

4.3. SPECIFICATION APPLICATION.

Appendices A through E contain specifications for Class 1 through 5 ARFF vehicles. Specifications are preceded by interactive worksheets designed to allow the user to select options and provide inputs to the specifications based on their requirements. The corresponding specification will be populated automatically based on the item selections and inputs. (Worksheets in Appendix A populate the Class 1, Class 2, and Class 3 specifications.) The document has been aligned to the *performance requirements of NFPA 414* and incorporates the *amended criteria of AC 150/5220-10*. Specifically, all the options that are allowed by the FAA are included. All the options where an airport must justify their requirements are also included. When an option requires justification, text must be provided by the user for the ADO review and approval. It should be noted that this document will serve as the baseline for submission of AIP funded vehicles – thus it is a specification for a commercially available vehicle without extraneous items that an airport may fund on its own. Follow the process in Figure 9 to produce the required specifications.

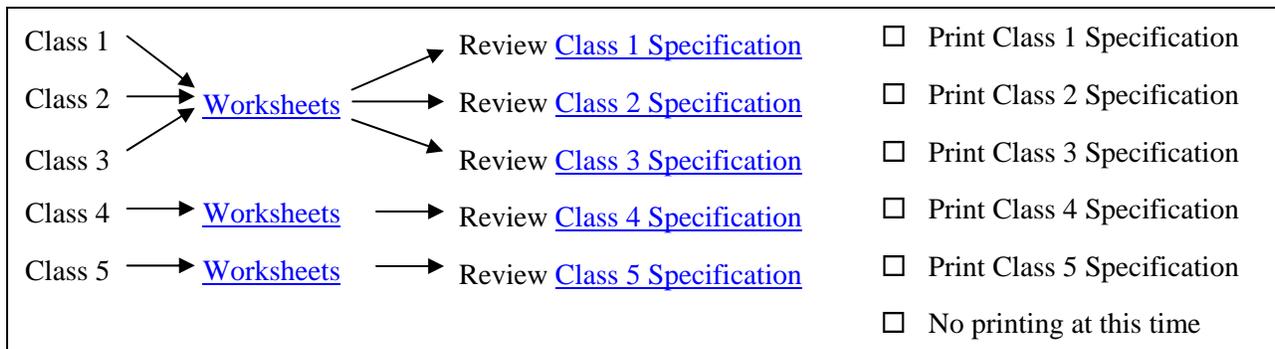


Figure 9. Specification Completion Process

APPENDIX D. CLASS 4 SPECIFICATION

Airport Requirements Worksheet (Class 4)

<i>Check one in each category:</i>	
Airport index	<input type="radio"/> B <input type="radio"/> C <input type="radio"/> D
Complementary system *	<input type="radio"/> without a complementary agent <input type="radio"/> with a complementary 500 pound (lb) Dry Chemical only <input type="radio"/> with a complementary 460 lb Halogenated Agent only <input type="radio"/> with both complementary 500 lb Dry Chemical and 460 lb Halogenated Agent
Temperature range equipment must be capable of operating in	<input type="radio"/> 0° to 110°F <input type="radio"/> -40° to 110°F
Primary vehicle turret type	<input type="radio"/> Roof turret <input type="radio"/> Extendable turret
Bumper turret type	<input type="radio"/> Fixed mount bumper turret <input type="radio"/> Low angle attack bumper turret
Agent system control type	<input type="radio"/> Structural fire fighting panel <input type="radio"/> Cab managed system
Auxiliary generator (kilowatts)	<input type="radio"/> 10 <input type="radio"/> 15 <input type="radio"/> 20

* Depending on item selected, additional options may be available in the next worksheet.

*** Complementary System Options Worksheet (Class 4)**

	Options	Justification Statement (limit 1000 characters)
Dry Chemical Agent-System	<input type="radio"/> 500 lb minimum capacity sodium-based dry chemical <input type="radio"/> 450 lb minimum capacity potassium bicarbonate dry chemical auxiliary	
Dry Chemical Primary-Turret-Discharge-Nozzle	<input type="radio"/> an auxiliary agent discharge mounted parallel to the foam solution discharge <input type="radio"/> a combination dry chemical/AFFF turret of the concentric direct injection type	
Halogenated-Agent-System		

Vehicle Space Requirements Worksheet (Class 4)

Maximum Requirements Inches/cm		Facility Qualifies?	Validation Statement (limit 1000 character)
Length	420/106	<input type="radio"/> YES <input type="radio"/> NO	
Width	122/310	<input type="radio"/> YES <input type="radio"/> NO	
Height	150/381	<input type="radio"/> YES <input type="radio"/> NO	

Standard/Specialized Equipment Requirements Worksheet (Class 4)

Standard Requirements	Specialized Requirements	Is specialized equipment justified?	Justification Statement (limit 1000 characters)
Mirrors	Audio-visual devices (to be substituted for mirrors)	<input type="radio"/> YES <input type="radio"/> NO	
Altitude less than 2,000 feet	Altitude 2,000 feet or more	<input type="radio"/> YES <input type="radio"/> NO	
Engine cooling system	Silicone engine cooling system components	<input type="radio"/> YES <input type="radio"/> NO	
Fuel filters	Heated diesel fuel-water separator	<input type="radio"/> YES <input type="radio"/> NO	
Tires and wheels	Tire bead locks	<input type="radio"/> YES <input type="radio"/> NO	
FLIR	FLIR heads-up display	<input type="radio"/> YES <input type="radio"/> NO	
Seats	Third non-suspension seat	<input type="radio"/> YES <input type="radio"/> NO	
Auxiliary Generator		N/A	

[RETURN TO SPECIFICATION COMPLETION CHART FOR PRINTING.](#)

PURCHASE DESCRIPTION
Class 4
AIRCRAFT RESCUE AND FIRE FIGHTING (ARFF) VEHICLE

1. **SCOPE.** This purchase description (PD) covers a commercially produced diesel engine driven ARFF vehicle for an _____ airport. It includes a 1500 gallon water/Aqueous Film Forming Foam (AFFF) fire suppression system:

The ARFF vehicle is intended to carry rescue and fire fighting equipment for the purpose of rescuing aircraft passengers, preventing aircraft fire loss, and combating fires in aircraft.

2. **CLASSIFICATION.** The ARFF vehicle(s) covered by this PD are classified in accordance with Part 139, *Certification and Operations: Land Airports Serving Certain Air Carriers*, Section 315, *Aircraft Rescue and Firefighting: Index Determination*; Section 317, *Aircraft Rescue and Firefighting: Equipment and Agents*; and Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5220-10, *Guide Specification for Aircraft Rescue and Fire Fighting (ARFF) Vehicles*, 24 September 2007, as follows:

Airport Index	Vehicle Class	Minimum Rated Capacities (gallons/liters)
	4	1500 gallon (5678 liter) water/foam solution

3. **VEHICLE CONFORMANCE/PERFORMANCE CHARACTERISTICS.** The ARFF vehicle will be in accordance with the applicable requirements of National Fire Protection Association (NFPA) 414, *Standard for Aircraft Rescue and Fire Fighting Vehicles* (2007 Edition), and Advisory Circular 150/5220-10.

3.1 **General Administration Requirements.**

3.1.1 **Manuals:** Technical manuals will consist of operator, service, and parts manuals.

3.1.1.1 **Technical manuals.** The overall format for the manuals will be commercial. Each technical manual will have a title page. Line art will be used to the maximum extent possible for illustrations and parts lists. One complete set of engine and transmission parts, service and operator's manuals will be packed with each vehicle.

- a. The contractor may submit digitized technical manuals in lieu of printed paper copies.
- b. The contractor will validate the technical manuals for accuracy prior to submission to the procuring activity for verification. The contractor will submit one complete set of draft manuals to the procuring activity for verification at least 60 days prior to the first production test.
- c. Any changes or corrections noted by the procuring activity will be corrected and updated pages or manuals will be submitted to the procuring activity.
- d. Once approved by the procuring activity the contractor will pack two complete sets of both hard copy and CDs (if applicable) with each vehicle and ship with the vehicle to the final destination.

Appendix D

3.1.1.1.1 Operator's manual. The operator's manual will include all information required for the safe and efficient operation of the vehicle, including fire extinguishing systems, equipment, and any special attachments or auxiliary support equipment. As a minimum, the operator's manual will include the following:

- a. The location and function of all controls and instruments will be illustrated and functionally described.
- b. All safety information that is consistent with the safety standards established by the Occupational Safety and Health Administration (OSHA).
- c. All operational and inspection checks and adjustments in preparation for placing the vehicle into service upon receipt from the manufacturer.
- d. Preparation for shipment to another airport.
- e. Warranty information and the period of the warranty coverage for the complete vehicle and for any component warranty that exceeds the warranty of the complete vehicle. Addresses and telephone numbers will be provided for all warranty providers.
- f. General description and necessary step-by-step instructions for the operation of the vehicle and its fire extinguishing system(s) and auxiliary equipment.
- g. A description of the post-operational procedures (draining, flushing, re-servicing, et cetera).
- h. Daily maintenance inspection checklists that the operator is expected to perform, including basic troubleshooting procedures.
- i. Disabled vehicle towing procedures.
- j. Procedures and equipment required for changing a tire.
- k. Schedules (hours, miles, time periods) for required preventative maintenance and required periodic maintenance.
- l. Line art drawing of the vehicle, including panoramic views (front, rear, left, and right sides) showing basic dimensions and weights (total vehicle and individual axle weight for the unloaded and fully loaded vehicle).

3.1.1.1.2 Service manual. The service manual will identify all special tools and test equipment required to perform servicing, inspection, and testing. The manual will cover troubleshooting and maintenance as well as minor and major repair procedures. The text will contain performance specifications, tolerances, and fluid capacities; current, voltage, and resistance data; test procedures; and illustrations and exploded views as may be required to permit proper maintenance by qualified vehicle mechanics. The manual will contain an alphabetical subject index as well as a table of contents. The service manual will contain at least the following, where applicable:

- a. Fire fighting system schematic(s).
- b. Hydraulic schematic.

- c. Pneumatic schematic.
- d. Electrical schematic.
- e. Winterization schematic.
- f. Fuel schematic.
- g. Schedules for required preventative maintenance and required periodic maintenance.
- h. Lubrication locations, procedures, and intervals for parts of the vehicle and equipment that require lubrication.

3.1.1.1.3 Parts identification manual. The parts manual will include illustrations and exploded views to properly identify all parts, assemblies, subassemblies, and special equipment. All components of assemblies shown in illustrations or exploded views will be identified by reference numbers that correspond to the reference numbers in the parts lists. All purchased parts will be cross-referenced with the original equipment manufacturer's (OEM) name and part number. The parts identification manual will provide the description and quantity of each item used per vehicle. The size, thread dimensions, torque specifications, and special characteristics will be provided for all nonstandard nuts, bolts, screws, washers, grease fittings, and similar items. The manual will contain a numerical index. The parts manual will contain a list of all of the component vendor names, addresses, and telephone numbers referenced in the parts list.

3.1.2 Painting, plating, and corrosion control.

3.1.2.1 Finish. Exterior surfaces will be prepared, primed, and painted with polyurethane paint in accordance with all of the paint manufacturer's instructions and recommendations. Vehicles will be painted and marked iaw AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport*. The interior of all compartments will be painted with an impact resistant, textured coating that resists stains, scuffs, chips, and scratches. All bright metal and anodized parts, such as mirrors, horns, light bezels, tread plates, and roll-up compartment doors, will not be painted.

