microphone, air horn button switch and 9 light/accessory switches shall be provided in cab. Siren to be installed in cab within easy access of Driver.

### **SIREN SPEAKER**

One (1) Whelen SA314, 100 watt siren speaker shall be provided and recess mounted behind the front bumper.

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

### **FRONT GRILL GUARD FLOODLIGHT - LED**

There shall be one (1) 20" Rigid E-series LED floodlight mounted in the upper portion of the front grill guard on front of cab.

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

### **FRONT EXTENDING SCENE LIGHTS - LED**

There will be two (2) Akron 12-volt LED, Extenda-Lites, model SceneStar ELSS-XLDC-PS-SM2-SW-WO mounted on the front of the body, one (1) per side. Each light will provide 19,000 lumens/candle power and shall be mounted to a 60" extension pole. The lights will be switch ON/Off by a switch mounted on each lighthouse.

The lights shall be switched ON/OFF along with the specified upper body side scene lights at the 12 volt control panel in the cab.

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### **SIDE SCENE LIGHTS**

There shall be four (4) Whelen M6 series (6" X 4") surface mounted Super-LED Scene lights (M6ZC) provided on the upper body. Light quantity shall be divided equally per side. Each light will have an 8-32 degree gradient lens and chrome flange.

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

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

### **REAR SCENE LIGHTS**

Two (2) Whelen M6 series (6" x 4") surface mounted Super-LED Scene lights 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 26 degree lens and chrome flange.

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

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

### **WARNING LIGHT PACKAGE**

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

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

For the purposes of defining and measuring the required optical performance, the upper and lower warning levels shall be divided into four (4) warning zones. The four zones shall be determined by lines drawn through the geometric center of the apparatus at 45 degrees to a line drawn lengthwise through the geometric center of the apparatus. The four (4) zones shall be designated A, B, C, and D in a clockwise direction, with zone A to the front of the apparatus.

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

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

The optical warning system on the fire apparatus shall be capable of two (2) separate signaling modes during emergency operations. One (1) mode shall signal to drivers and pedestrians that the apparatus is responding to an emergency and is calling for the right-of-way. One (1) mode shall signal that the apparatus is stopped and is blocking the right-of-way. The use of some or all of the same warning lights shall be permitted for both modes provided the other requirements of this chapter are met.

A switching system shall be provided that senses the position of the parking brake or the park position of an automatic transmission.

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When the master optical warning system switch is closed and the parking brake is released or the automatic transmission is not in park, the warning devices signaling the call for the right-of-way shall be energized. When the master optical warning system switch is closed and the parking brake is on or the automatic transmission is in park, the warning devices signaling the blockage of the right-of-way shall be energized. The system shall be permitted to have a method of modifying the two (2) signaling modes.

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

### **UPPER LEVEL OPTICAL WARNING DEVICES**

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

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

There shall be one (1) Whelen Edge FN60QLED LED 60" lightbar permanently mounted to the cab roof. The lightbar configuration shall be per the FORT WORTH FIRE DEPARTMENT's specification.

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 siren control head in the cab console.

### **GTT OPTICOM**

One (1) GTT Opticom emitter light shall be provided inside specified light bar. Opticom may replace specified light(s) in specified light bar. The Opticom shall be activated with light bar and de-activated when the park brake is set and the vehicle is in blocking mode.

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

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

There shall be two (2) Whelen M6 series red linear Super-LED lights (M6RC) provided, one (1) each side. Each light shall have a clear lens and chrome flange.

The lights shall be switched at the siren control head in the cab console.

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

There shall be two (2) Whelen M6 series red linear Super-LED lights (M6RC) provided, one (1) each side. Each light shall have a clear lens and chrome flange.

The lights shall be switched at the siren control head in the cab console.

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### ZONE C - REAR WARNING LIGHTS

There shall be one (1) Whelen M6 series Red linear Super-LED light (M6R) provided in the upper curbside area of the body and one (1) Whelen M6 Blue linear Super-LED light (M6B) provided in the upper streetside portion of the body. Each light shall have a clear lens and chrome flange.

The lights shall be switched at the siren control head in the cab console.

### **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 M7 series Red Linear Super-LED lights (M7RC) provided, one (1) each side. Each light shall have a clear lens and chrome flange.

There shall be two (2) Whelen M7 series Red Linear Super-LED lights (M7BC) provided, one (1) each side. Each light shall have a red lens and chrome flange.

The lights shall be switched at the siren control head in the cab console.

There shall be one (1) Whelen M6 series Red Linear Super-LED light (M6RC) provided in the lower, rear streetside area of the body and one (1) Whelen M6 series Blue Linear Super-LED light (M6BC) provided in the lower, rear curbside body location. Each light shall have a clear lens and chrome flange.

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

There shall be two (2) Whelen M6 series Red Linear Super-LED lights (M6RC) provided, one (1) each side of the front bumper extension. Each light shall have a clear lens and chrome flange.

The lights shall be switched at the siren control head in the cab console.

There shall be two (2) Whelen M4 series Red/Blue split Linear Super-LED lights (M4J) provided, one (1) each side of front bumper. Each light shall have a clear lens and chrome flange.

The lights shall be switched at the siren control head in the cab console.



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

There shall be two (2) Whelen M6 series Red Linear Super-LED lights (M6RC) provided, one (1) each side. Each light shall have a clear lens and chrome flange.

The lights shall be switched at the siren control head in the cab console.

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

There shall be one (1) Whelen M6 series Red Linear Super-LED light (M6RC) provided in the lower, rear streetside area of the body and one (1) Whelen M6 series Blue Linear Super-LED light (M6BC) provided in the lower, rear curbside body location. Each light shall have a clear lens and chrome flange.

The lights shall be switched at the siren control head in the cab console.

### EQUIPMENT PAYLOAD WEIGHT ALLOWANCE

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

### EQUIPMENT

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

- One (1) container of assorted stainless steel nuts, bolts, screws and washers used in the construction of the apparatus shall be provided with the completed apparatus.
- One (1) Alco-Lite AEL-10, 10' aluminum "Fresno" folding ladder(s) shall be provided with the completed unit.
  - The ladder(s) shall be mounted on upper side wall of walkway.
- One (1) Akron Brass 6' rubbish hook model UT-6-D-RH (s) shall be provided with the completed unit.
  - The pike pole(s) shall be mounted on curbside roof area of the body.
- One (1) Streamlight Survivor, LED flashlight(s) shall be provided. Each flashlight shall be orange in color and have a 12 volt DC charger and vehicle mount kit. Each flashlight shall have an LED spotlight style bulbs and reflectors. The flashlight(s) shall be wired to battery direct unless otherwise specified by FORT WORTH FIRE DEPARTMENT.
  - The flashlight(s) shall be mounted in the center console in cab.

### REMAINING NFPA MINOR EQUIPMENT BY PURCHASER

All other minor equipment not specified above, but required by NFPA 1901, section 10.5.1 shall be supplied and mounted by FORT WORTH FIRE DEPARTMENT before the unit is placed in emergency service.