3.1.2.2 Dissimilar metals. Dissimilar metals, as defined in MIL-STD-889, *Dissimilar Metals*, will not be in contact with each other. Metal plating or metal spraying of dissimilar base metals to provide electromotively compatible abutting surfaces is acceptable. The use of dissimilar metals separated by suitable insulating material is permitted, except in systems where bridging of insulation materials by an electrically conductive fluid can occur.

3.1.2.3 Protection against deterioration. Materials that deteriorate when exposed to sunlight, weather, or operational conditions normally encountered during service will not be used or will have a means of protection against such deterioration that does not prevent compliance with performance requirements. Protective coatings that chip, crack, or scale with age or extremes of climatic conditions or when exposed to heat will not be used.

3.1.2.4 Reflective stripes. An eight (8) inch horizontal reflective stripe will be applied around the vehicle in accordance with AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport*. Offsets in the reflective stripes will be made to maximize the length of reflective surface. Bright metal trim or anodized parts may interrupt the reflective stripes. The pattern will be eight (8) inch wide reflective striping.

3.1.2.5 Lettering. Vehicles will have the letters "insert Airport Name" and, if available, the Airport Insignia, applied in a contrasting color or by decal on both sides of the vehicle in long radius elliptical arches above and below the lettering center line. The size of the lettering will be a minimum of 2½-inches to a maximum of 6-inches.

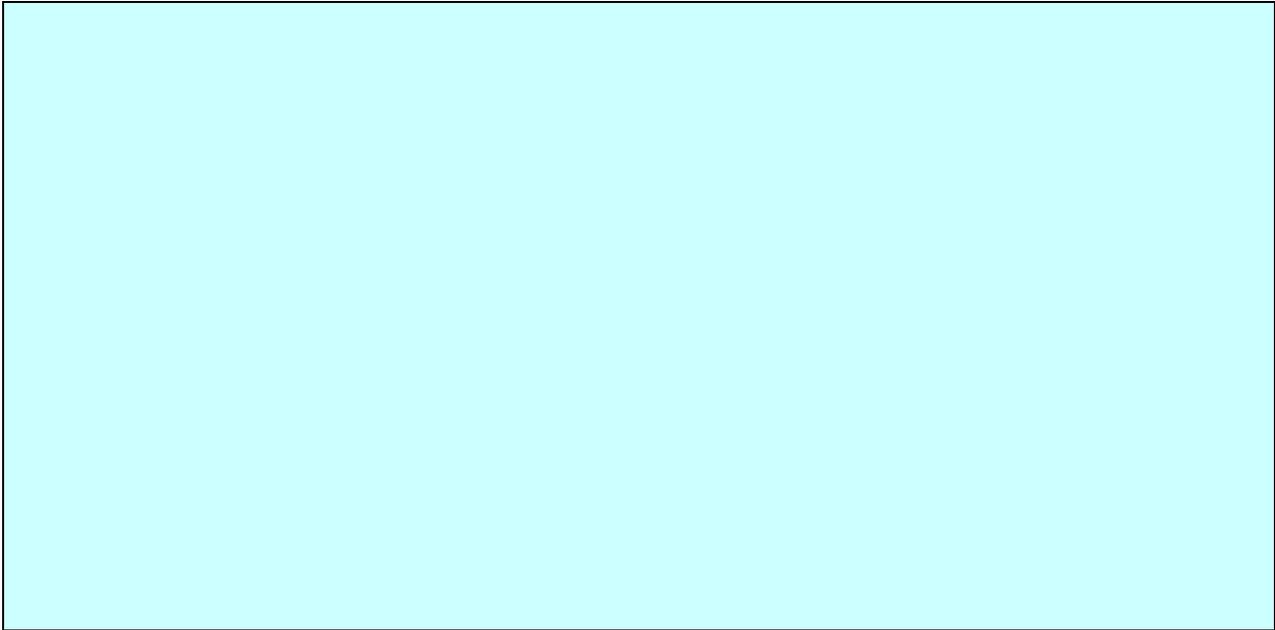
3.1.3 Vehicle identification plate. A permanently marked identification plate will be securely mounted at the driver's compartment. The identification plate will contain the following information:

- a. NOMENCLATURE
- b. MANUFACTURER'S MAKE AND MODEL
- c. MANUFACTURER'S SERIAL NUMBER
- d. STOCK NUMBER (SN)
- e. VEHICLE CURB WEIGHT: kg (pounds)
- f. PAYLOAD, MAXIMUM: kg (pounds)
- g. GROSS VEHICLE WEIGHT (GVW): kg (pounds)
- h. FUEL CAPACITY AND TYPE: gals (gallons)
- i. DATE OF DELIVERY (month and year)
- j. WARRANTY (months and km (miles))
- k. CONTRACT NUMBER
- l. PAINT COLOR AND NUMBER

A second permanently marked information data plate will be securely mounted on the interior of the driver's compartment door. The plate will contain the information required by NFPA 414 Section 1.3.5 Vehicle Information Data Plate. A single plate that combines or contains the information required for both plates is acceptable.

3.1.4 Environmental conditions.

3.1.4.1 Vehicle operation and storage temperature conditions will vary with geographical location. Thus, the locality temperature range can go from -40° to 110°F.



3.1.5 Reduction of potential foreign object damage. All loose metal parts, such as pins, will be securely attached to the vehicle with wire ropes or chains. Removable panels, if provided, will be attached with captive fasteners.

3.1.6 Vehicle Mobility.

3.1.6.1 Operating terrain. The vehicle will be capable to safely operate on paved roads, graded gravel roads, cross country terrain, and sandy soil environments. Cross country terrain will consist of open fields, broken ground, and uneven terrain. An off-road, high-mobility suspension system resulting in no more than 0.5 g rms acceleration at the driver's seat of the vehicle when traversing an 8-inch (20 cm) diameter half round at 35 mph (56 kph) must be provided. The suspension design by which the manufacturer meets the suspension performance requirements is at the manufacturer's discretion.

3.1.6.2 Gradeability. The fully loaded vehicle will be able to ascend any paved slope up to and including 50-percent.

3.1.6.3 Side slope stability. The fully loaded vehicle will be stable on a 30° side slope when tested in accordance with NFPA 414.

3.1.6.4 Cornering stability. The fully loaded vehicle will be stable in accordance with NFPA 414 when tested in accordance with NFPA 414.

3.2 Weights and dimensions.

3.2.1 Overall dimensions. Overall dimensions will be the minimum consistent with the operational performance and the design constraints necessary to achieve the specified performance. Overall dimensions will not exceed:

Vehicle Capacity /Dimensions	1500 Gallon
Length (inches/cm)	420/1067
Width (inches/cm, excluding mirrors)	122/310
Height (inches/cm)	150/381

NOTE: For Airport Operator Validation: Consult AC 150/5210-15, *Aircraft Rescue and Fire Fighting Station Building Design, Appendix A* to ensure vehicles measurements do not exceed existing airport fire station dimensions.

<u>VEHICLE MEASUREMENT VALIDATION</u>
ADO/FAA Approval: ➡ _____

3.2.2 Angles of approach and departure. The fully loaded vehicle will have angles of approach and departure of not less than 30°.

3.2.3 Field of vision. The vehicle will have a field of vision in accordance with NFPA 414.

3.2.3.1 Mirrors. Combination flat and convex outside rearview mirrors will be installed on each side of the cab. The flat mirrors will be of the motorized remote control type, providing not less than 60° horizontal rotational viewing range. The flat mirrors will also have electrically heated heads. Mirror remote and heating controls will be located on the instrument panel within reach of the seated driver. To provide the driver a clear view of the area ahead of the vehicle and to eliminate potential blind spots, a rectangular mirror will be installed on the lower corner of each side of the windshield, but not within the driver's direct line of sight, having a minimum area of 35 square inches. Where justified, audio-visual devices that meet or exceed the field of vision provided by wide-angled mirrors may be substituted for mirrors.

<u>JUSTIFICATION</u>
ADO/FAA Approval: ➡ _____

3.3 Chassis and vehicle components.

3.3.1 Engine. The vehicle will have a turbocharged diesel engine that is certified to comply with the Environmental Protection Agency (EPA) and state laws for off-highway emission requirements at the time of manufacture. The engine and transmission must operate efficiently and without detrimental effect to any drive train components when lubricated with standard, commercially available lubricants per the recommendations of the engine and transmission manufacturers.

3.3.1.1 High idle switch. A high idle switch, which does not increase engine speed more than 25 percent above normal low idle speed and does not exceed the engine manufacturer's recommendation, may be provided to increase alternator, air compressor, or air conditioning compressor output to meet the maximum load requirements. A lighted rocker or toggle switch, accessible from the driver's seated position, will activate the high idle control unit. The high idle switch will operate only when the vehicle is out of gear and the parking brake is engaged. The high idle control unit will automatically disengage if the transmission is placed in gear, the parking brake is released, or the fire pump is engaged. The high idle control unit will not engage automatically; the high idle control unit will only engage when the high idle switch is in the "ON" position.

3.3.1.2 Acceleration. The fully loaded vehicle will accelerate from 0 to 50 miles per hour (mph) on a level paved road within: 25 seconds.

3.3.1.3 Maximum speed. The fully loaded vehicle will attain a minimum top speed of 65 mph on a level, paved road.

3.3.1.4 Pump and roll on a 40-percent grade. The fully loaded vehicle will be capable of pump and roll operations on a paved, dry, 40-percent grade in accordance with NFPA 414.

3.3.1.5 Altitude. Where justified, the vehicle, including the pumping system, will be designed for operation at 2,000 feet above sea level.

<u>JUSTIFICATION</u>
ADO/FAA Approval: ➡ _____

Appendix D

3.3.2 Engine cooling system. The engine cooling system will be in accordance with NFPA 414. A label will be installed near the engine coolant reservoir reading “Engine Coolant Fill.”

Where justified: Silicone radiator and heater hoses, constant-torque clamps, radiator shutters, and coolant filter as permitted by AC 150/5220-10.

<u>JUSTIFICATION</u>
ADO/FAA Approval: ➡ _____

3.3.3 Fuel system. The fuel system will be in accordance with NFPA 414.

3.3.3.1 Fuel priming pump. The vehicle will be equipped with a 12-volt electric fuel pump in addition to the mechanical fuel pump. The electric pump will be used as a priming pump capable of re-priming the engines fuel system.

3.3.3.2 Fuel filters. Primary and secondary fuel filters will be provided. Fuel filter elements will be easily replaceable by a mechanic without loss of engine prime. All AC 150/5220-10 Class 4/5 vehicle engine oil and transmission fluid filters must be the full-flow type with a replaceable the full-flow type spin-on element.

Where justified, a heated diesel fuel-water separator will be provided. The fuel/water separator will include a water coalescer and a drain valve that is readily accessible by an operator or a mechanic, and will be in accordance with SAE J1839. A combination fuel filter and fuel/water separator may be provided.

<u>JUSTIFICATION</u>
ADO/FAA Approval: ➡ _____

3.3.3.3 Fuel tank. The vehicle will have one or two fuel tanks with a minimum usable capacity in accordance with NFPA 414. Each tank will have a fill opening of 3 inches minimum, readily accessible to personnel standing on the ground and designed to prevent fuel splash while refueling. Each tank will be located and mounted so as to provide maximum protection from damage, exhaust heat, and ground fires. If more than one tank is furnished, means will be provided to assure equalized fuel level in both tanks. An overturn fuel valve will be provided for each tank to prevent spillage in the event of a rollover. Each fuel tank must be prominently labeled “Diesel Fuel Only”.

3.3.4 Exhaust system. The exhaust system will be in accordance with NFPA 414. The exhaust system will be constructed of high grade rust resistant materials and protected from damage resulting from travel over rough terrain. The muffler(s) will be constructed of aluminized steel or stainless steel. Exhaust system outlet(s) will be directed upward or to the rear, away from personnel accessing equipment compartments and the engine air intake, and will not be directed toward the ground.

3.3.5 Transmission. A fully automatic transmission with a hydraulic torque converter and at least five forward speeds and reverse will be provided. The normal driving range selector position will provide at least four gear ratios without movement of the selector. The transmission will be in accordance with NFPA 414.

3.3.6 Driveline. The vehicle driveline will be in accordance with NFPA 414. If the driveline is equipped with a differential locking control, a warning/caution label will be placed in view of the driver indicating the proper differential locking/un-locking procedures. The operator’s manual will also include a similar warning/caution. All moving parts requiring routine lubrication must have a means of providing for such lubrication. There must be no pressure lubrication fittings where their normal use would damage grease seals or other parts.

3.3.7 Axle capacity. Each axle will have a rated capacity, as established by the axle manufacturer, in accordance with NFPA 414.

3.3.8 Suspension. The suspension system will be in accordance with NFPA 414 and AC 150/5220-10.

3.3.9 Tires and wheels. Tires and wheels will be in accordance with NFPA 414. The vehicle will be equipped with single tires and wheels at all wheel positions. The vehicle will be equipped with tubeless steel belted radial tires with non-directional on/off-road type tread mounted on disc wheel assemblies. Tire and wheel assemblies will be identical at all positions. Tires and wheels will be certified by the manufacturer for not less than 25 miles of continuous operation at 60 mph at the normal operational inflation pressure. A spare tire and wheel assembly will be provided; however, the spare tire and wheel assembly is not required to be mounted on the vehicle. Tires will be new. Retreads, recaps, or re-grooved tires will not be permitted.

Tire bead locks, where justified, may be installed on all tires and rims.

<u>JUSTIFICATION</u>
ADO/FAA Approval: ➡ _____

3.3.10 Towing connections. The vehicle will be equipped with towing connections in accordance with NFPA 414. The vehicle will be designed for flat towing; the capability to lift and tow the vehicle is not required. The tow connections may intrude into the 30 degree approach angle.

3.3.11 Brake system. The vehicle will be equipped with a multi-channel all-wheel antilock brake system with at least one channel per axle; one channel per wheel is preferred. The brakes will be fully air-

actuated; disc brakes are preferred. Brakes will be in accordance with CFR 49 CFR 393.40 through 393.42(b)), 393.43, and 393.43 through 393.52. The braking system complete with all necessary components will include:

- a. Air compressor having a capacity of not less than 16 standard cubic feet per minute (scfm).
- b. Air storage reservoir(s), each tank equipped with drain (bleed) valves, and with safety and check valves between the compressor and the reservoir tank.
- c. Automatic moisture ejector on each air storage reservoir.
- d. Automatic slack adjusters on cam brakes or internal self-adjusting brakes on wedge brakes on all axles.
- e. Spring set parking brakes.

All components of the braking system will be installed in such a manner as to provide adequate road clearance when traveling over uneven or rough terrain, including objects liable to strike and cause damage to the brake system components. No part of the braking system will extend below the bottom of wheel rims, to ensure, in case of a flat tire, that the weight of the vehicle will be supported by the rim and the flat tire and not be imposed on any component of the braking system. Slack adjusters and air chambers will be located above the bottom edge of the axle carrier.

3.3.11.1 Air dryer. A replaceable cartridge desiccant air dryer will be installed in the air brake system. The dryer will have the capability of removing not less than 95 percent of the moisture in the air being dried. The dryer will have a filter to screen out oil and solid contaminants. The dryer will have an automatic self-cleaning cycle and a thermostatically controlled heater to prevent icing of the purge valve.

3.3.11.2 Compressed air shoreline. A flush mounted, check valved, auto-eject compressed air shoreline connection will be provided to maintain brake system pressure while the vehicle is not running. The shoreline will be flush mounted (not to extend outside the body line), located on the exterior of the vehicle, either on the left side rear corner of the cab, or at the rear of the vehicle. A minimum 50 foot long air supply hose equipped with an appropriate mating shoreline connector and an air fitting will be provided with the vehicle.

3.3.12 Steering. The vehicle will be equipped with power steering.

3.3.12.1 Steering effort. The steering system performance will be in accordance with NFPA 414.

3.3.12.2 Turning diameter. The fully loaded vehicle will have a wall to wall turning diameter of less than three times the overall length of the vehicle in both directions in accordance with NFPA 414.

3.3.13 License plate bracket. A lighted license plate bracket will be provided at the left rear and left front of the vehicle. The location of the left front bracket will be placed so as not to interfere with the operation of fire fighting systems.

3.4 Cab. The vehicle will have a fully enclosed two door cab of all aluminum or all stainless steel construction. Cab door openings will extend for the full vertical height of the side panels. Steps and handrails will be provided for all crew doors, and at least one grab handle will be provided for each crew member, located inside the cab for use while the vehicle is in motion. The lowermost step(s) will be no

more than 20 inches above level ground when the vehicle is fully loaded. A tilt and telescoping steering column will be provided.

3.4.1 Windshield and windows. The windshield and windows will be of tinted safety glass. Each door window will be capable of being opened far enough to facilitate emergency occupant escape in the event of a vehicle accident. If the cab is equipped with power windows, a roof hatch will be provided to facilitate emergency occupant escape in the event of a vehicle accident. If a roof escape hatch is provided, a label reading "Emergency Escape Hatch" will be installed on the cab interior side of the hatch.

3.4.2 Cab interior sound level. The maximum cab interior sound level will be in accordance with NFPA 414.

3.4.3 Instruments and controls. All instruments and controls will be illuminated. Gauges will be provided for oil pressure, coolant temperature, and automatic transmission temperature. In addition to the instruments and controls required by NFPA 414, the following will be provided within convenient reach of the seated driver:

- a. Master warning light control switch,
- b. Work light switch(es), and
- c. Compartment "Door Open" warning light and intermittent alarm that sounds when a compartment door is open and the parking brakes are released or the transmission is in any position other than neutral.

3.4.4 Windshield deluge system. The vehicle will be equipped with a powered windshield deluge system. The deluge system will be supplied from the agent water tank and will have an independent pumping system. The deluge system activation switch will be located within reach of the seated driver and turret operator.

3.4.5 Forward looking infrared. The vehicle will be equipped with a forward looking infrared (FLIR) system in accordance with NFPA 414. The FLIR camera will be identical whether installed on a vehicle equipped with a roof turret or an extendable turret. The FLIR monitor described in NFPA 414 will have a minimum dimension of 10 inches (measured diagonally). The monitor will be so located as to be visible to both the seated driver and turret operator.

Where justified, a FLIR heads-up display located in the cab may be provided.

<u>JUSTIFICATION</u>
ADO/FAA Approval: ➡ _____

Appendix D

3.4.6 Climate control system. The offeror/contractor's standard heater/defroster and air conditioning system will be provided. In 100°F ambient temperature and at maximum compressor speed, the air conditioning system will cool the fully occupied cab to 75°F within 30 minutes. The climate control system will induct at least 60 cubic feet per minute of fresh air into the cab. At least four adjustable panel louvers will be provided, approximately evenly spaced across the width of the cab; each will provide approximately equal flow. Cab mounted components will be protected from inadvertent damage by personnel.

3.4.7 Seats. The driver seat will be adjustable fore and aft and for height. The turret operator’s seat, located to the right front of the cab seat will be a fixed (non-suspension) type. If the vehicle is not equipped with independent suspension, air suspension seats will be provided for the driver and turret operator. The turret operator seat will each be provided with a backrest and a bracket designed to store a self-contained breathing apparatus (SCBA) in accordance with 15.5 of NFPA 1901. Each seat will be provided with a Type 2 seat belt assembly (i.e., 3-point retractable restraint) in accordance with CFR 49 CFR 571.209. Seat belts must be of sufficient length to accommodate crew members in full personal protective equipment (PPE).

Where justified, a third fixed (non-suspension) seat for an additional crew member will be provided, located to the left, and possibly behind the driver.

JUSTIFICATION
ADO/FAA Approval: ➡ _____

3.4.8 Windshield wipers and washer. The vehicle will be equipped with electrically powered windshield wipers. The wiper arms and blades will be of sufficient length to clear the windshield area described by SAE J198. Individual wiper controls will include a minimum of two speed settings and an intermittent setting. The wiper blades will automatically return to a park position, out of the line of vision. The vehicle will be equipped with a powered windshield washer system, including an electric fluid pump, a minimum one gallon fluid container, washer nozzles mounted to the wiper arms (wet arms), and a momentary switch.

3.4.9 Warning signs. Signs that state "Occupants must be seated and wearing a seat belt when apparatus is in motion" will be provided in locations that are visible from each seated position in accordance with NFPA 414."

3.4.10 Lateral accelerometer. The vehicle will be equipped with a lateral accelerometer in accordance with 4.11.8 of NFPA 414.

3.5 Body, compartments, and equipment mounting.

3.5.1 Body. The vehicle will have an all-aluminum or all stainless steel body.

3.5.2 Compartments. The vehicle body will have lighted compartments in accordance with NFPA 414 with a minimum of 10 cubic feet of enclosed storage space.

3.5.2.1 Compartment doors. Storage compartments will have clear anodized aluminum, counterbalanced, non-locking, roll-up doors. Door latch handles will be full-width bar type. Door straps will be provided to assist in closing the compartment doors when the rolled up or hinged door height exceeds six feet above the ground.

3.5.2.2 Scuffplates. Replaceable scuffplates will be provided at each compartment threshold to prevent body damage from sliding equipment in and out of the compartments. The scuffplates will be securely attached to the compartment threshold but will be easily replaceable in the event of damage.

3.5.2.3 Drip rails. Drip rails will be provided over each compartment door. If the drip rails are not integral with the body, they will be of anodized extruded aluminum.

3.5.2.4 Shelves. An adjustable and removable compartment shelf will be provided for every 18 inches of each vertical storage compartment door opening. Shelving adjustments will require no more than common hand tools, and will not require disassembly of fasteners. Shelves will support a minimum of 200 pounds without permanent deformation. Each shelf will be accessible to crew members standing on the ground or using a pull out and tip-down configuration for shelving over 54-inches from the ground. Access to any shelf over 54 inches from the ground will be facilitated by the installation of a pull-out step and a grab rail. Each shelf will have drain holes located so as to allow for drainage of any water from the stowed equipment.

3.5.2.5 Drainage mats. Each compartment floor and shelf will be covered with a removable black mat designed to allow for drainage of any water from the stowed equipment.

3.5.3 SCBA storage tubes. Tubes for storage of four SCBA bottles will be provided, two on each side of the vehicle. The tubes will be in accordance with NFPA 1901 and will be of sufficient size to accommodate the procuring agencies SCBA cylinders.

3.5.4 Ladder, handrails, and walkways. Ladder, stepping, standing, and walking surfaces will be in accordance with NFPA 414. Handrails will be provided in accordance with NFPA 414. The lowermost step(s) or ladder rungs will be less than 20 inches (51 cm) above level ground when the vehicle is fully loaded. The lowermost steps may extend below the angle of approach or departure or ground clearance limits if they are designed to swing clear. The tread of the bottom steps must be at least 8 inches (20 cm) in width and succeeding steps at least 16 inches (40 cm) in width. The full width of all steps must have at least 6 inches (15 cm) of unobstructed toe room or depth when measured from, and perpendicular to, the front edge of the weight-bearing surface of the step.

3.5.5 Ancillary equipment. Ancillary equipment listed in NFPA 414 A.4.2.1 (1)-(17) is not covered by this purchase description in accordance with AC 150/5220-10.

NOTE: Equipment funding will be obtained as a separate contract under the provisions of AC 150/5210-14, *Aircraft Rescue and Fire Fighting Equipment, Tools, and Clothing*.

3.6 Agent system.

3.6.1 Agent (fire) pump. The vehicle will be equipped with a centrifugal pump capable of providing the performance specified herein as prescribed by NFPA 414. The pump will have a bronze body and impeller and a stainless steel shaft.

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3.6.1.1 Agent system piping. All metallic surfaces of the piping and associated components that come into contact with the agent will be of brass, bronze, or passivated stainless steel.

3.6.1.2 Tank to pump connection. A check valve and shutoff valve will be provided in each tank to pump line.

3.6.1.3 Intake connections. The vehicle will be equipped with two valved 4½-inch intake connections, one on each side of the vehicle. The vehicle will be equipped with two valved 2½-inch intake connections, one on each side of the vehicle, adjacent to the 4½-inch intake connections and fitted with either 30° or 45° turn-down fittings. Each 4½-inch intake connection will have male National Hose threads, a quarter-turn control valve, a bleeder valve, a strainer, a cap, and a slow-operating valve and an automatic pressure relief device in accordance with NFPA 1901. Each 2½-inch intake connection will have rocker lug female National Hose threads, a quarter-turn control valve, a bleeder valve, a strainer, and a plug in accordance with NFPA 1901. The vehicle will be capable of filling its water tank by pumping from a draft, a hydrant, or a nurse truck through any of the intake connections without the use of a hose from a discharge connection to a tank fill connection.

3.6.1.4 Discharge connections. Two 2½-inch discharge connections with male National Hose threads will be provided. One 2 ½ - inch discharge will be provided on each side of the vehicle. Each connection will be equipped with a cap, a quarter-turn control valve, a bleeder valve, and a pressure gauge in accordance with NFPA 1901. Each connection will be rated at 250-gpm minimum.

3.6.1.5 Piping, couplings, and valves. The agent system piping will incorporate groove type couplings to the maximum practical extent. All piping sections between agent system components will be readily removable without disturbing the components.

3.6.1.6 Overheat protection. The agent system will be equipped with an overheat protection system in accordance with NFPA 414.

3.6.1.7 Pressure relief valves. The agent system will be equipped with pressure relief valves in accordance with NFPA 414.

3.6.1.8 Drains. The agent system will be equipped with a drainage system in accordance with NFPA 414.

3.6.1.9 Priming pump. The vehicle will be equipped with a priming pump in accordance with NFPA 1901.

3.6.2 Water tank. The vehicle will have a water tank with a manufacturer certified minimum capacity of at least 1500 gallons.

3.6.2.1 Water tank construction. The water tank will be constructed of passivated stainless steel or polypropylene. All materials used will be capable of storing water, foam concentrate, and water/foam solutions.

3.6.2.2 Water tank manhole cover and drain. The water tank will be equipped with an easily removable manhole cover with a minimum opening diameter of 20 inches. The water tank will incorporate a drain and drain valve. The valve will be on the left side of the vehicle and controlled by a crew member standing on the ground. The drain line will be 2-inch internal diameter (I.D.) minimum. The point for discharge for the water tank drain will be below the under vehicle body panels.

3.6.2.3 Water tank overflow system and venting. The water tank will incorporate a venting system to relieve pressure on the tank during fill and discharge operations at maximum flow rates. It will have an overflow system to relieve excess fluid in the event of tank overflow. The vent and overflow system will prevent leakage of water when the tank is filled to capacity and the vehicle is operating on the maximum side slopes and grades specified herein. Drainage from the vent and overflow system will not flow over body panels or other vehicle components and will not be in the track of any of the tires. Tank vent hoses will be of the non-collapsible type.

3.6.2.4 Water tank top fill opening. A top fill opening of not less than 8 inches internal diameter with a readily removable ¼-inch mesh strainer will be provided. The fill opening may be incorporated as part of the manhole cover, and will be sized to accommodate a 2½-inch fill hose.

3.6.2.5 Water tank fill connections. The water tank will incorporate one 4½-inch male National Hose thread connection and one 2½-inch rocker lug female National Hose thread connection on each side of the vehicle. Each connection will be fitted with a 30° turn-down fitting. The water fill will allow external re-supply of the water tank during discharge pumping operations. Each tank fill connection will be in accordance with NFPA 414.

3.6.3 Foam system.

3.6.3.1 Foam concentrate tank. The foam concentrate tank(s) will have a manufacturer certified working capacity sufficient for two tanks of water at the maximum tolerance specified in NFPA 412, *Standard for Evaluating Aircraft Rescue and Fire-Fighting Foam Equipment* for 6-percent foam concentrate (i.e., 7.0-percent).

3.6.3.1.1 Foam tank construction. The foam tank will be constructed of passivated stainless steel or polypropylene. All materials used will be capable of storing foam concentrate.

3.6.3.1.2 Foam tank drain. The foam tank will incorporate a drain and drain valve. The valve will be on the left side of the vehicle and controlled by a crew member standing on the ground. The drain line will have a minimum 1½-inch I.D. The foam tank drain outlet will be located so that the contents of the tank can be drained into 5-gallon cans and 55-gallon drums.

3.6.3.1.3 Foam tank top fill trough. The foam tank will incorporate a top fill trough mounted in the top of the tank readily accessible to at least two crew members on top of the vehicle. The top fill trough will incorporate a cover, latch, and sealed so as to prevent spillage under any operating condition. The top fill trough will be designed to allow two standard 5-gallon foam concentrate containers to be emptied simultaneously. The top fill trough neck will extend sufficiently close to the bottom of the tank to reduce foaming to a minimum during the fill operation. The top fill trough will incorporate readily removable, rigidly constructed 10 mesh stainless steel or brass strainers. All components in and around the top fill trough will be constructed of materials that resist all forms of deterioration that could be caused by the foam concentrate or water.

3.6.3.2 Foam tank fill connections. The foam tank will incorporate a 1½-inch National Hose thread female hose connection on each side of the vehicle to permit filling by an external transfer hose at flow rates up to 75-gpm. The connections will be provided with chained-on long handled plugs or rocker lug plugs. The top of the connections will be no higher than 48 inches above the ground and readily accessible. The fill lines will incorporate check valves and readily removable, rigidly constructed ¼-inch mesh strainers. All components in the foam tank fill system will be constructed of materials that resist all forms of deterioration that could be caused by the foam concentrate or water.

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3.6.3.2.1 Foam tank vent and overflow system. The foam tank will incorporate a vent system to relieve pressure on the tank during fill and discharge operations at maximum flow rates and an overflow system to relieve excess liquid in the event of tank overflow. The vent and overflow system will prevent leakage of foam when the tank is filled to capacity and the vehicle is operating on the maximum side slopes and grades specified herein. Drainage from the vent and overflow system will not flow over body panels or other vehicle components and will not be in front of or behind any of the tires. Tank vent hoses will be of the non-collapsible type.

3.6.3.3 Foam transfer pump. An electric motor driven or pneumatic, self-priming, diaphragm pump will be provided and mounted in a compartment on the vehicle. The pump will be driven from the vehicle electrical or air system. The pump will be capable of transferring and drawing foam liquid concentrate at adjustable flow rates up to 25-gpm directly through the pump and loading connections (see 3.6.3.2). All materials and components that come in contact with the foam will be compatible with the foam concentrate. The pump and its plumbing will have provisions for flushing with water from the water tank. The pump will be removable as an assembly without disturbing other components. A suitable length of hose with appropriate connections will be provided for filling the foam tank from an external foam storage container.

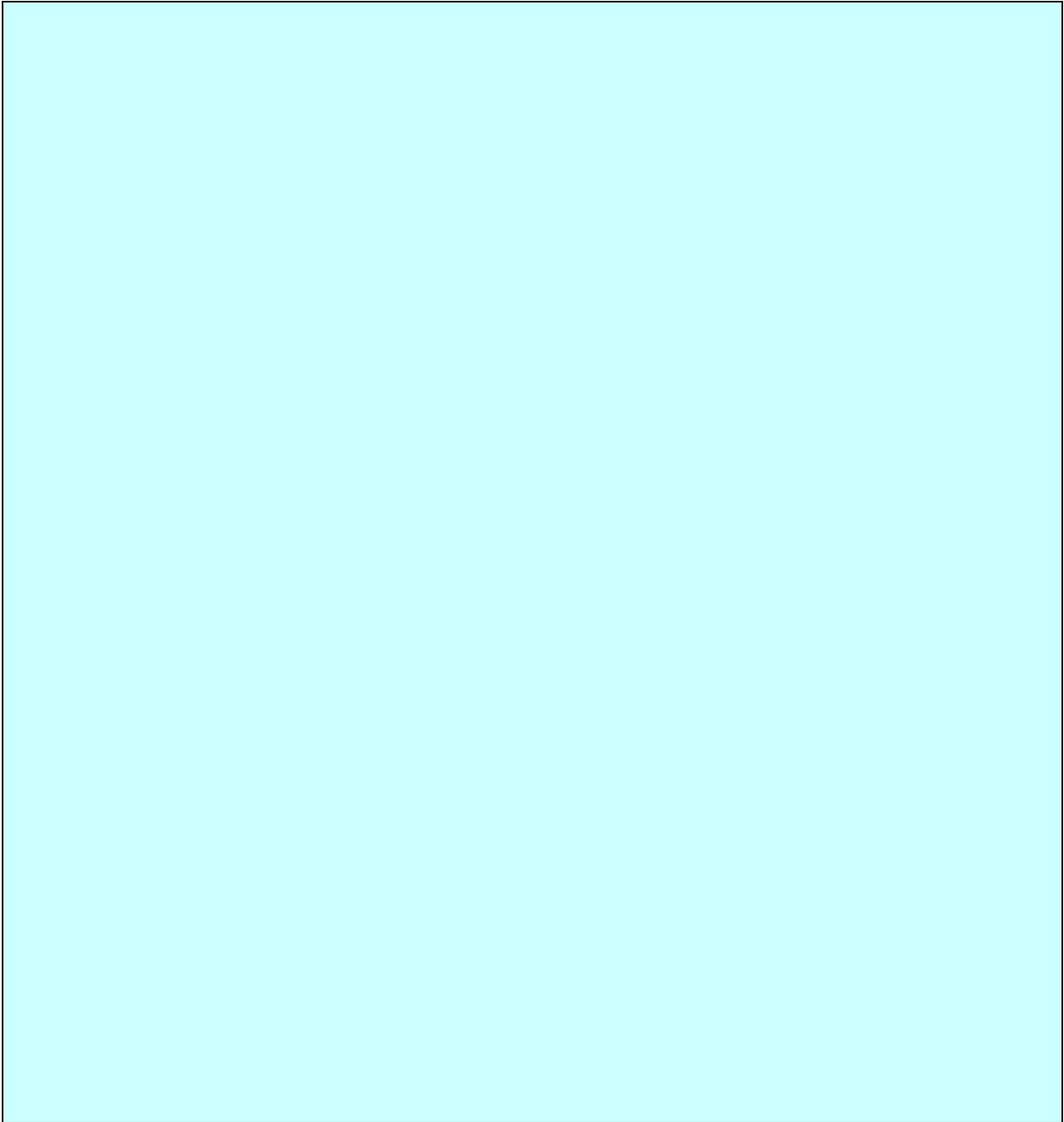
3.6.3.4 Foam flushing system. The foam concentrate system will be designed in accordance with NFPA 414 so that the system can be readily flushed with clear water.

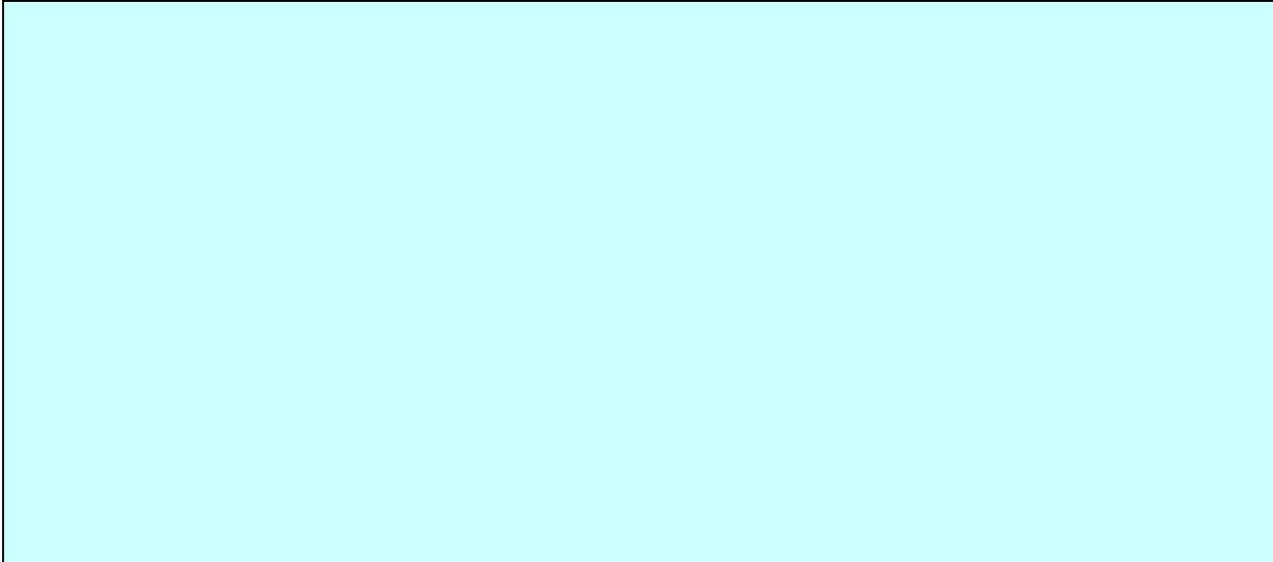
3.6.3.5 Foam concentrate piping. All metallic surfaces of the piping and associated components that come into contact with the foam concentrate will be of brass, bronze, or passivated stainless steel. The foam concentrate piping will be in accordance with NFPA 414.

3.6.4 Foam proportioning system. The vehicle will have an around-the-pump or a direct injection foam proportioning system for Aqueous Film-Forming Foam (AFFF). The system will automatically and uniformly proportion water and 3-percent foam concentrate within a minimum ratio of 2.8-percent to a maximum ratio of 3.5-percent foam concentrate to water by volume. The system will also be capable of proportioning 6-percent foam concentrate (5.6-percent minimum, 7.0-percent maximum). If a fixed orifice plate system is used, a plate will be provided for each percentage foam concentrate; the additional plate will be securely mounted in a protected location on the vehicle. A fire vehicle mechanic will be able to interchange the plates using common hand tools.

straight stream to fully dispersed. The bumper turret will be capable of automatic oscillation, with the range of oscillation fixed at 45° each side of center (left and right) and elevation/depression.

3.6.7 Preconnected handlines. A 200 foot, 1¾-inch pre-connected woven jacket handline, with a 1½-inch control valve and a pistol grip nozzle, will be located on each side of the vehicle. A safety system will be provided to prevent charging of the hose until the hose has been fully deployed. The handlines and nozzles will be in accordance with NFPA 414, and will provide 95-125 gpm at 100 psi nozzle pressure. A control for charging each handline will be provided for operation by both the driver and the turret operator.





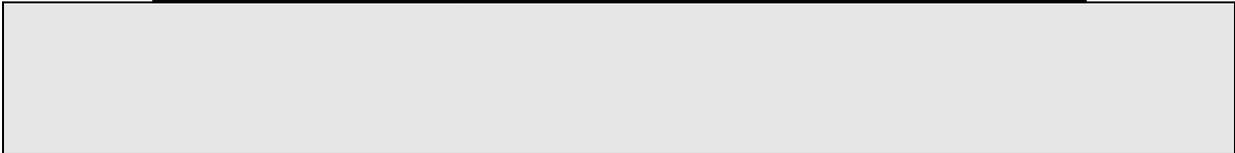
JUSTIFICATION (Dry Chemical Agent)



ADO/FAA Approval: ➡ _____

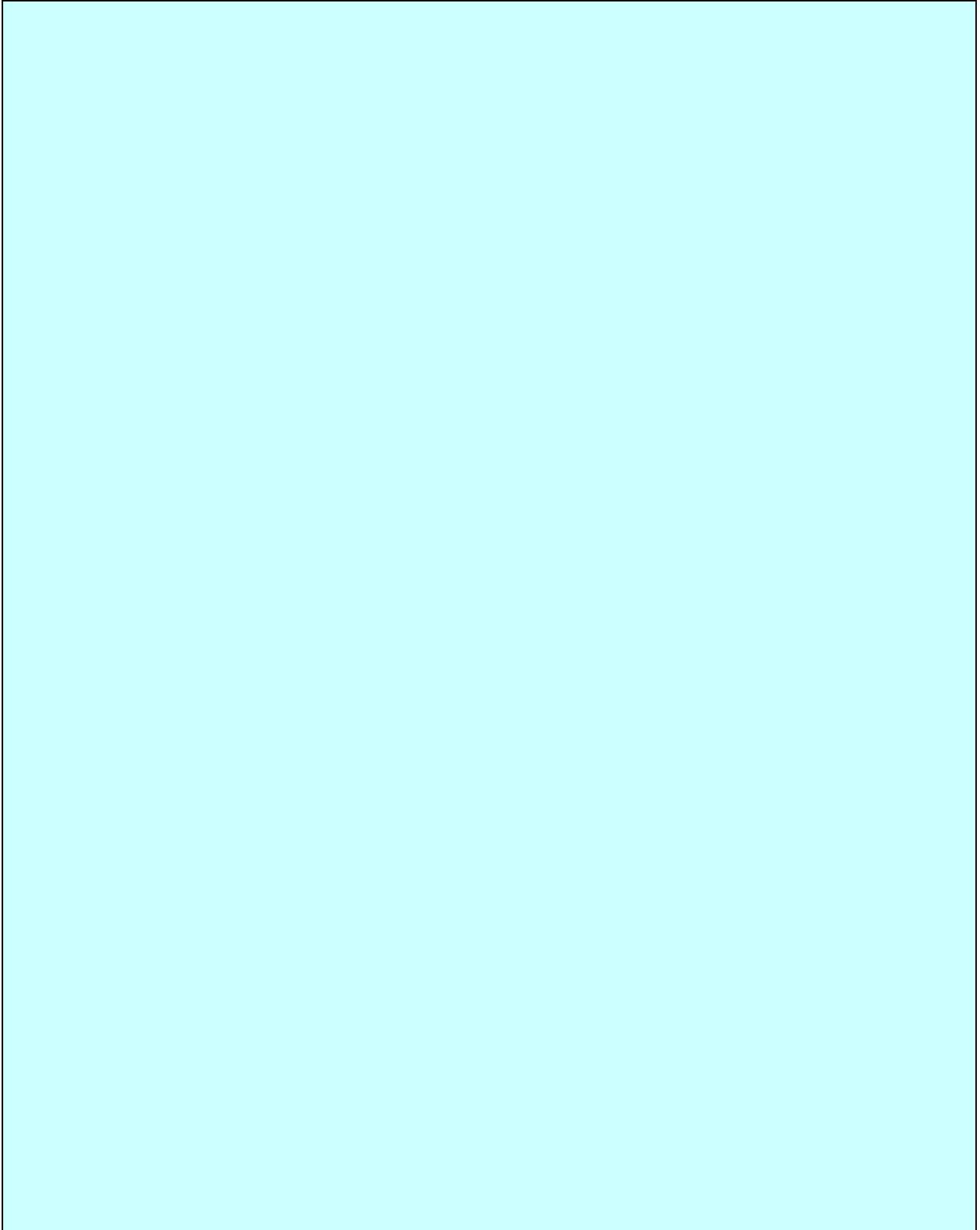


JUSTIFICATION (Dry Chemical Primary Turret Discharge Nozzle)



ADO/FAA Approval: ➡ _____





<u>JUSTIFICATION</u>
ADO/FAA Approval: ➡ _____

3.9 Electrical systems and warning devices. The vehicle will have a 12-volt electrical and starting system.

3.9.1 Alternator. A single or dual alternator charging system in accordance with NFPA 1901 will be provided. The minimum continuous electrical load will include operation of the air conditioning system.

3.9.2 Batteries. Batteries will be of the maintenance-free type; addition of water will not be required during normal service life. The battery cover and vent system will be designed to prevent electrolyte loss during service and to keep the top of the battery free from electrolyte.

3.9.2.1 Battery compartment. The batteries will be enclosed in a weatherproof box or compartment and be readily accessible.

3.9.3 Battery charger or conditioner. The vehicle will have a DC taper type battery charger or an automatic battery conditioner, providing a minimum 12 amp output. The charger/conditioner will be permanently mounted on the vehicle in a properly ventilated, accessible location. The charger/conditioner will be powered from the electrical shoreline receptacle (see 3.9.1). A charging indicator will be installed next to the receptacle. When a battery conditioner is provided, the conditioner will monitor the battery state of charge and, as necessary, automatically charge or maintain the batteries without gassing, depleting fluid level, overheating, or overcharging. A slave receptacle will be provided at the rear of the vehicle.

3.9.4 Electromagnetic interference. The vehicle electrical system will be in accordance with SAE J551-2 for electromagnetic interference.

3.9.5 Work lighting.

3.9.5.1 Telescoping Flood Lights. Two 110-volt, 1,000 watt halogen floodlights will be provided. One light will be mounted on the left and right side of the vehicle on extension tubes. Both lights will be controlled from switches in the cab. The floodlights will be powered by the auxiliary generator.

3.9.5.2 Scene lights. A total of six 110-volt or 12-volt HID high mounted floodlights will be provided to illuminate the work areas around the vehicle: two on each side and two in the front. Each pair of side mounted lights will be controlled by a switch mounted on the side of the vehicle and by a switch mounted on the instrument panel. A switch will also be mounted on the instrument panel to control the lights at the front.

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3.9.6 Audible warning devices.

3.9.6.1 Siren. The vehicle will be equipped with an electronic siren system. The amplifier unit will include volume control and selection of "Radio," "PA," "Manual," "Yelp," "Wail," and "Hi-Lo" (European) modes, and a magnetic noise canceling microphone. The amplifier, microphone, and controls will be within reach of the driver and the turret operator. Siren activating foot switches will be located in front of the driver and the turret operator. The siren speaker will be rated at 100 watts minimum and will be located in a guarded position as low and as far forward on the vehicle as practical.

3.9.6.2 Horn. Dual forward facing air horns will be installed in protected locations near the front of the vehicle. Air horn activating foot switches will be located in front of the driver and the turret operator.

3.9.7 Emergency warning lights. All emergency warning lights will use light emitting diode (LED), strobe, or rotating beacon elements and will meet the requirements of FAA Advisory Circular 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport*, August 2007. Lighting bars will be installed on the top front, sides, and rear of the vehicle. A switch will be provided on the instrument panel to control all of the top, side, front and rear emergency warning lights. A switch will also be provided on the instrument panel to disable all lower emergency warning lights when desired.

3.9.7.1 Emergency warning light color. All emergency warning lights will meet the requirements of AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport*, August 2007.

3.9.7.2 Headlight flashing system. A high beam, alternating/flashing, headlight system will be provided. The headlight flasher will be separately switched from the warning light panel.

3.9.8 Radio circuit. The vehicle will have two separate 30 amp circuits, with breakers and at least 6-foot long wires, routed to a space provided adjacent to the driver and turret operator for purchaser provided radios and other electrical equipment. The wiring will be tagged indicating its purpose. ***Radios are an airport responsibility and not part of this specification.***

3.9.9 Power receptacles.

3.9.9.1 Primary power receptacles. The vehicle will have 2-110-volt power outlets mounted on the exterior of the vehicle. Each outlet will have 2-110-volt female receptacles. One duplex outlet will be located on each side of the vehicle and will be mounted adjacent to the cab entry doors.

3.9.9.2 Auxiliary power receptacles. The vehicle will have 2-12-volt auxiliary power receptacles mounted adjacent to the driver and crew member positions, preferably in the instrument panel.

3.9.9.3 Cable reels. The vehicle will be equipped with an electrical cable reel, located within a compartment. The reel will be equipped with 200 feet of 20 amp, 600 volt, 90°C insulated electrical cable. The electrical cable will be equipped with a rubber ball stop to prevent cable pull through during rewinding operations. A four-way roller guide will be provided on the cable reel to prevent chafing of cable insulation. The cable reel will have an electric rewind motor with provisions for manual rewind in the event of motor failure; the manual rewind handle will be securely stored near the cable reel. A portable weatherproof duplex outlet box, with built-in circuit breakers and twist-lock receptacles, will be provided for on the cable end. The cable reel will be powered by the auxiliary generator.

3.9.10 Auxiliary generator. A minimum kilowatt (KW) (continuous rating), 120/240 volt, 60 hertz, split shaft power takeoff (PTO) driven generator will be provided. The PTO will be activated from the driver's position and will have a monitor light to indicate engagement. The PTO will operate only when

the vehicle is out of gear and the parking brake is engaged; it will automatically disengage if the transmission is placed in gear or the parking brake is released. A governor will regulate engine speed to match the generator output to the connected load. Gauges will monitor the operation of the generator system and indicate the connected load. Access for maintenance will be provided above and below the generator. Individual circuit breaker tripping or failure will not affect operation of other active circuits.

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3.10 Line voltage electrical system.

3.10.1 Electrical shoreline connection. The battery charger/conditioner will be powered from a covered, polarized, insulated, labeled, recessed (flush mounted), male, 110 volt AC auto-eject receptacle. The connection will be located on the exterior of the vehicle at the rear. A weatherproof charge meter will be installed next to the receptacle. A 50 foot long, three wire, 15 amp rated, 110 volt, AC power cable, with straight blade (non twist-lock) connectors, will be provided.

3.11 Air systems.

3.11.1 Air hose reel. An air hose reel will be provided on the right side of the vehicle. The hose reel will be equipped with 200 feet of 3/8-inch I.D. hoseline. A 3/8 inch National Pipe Taper (NPT) fitting and female style quick disconnect will be connected to the end of the hoseline. A four-way roller guide will be provided for the hose reel to prevent hose chafing and kinking. The hoseline will be equipped with a rubber ball stop to prevent hose pull through on roller guides during rewinding operations. The hose reel will have an electric rewind motor and provisions for manual rewind in the event of motor failure; the manual rewind handle will be securely stored near the hose reel. A pressure protected air supply from the chassis air system will be connected to the hose reel. The air supply lines will be routed with minimum bends and located or guarded from damage from the carried equipment.

3.12 Quality of Workmanship. The vehicle, including all parts and accessories, will be fabricated in a thoroughly workmanlike manner. Particular attention will be given to freedom from blemishes, burrs, defects, and sharp edges; accuracy of dimensions, radii of fillets, and marking of parts and assemblies; thoroughness of welding, brazing, soldering, riveting, and painting; alignment of parts; tightness of fasteners; et cetera. The vehicle will be thoroughly cleaned of all foreign matter.

4. REGULATORY REQUIREMENTS.

4.1 Recoverable Materials. The contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with Title 48: Federal Acquisition Regulations System, Part 2823—*Environment, Conservation, Occupational Safety, and Drug-free Workplace*, Subpart 2823.4 *Use of Recovered Material*, 403 *Policy* and 404 *Procedures*.

4.2 Green Procurement Program. Green Procurement Program (GPP) is a mandatory federal acquisition program that focuses on the purchase and use of environmentally preferable products and services. GPP requirements apply to all acquisitions using appropriated funds, including services and new requirements. FAR 23.404(b) applies and states the GPP requires 100% of EPA designated product purchase that are included in the Comprehensive Procurement Guidelines list that contains recovered materials, unless the item cannot be acquired:

- a. competitively within a reasonable timeframe;
- b. meet appropriate performance standards, or
- c. at a reasonable price.

The prime contractor is responsible for ensuring that all subcontractors comply with this requirement.

5. PRODUCT CONFORMANCE PROVISIONS.

5.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. Performance inspection (see 5.2).
- b. Conformance inspection (see 5.3).

5.2 Performance inspection. The vehicle will be subjected to the examinations and tests described in 5.6.3.1 through 5.6.3.5 (if applicable). The contractor will provide or arrange for all test equipment, personnel, schedule, and facilities.

5.3 Conformance inspection. The vehicle will be subjected to the examinations and tests described in 5.6.3.1 through 5.6.3.5 (if applicable). The contractor will provide or arrange for all test equipment, personnel, and facilities.

5.4 Product conformance. The products provided will meet the performance characteristics of this PD, conform to the producer's own drawings, specifications, standards, and quality assurance practices, and be the same product offered for sale in the commercial marketplace. The purchaser reserves the right to require proof of such conformance.

5.5 Technical proposal. The offeror/contractor will provide an itemized technical proposal that describes how the proposed model complies with each characteristic of this PD; a paragraph by paragraph response to the characteristics section of this PD will be provided. The offeror/contractor will provide two copies of their commercial descriptive catalogs with their offer as supporting reference to the itemized technical proposal. The offeror/contractor will identify all modifications made to their commercial model in order to comply with the requirements herein. The vehicle furnished will comply with the "commercial item" definition of FAR 2.101 as of the date of award. The purchaser reserves the

right to require the offeror/contractor to prove that their product complies with the referenced commerciality requirements and each conformance/performance characteristics of this PD.

5.6 Inspection requirements.

5.6.1 General inspection requirements. Apparatus used in conjunction with the inspections specified herein will be laboratory precision type, calibrated at proper intervals to ensure laboratory accuracy.

5.6.2 Test rejection criteria. Throughout all tests specified herein, the vehicle will be closely observed for the following conditions, which will be cause for rejection:

- a. Failure to conform to design or performance requirements specified herein or in the contractor's technical proposal.
- b. Any spillage or leakage of any liquid, including fuel, coolant, lubricant, or hydraulic fluid, under any condition, except as allowed herein.
- c. Structural failure of any component, including permanent deformation, or evidence of impending failure.
- d. Evidence of excessive wear.
- e. Interference between the vehicle components or between the vehicle, the ground, and all required obstacles, with the exception of normal contact by the tires.
- f. Misalignment of components.
- g. Evidence of undesirable roadability characteristics, including instability in handling during cornering, braking, and while traversing all required terrain.
- h. Conditions that present a safety hazard to personnel during operation, servicing, or maintenance.
- i. Overheating of the engine, transmission, or any other vehicle component.
- j. Evidence of corrosion.
- k. Failure of the fire fighting system and sub-systems.

5.6.3 Detailed inspection requirements.

5.6.3.1 Examination of product. Each vehicle will be examined to verify compliance with the requirements herein. Attention will be given to materials, workmanship, dimensions, surface finishes, protective coatings and sealants and their application, welding, fastening, and markings. Proper operation of each vehicle function will be verified. A copy of the vehicle manufacturer's certifications will be provided with each vehicle in accordance with NFPA 414. Each vehicle will be inspected.

5.6.3.1.1 Roadability test. The fully loaded vehicle will be driven over ten miles of paved and ten miles of cross country terrain consisting of open fields, broken ground, and uneven terrain. After completing the driving portion of the roadability test, all loads will be removed and all structure and surfaces will be visibly inspected for failure or permanent deformation.

5.6.3.1.2 Gradeability test. The fully loaded vehicle will be tested in accordance with NFPA 414 to demonstrate compliance with 3.1.6.2.

5.6.3.1.3 Tilt table test. The fully loaded vehicle will be tested in accordance with NFPA 414 to demonstrate compliance with 3.1.6.3. A slip/trip rail with a maximum height of 2-inches may be used. If an adjustable height suspension system is provided, the suspension system may be set to the height normally used on hard pavement.

5.6.3.1.4 Cornering stability test. The fully loaded vehicle will be tested in accordance with NFPA 414 to demonstrate compliance with 3.1.6.4.

5.6.3.1.5 Weight and weight distribution measurement. Each vehicle will be weighed (full and empty) to demonstrate compliance with NFPA 414.

5.6.3.1.6 Dimension measurement. The vehicle will be measured in accordance with NFPA 414. In addition to the dimensions listed in NFPA 414, the overall length, width, and height will be measured to demonstrate compliance with 3.2.1.

5.6.3.1.7 Angles of approach and departure measurement. The angles of approach and departure of the fully loaded vehicle will be measured to demonstrate compliance with 3.2.2.

5.6.3.1.8 Acceleration test. Each vehicle will be tested in accordance with NFPA 414 to demonstrate compliance with 3.3.1.2. A time-distance recorder or GPS based electronic data collection system will be used to record data for this test.

5.6.3.1.9 Maximum speed test. Each vehicle will be tested in accordance with 5.4.4 of NFPA 414 to demonstrate compliance with 3.3.1.3. A time-distance recorder or GPS based electronic data collection system will be used to record data for this test.

5.6.3.1.10 Pump and roll on a 40-percent grade test. The fully loaded vehicle will be tested in accordance with NFPA 414.

5.6.3.1.11 Service brake system test. Each vehicle will be tested in accordance with NFPA 414. A time-distance recorder or GPS based electronic data collection system will be used to record data for this test.

5.6.3.1.12 Air system and air compressor test. Each vehicle will be tested in accordance with NFPA 414.

5.6.3.1.13 Turning diameter test. The fully loaded vehicle will be tested in accordance with NFPA 414 to demonstrate compliance with 3.3.12.2.

5.6.3.1.14 Evasive maneuver test. The fully loaded vehicle will be tested in accordance with NFPA 414 at 35 miles per hour (mph) (56 kilometers per hour (kph) to demonstrate compliance with AC 150/5220-10.

5.6.3.2 Cab interior sound level test. The cab interior sound levels of the vehicle will be measured in accordance with NFPA 414 to demonstrate compliance with 3.4.2.

5.6.3.3 Agent system tests.

5.6.3.3.1 Agent discharge pumping test. Each vehicle will be tested in accordance with NFPA 414.

5.6.3.3.2 Pump and maneuver test. Each vehicle will be tested in accordance with NFPA 414.

5.6.3.3.3 Hydrostatic pressure test. Each vehicle will be tested in accordance with NFPA 414.

5.6.3.3.4 Priming device test. Each vehicle that is equipped with a priming pump will be tested in accordance with NFPA 1901.

5.6.3.3.5 Agent tank capacity test. The vehicle will be tested in accordance with NFPA 414 to demonstrate compliance with the capacity requirements of 3.6.2 and 3.6.3.1.

5.6.3.3.6 Water tank fill and overflow test. The vehicle will be tested in accordance with NFPA 414 to demonstrate compliance with 3.6.2.3.

5.6.3.3.7 Foam concentration test. Each vehicle will be tested in accordance with NFPA 414 at the 3-percent concentration setting to demonstrate compliance with the foam concentration quality requirements of 3.6.4.

5.6.3.3.8 Primary turret flow rate test. The vehicle will be tested in accordance with NFPA 414. Each vehicle will be tested to demonstrate compliance with NFPA 414.

5.6.3.4 Electrical system tests.

5.6.3.4.1 Electrical charging system test. The vehicle will be tested in accordance with NFPA 414 to demonstrate compliance with Annex B.4 of NFPA 414.

5.6.3.4.2 Electromagnetic interference test. The vehicle will be tested in accordance with NFPA 414 and SAE J551 to demonstrate compliance with 3.8.4.

5.6.3.5. Extendable turret. Each vehicle equipped with an extendable turret nozzle will be tested in accordance with NFPA 414 (2007 Edition) and NFPA 1901 (2003 Edition) as specified in AC 150/5220-10.

5.6.3.6 Piercing/penetrating nozzle test. Each vehicle equipped with a piercing/penetrating nozzle will be tested in accordance with NFPA 414.

6. PACKAGING.

6.1 Preservation, packing, and marking will be as specified in the purchase description, contract or delivery order.

6.2 The vehicle must be delivered with full operational quantities of lubricants, brake and hydraulic fluids, and cooling system fluid all of which must be suitable for use in the temperature range expected at the airport.

6.3 The vehicle must be provided with all fire fighting agents and propellants to make it operational upon delivery.

6.4. The vehicle manufacturer must provide initial adjustments to the vehicle for operational readiness and mount any ancillary appliances purchased through the vehicle manufacturer as part of the vehicle.

7. TRAINING.

7.1 Upon delivery of the vehicle to the airport, the manufacturer must, at no additional cost, provide the services of a qualified technician for up to a maximum of 5 consecutive days (or up to 8 days for an extendable turret) for training. This is considered sufficient time for the purchaser to adjust shift work schedules to get maximum employee attendance to training sessions at some point during the training period. During this time sufficient repetitive learning opportunities must be provided by the manufacturer to allow various shifts to complete the training requirements.

7.2 The technician must provide thorough instruction in the use, operation, maintenance and testing of the vehicle. This setup must include operator training for the primary operators, which will give them sufficient knowledge to train other personnel in the functional use of all fire fighting and vehicle operating systems. Prior to leaving the vehicle, the technician should review the maintenance instructions with the purchaser's personnel to acquaint them with maintenance procedures as well as how to obtain support service for the vehicle.

7.3 Training must include written operating instructions that depict the step-by-step operation of the vehicle. Written instructions must include materials that can be used to train subsequent new operators.

8. REFERENCED DOCUMENTS.

8.1 Source of documents.

8.1.1 The CFR may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington DC 20402.

Title 49, Transportation, CFR Part139, *Certification and Operations: Land Airports Serving Certain Air Carriers*

Section 315, *Aircraft Rescue and Firefighting: Index Determination*

Section 317, *Aircraft Rescue and Firefighting: Equipment and Agents*

Title 49: Transportation, 49 CFR, [Part 393—Parts and Accessories Necessary for Safe Operation: Subpart C—Brakes](#)

Sections: 393.40 through 393.42(b)), 393.43, and 393.43 through 393.52

Title 49; Transportation, 49 CFR *Federal Motor Vehicle Safety Standards, Part 209, Seat Belt Assemblies*

8.1.2 SAE documents may be obtained from SAE, Inc., 400 Commonwealth Drive, Warrendale PA 15096.

8.1.3 National Fire Protection Association (NFPA): NFPA documents may be obtained from NFPA, Batterymarch Park, Quincy MA 02269-9101.

NFPA 412, *Standard for Evaluating Aircraft Rescue and Fire-Fighting Foam Equipment* (2009 Edition)

NFPA 414, *Standard for Aircraft Rescue and Fire Fighting Vehicles* (2007 Edition)

NFPA 1901, *Standard for Automotive Fire Apparatus* (2009 Edition)

8.1.4 Federal Aviation Administration (FAA): FAA documents may be obtained from FAA,

FAA Advisory Circular 150/5220-10, *Guide Specification for Aircraft Rescue and Fire Fighting (ARFF) Vehicles*, September 2007

FAA Advisory Circular 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport*, August 2007

APPENDIX E. CLASS 5 SPECIFICATION

Airport Requirements Worksheet (Class 5)

<i>Check one in each category:</i>	
Airport index	<input type="radio"/> B <input type="radio"/> C <input type="radio"/> D
Complementary system *	<input type="radio"/> without a complementary agent <input type="radio"/> with a complementary 500 pound (lb) Dry Chemical only <input type="radio"/> with a complementary 460 lb Halogenated Agent only <input type="radio"/> with both complementary 500 lb Dry Chemical and 460 lb Halogenated Agent
Temperature range equipment must be capable of operating in	<input type="radio"/> 0° to 110°F <input type="radio"/> -40° to 110°F
Primary vehicle turret type	<input type="radio"/> Roof turret <input type="radio"/> Extendable turret
Bumper turret type	<input type="radio"/> Fixed mount bumper turret <input type="radio"/> Low angle attack bumper turret
Agent system control type	<input type="radio"/> Structural fire fighting panel <input type="radio"/> Cab managed system
Auxiliary generator (kilowatts)	<input type="radio"/> 10 <input type="radio"/> 15 <input type="radio"/> 20

* Depending on item selected, additional options may be available in the next worksheet.

*** Complementary System Options Worksheet (Class 5)**

	Options	Justification Statement (limit 1000 characters)
Dry Chemical Agent-System	<input type="radio"/> 500 lb minimum capacity sodium-based dry chemical <input type="radio"/> 450 lb minimum capacity potassium bicarbonate dry chemical auxiliary	
Dry Chemical Primary-Turret-Discharge-Nozzle	<input type="radio"/> an auxiliary agent discharge mounted parallel to the foam solution discharge <input type="radio"/> a combination dry chemical/AFFF turret of the concentric direct injection type	
Halogenated-Agent-System		

Vehicle Space Requirements Worksheet (Class 5)

Maximum Requirements Inches/cm		Facility Qualifies?	Validation Statement (limit 1000 character)
Length	420/106	<input type="radio"/> YES <input type="radio"/> NO	
Width	122/310	<input type="radio"/> YES <input type="radio"/> NO	
Height	150/381	<input type="radio"/> YES <input type="radio"/> NO	

Standard/Specialized Equipment Requirements Worksheet (Class 5)

Standard Requirements	Specialized Requirements	Is specialized equipment justified?	Justification Statement (limit 1000 characters)
Mirrors	Audio-visual devices (to be substituted for mirrors)	<input type="radio"/> YES <input type="radio"/> NO	
Altitude less than 2,000 feet	Altitude 2,000 feet or more	<input type="radio"/> YES <input type="radio"/> NO	
Engine cooling system	Silicone engine cooling system components	<input type="radio"/> YES <input type="radio"/> NO	
Fuel filters	Heated diesel fuel-water separator	<input type="radio"/> YES <input type="radio"/> NO	
Tires and wheels	Tire bead locks	<input type="radio"/> YES <input type="radio"/> NO	
FLIR	FLIR heads-up display	<input type="radio"/> YES <input type="radio"/> NO	
Seats	Third non-suspension seat	<input type="radio"/> YES <input type="radio"/> NO	
Auxiliary Generator		N/A	

[RETURN TO SPECIFICATION COMPLETION CHART FOR PRINTING.](#)

PURCHASE DESCRIPTION
Class 5
AIRCRAFT RESCUE AND FIRE FIGHTING (ARFF) VEHICLE

1. **SCOPE.** This purchase description (PD) covers a commercially produced diesel engine driven ARFF vehicle for an _____ airport. It includes a 3000-4500 gallon water/Aqueous Film Forming Foam (AFFF) fire suppression system:

The ARFF vehicle is intended to carry rescue and fire fighting equipment for the purpose of rescuing aircraft passengers, preventing aircraft fire loss, and combating fires in aircraft.

2. **CLASSIFICATION.** The ARFF vehicle(s) covered by this PD are classified in accordance with Part 139, *Certification and Operations: Land Airports Serving Certain Air Carriers*, Section 315, *Aircraft Rescue and Firefighting: Index Determination*; Section 317, *Aircraft Rescue and Firefighting: Equipment and Agents*; and Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5220-10, *Guide Specification for Aircraft Rescue and Fire Fighting (ARFF) Vehicles*, 24 September 2007, as follows:

Airport Index	Vehicle Class	Minimum Rated Capacities (gallons/liters)
	5	3000 gallon/11,356 liter water/foam solution
	5	3500 gallon/13,249 liter water/foam solution
	5	4000 gallon/15,142 liter water/foam solution
	5	4500 gallon/17,034 liter water/foam solution

3. **VEHICLE CONFORMANCE/PERFORMANCE CHARACTERISTICS.** The ARFF vehicle will be in accordance with the applicable requirements of National Fire Protection Association (NFPA) 414, *Standard for Aircraft Rescue and Fire Fighting Vehicles* (2007 Edition), and Advisory Circular 150/5220-10.

3.1 **General Administration Requirements.**

3.1.1 **Manuals:** Technical manuals will consist of operator, service, and parts manuals.

3.1.1.1 **Technical manuals.** The overall format for the manuals will be commercial. Each technical manual will have a title page. Line art will be used to the maximum extent possible for illustrations and parts lists. One complete set of engine and transmission parts, service and operator's manuals will be packed with each vehicle.

- a. The contractor may submit digitized technical manuals in lieu of printed paper copies.
- b. The contractor will validate the technical manuals for accuracy prior to submission to the procuring activity for verification. The contractor will submit one complete set of draft manuals to the procuring activity for verification at least 60 days prior to the first production test.
- c. Any changes or corrections noted by the procuring activity will be corrected and updated pages or manuals will be submitted to the procuring activity.

- d. Once approved by the procuring activity the contractor will pack two complete sets of both hard copy and CDs (if applicable) with each vehicle and ship with the vehicle to the final destination.

3.1.1.1.1 Operator's manual. The operator's manual will include all information required for the safe and efficient operation of the vehicle, including fire extinguishing systems, equipment, and any special attachments or auxiliary support equipment. As a minimum, the operator's manual will include the following:

- a. The location and function of all controls and instruments will be illustrated and functionally described.
- b. All safety information that is consistent with the safety standards established by the Occupational Safety and Health Administration (OSHA).
- c. All operational and inspection checks and adjustments in preparation for placing the vehicle into service upon receipt from the manufacturer.
- d. Preparation for shipment to another airport.
- e. Warranty information and the period of the warranty coverage for the complete vehicle and for any component warranty that exceeds the warranty of the complete vehicle. Addresses and telephone numbers will be provided for all warranty providers.
- f. General description and necessary step-by-step instructions for the operation of the vehicle and its fire extinguishing system(s) and auxiliary equipment.
- g. A description of the post-operational procedures (draining, flushing, re-servicing, et cetera).
- h. Daily maintenance inspection checklists that the operator is expected to perform, including basic troubleshooting procedures.
- i. Disabled vehicle towing procedures.
- j. Procedures and equipment required for changing a tire.
- k. Schedules (hours, miles, time periods) for required preventative maintenance and required periodic maintenance.
- l. Line art drawing of the vehicle, including panoramic views (front, rear, left, and right sides) showing basic dimensions and weights (total vehicle and individual axle weight for the unloaded and fully loaded vehicle).

3.1.1.1.2 Service manual. The service manual will identify all special tools and test equipment required to perform servicing, inspection, and testing. The manual will cover troubleshooting and maintenance as well as minor and major repair procedures. The text will contain performance specifications, tolerances, and fluid capacities; current, voltage, and resistance data; test procedures; and illustrations and exploded views as may be required to permit proper maintenance by qualified vehicle mechanics. The manual will contain an alphabetical subject index as well as a table of contents. The service manual will contain at least the following, where applicable:

- a. Fire fighting system schematic(s).
- b. Hydraulic schematic.
- c. Pneumatic schematic.
- d. Electrical schematic.
- e. Winterization schematic.
- f. Fuel schematic.
- g. Schedules for required preventative maintenance and required periodic maintenance.
- h. Lubrication locations, procedures, and intervals for parts of the vehicle and equipment that require lubrication.

3.1.1.1.3 Parts identification manual. The parts manual will include illustrations and exploded views to properly identify all parts, assemblies, subassemblies, and special equipment. All components of assemblies shown in illustrations or exploded views will be identified by reference numbers that correspond to the reference numbers in the parts lists. All purchased parts will be cross-referenced with the original equipment manufacturer's (OEM) name and part number. The parts identification manual will provide the description and quantity of each item used per vehicle. The size, thread dimensions, torque specifications, and special characteristics will be provided for all nonstandard nuts, bolts, screws, washers, grease fittings, and similar items. The manual will contain a numerical index. The parts manual will contain a list of all of the component vendor names, addresses, and telephone numbers referenced in the parts list.

3.1.2 Painting, plating, and corrosion control.

3.1.2.1 Finish. Exterior surfaces will be prepared, primed, and painted with polyurethane paint in accordance with all of the paint manufacturer's instructions and recommendations. Vehicles will be painted and marked iaw AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport*. The interior of all compartments will be painted with an impact resistant, textured coating that resists stains, scuffs, chips, and scratches. All bright metal and anodized parts, such as mirrors, horns, light bezels, tread plates, and roll-up compartment doors, will not be painted.

3.1.2.2 Dissimilar metals. Dissimilar metals, as defined in MIL-STD-889, *Dissimilar Metals*, will not be in contact with each other. Metal plating or metal spraying of dissimilar base metals to provide electromotively compatible abutting surfaces is acceptable. The use of dissimilar metals separated by suitable insulating material is permitted, except in systems where bridging of insulation materials by an electrically conductive fluid can occur.

3.1.2.3 Protection against deterioration. Materials that deteriorate when exposed to sunlight, weather, or operational conditions normally encountered during service will not be used or will have a means of protection against such deterioration that does not prevent compliance with performance requirements. Protective coatings that chip, crack, or scale with age or extremes of climatic conditions or when exposed to heat will not be used.

3.1.2.4 Reflective stripes. An eight (8) inch horizontal reflective stripe will be applied around the vehicle in accordance with AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport*.

Offsets in the reflective stripes will be made to maximize the length of reflective surface. Bright metal trim or anodized parts may interrupt the reflective stripes. The pattern will be eight (8) inch wide reflective striping.

3.1.2.5 Lettering. Vehicles will have the letters "insert Airport Name" and, if available, the Airport Insignia, applied in a contrasting color or by decal on both sides of the vehicle in long radius elliptical arches above and below the lettering center line. The size of the lettering will be a minimum of 2½-inches to a maximum of 6-inches.

3.1.3 Vehicle identification plate. A permanently marked identification plate will be securely mounted at the driver's compartment. The identification plate will contain the following information:

- a. NOMENCLATURE
- b. MANUFACTURER'S MAKE AND MODEL
- c. MANUFACTURER'S SERIAL NUMBER
- d. STOCK NUMBER (SN)
- e. VEHICLE CURB WEIGHT: kg (pounds)
- f. PAYLOAD, MAXIMUM: kg (pounds)
- g. GROSS VEHICLE WEIGHT (GVW): kg (pounds)
- h. FUEL CAPACITY AND TYPE: gals (gallons)
- i. DATE OF DELIVERY (month and year)
- j. WARRANTY (months and km (miles))
- k. CONTRACT NUMBER
- l. PAINT COLOR AND NUMBER

A second permanently marked information data plate will be securely mounted on the interior of the driver's compartment door. The plate will contain the information required by NFPA 414 Section 1.3.5 Vehicle Information Data Plate. A single plate that combines or contains the information required for both plates is acceptable.

3.1.4 Environmental conditions.

3.1.4.1 Vehicle operation and storage temperature conditions will vary with geographical location. Thus, the locality temperature range can go from -40° to 110°F.



3.1.5 Reduction of potential foreign object damage. All loose metal parts, such as pins, will be securely attached to the vehicle with wire ropes or chains. Removable panels, if provided, will be attached with captive fasteners.

3.1.6 Vehicle Mobility.

3.1.6.1 Operating terrain. The vehicle will be capable to safely operate on paved roads, graded gravel roads, cross country terrain, and sandy soil environments. Cross country terrain will consist of open fields, broken ground, and uneven terrain. An off-road, high-mobility suspension system resulting in no more than 0.5 g rms acceleration at the driver's seat of the vehicle when traversing an 8-inch (20 cm) diameter half round at 35 mph (56 kph) must be provided. The suspension design by which the manufacturer meets the suspension performance requirements is at the manufacturer's discretion.

3.1.6.2 Gradeability. The fully loaded vehicle will be able to ascend any paved slope up to and including 50-percent.

3.1.6.3 Side slope stability. The fully loaded vehicle will be stable on a 30° side slope when tested in accordance with NFPA 414.

3.1.6.4 Cornering stability. The fully loaded vehicle will be stable in accordance with NFPA 414 when tested in accordance with NFPA 414.

3.2 Weights and dimensions.

3.2.1 Overall dimensions. Overall dimensions will be the minimum consistent with the operational performance and the design constraints necessary to achieve the specified performance. Overall dimensions will not exceed:

Vehicle Capacity /Dimensions	3000 Gallon
Length (inches/cm)	480/1220
Width (inches/cm, excluding mirrors)	122/310
Height (inches/cm)	150/381

NOTE: For Airport Operator Validation: Consult AC 150/5210-15, *Aircraft Rescue and Fire Fighting Station Building Design, Appendix A* to ensure vehicles measurements do not exceed existing airport fire station dimensions.

<u>VEHICLE MEASUREMENT VALIDATION</u>
ADO/FAA Approval: ➡ _____

3.2.2 Angles of approach and departure. The fully loaded vehicle will have angles of approach and departure of not less than 30°.

3.2.3 Field of vision. The vehicle will have a field of vision in accordance with NFPA 414.

3.2.3.1 Mirrors. Combination flat and convex outside rearview mirrors will be installed on each side of the cab. The flat mirrors will be of the motorized remote control type, providing not less than 60° horizontal rotational viewing range. The flat mirrors will also have electrically heated heads. Mirror remote and heating controls will be located on the instrument panel within reach of the seated driver. To provide the driver a clear view of the area ahead of the vehicle and to eliminate potential blind spots, a rectangular mirror will be installed on the lower corner of each side of the windshield, but not within the driver's direct line of sight, having a minimum area of 35 square inches. Where justified, audio-visual devices that meet or exceed the field of vision provided by wide-angled mirrors may be substituted for mirrors.

JUSTIFICATION
ADO/FAA Approval: ➡ _____

3.3 Chassis and vehicle components.

3.3.1 Engine. The vehicle will have a turbocharged diesel engine that is certified to comply with the Environmental Protection Agency (EPA) and state laws for off-highway emission requirements at the time of manufacture. The engine and transmission must operate efficiently and without detrimental effect to any drive train components when lubricated with standard, commercially available lubricants per the recommendations of the engine and transmission manufacturers.

3.3.1.1 High idle switch. A high idle switch, which does not increase engine speed more than 25 percent above normal low idle speed and does not exceed the engine manufacturer's recommendation, may be provided to increase alternator, air compressor, or air conditioning compressor output to meet the maximum load requirements. A lighted rocker or toggle switch, accessible from the driver's seated position, will activate the high idle control unit. The high idle switch will operate only when the vehicle is out of gear and the parking brake is engaged. The high idle control unit will automatically disengage if the transmission is placed in gear, the parking brake is released, or the fire pump is engaged. The high idle control unit will not engage automatically; the high idle control unit will only engage when the high idle switch is in the "ON" position.

3.3.1.2 Acceleration. The fully loaded vehicle will accelerate from 0 to 50 miles per hour (mph) on a level paved road within: 35 seconds.

3.3.1.3 Maximum speed. The fully loaded vehicle will attain a minimum top speed of 65 mph on a level, paved road.

3.3.1.4 Pump and roll on a 40-percent grade. The fully loaded vehicle will be capable of pump and roll operations on a paved, dry, 40-percent grade in accordance with NFPA 414.

3.3.1.5 Altitude. Where justified, the vehicle, including the pumping system, will be designed for operation at 2,000 feet above sea level.

JUSTIFICATION
ADO/FAA Approval: ➡ _____

3.3.2 Engine cooling system. The engine cooling system will be in accordance with NFPA 414. A label will be installed near the engine coolant reservoir reading “Engine Coolant Fill.”

Where justified: Silicone radiator and heater hoses, constant-torque clamps, radiator shutters, and coolant filter as permitted by AC 150/5220-10.

<u>JUSTIFICATION</u>
ADO/FAA Approval: ➡ _____

3.3.3 Fuel system. The fuel system will be in accordance with NFPA 414.

3.3.3.1 Fuel priming pump. The vehicle will be equipped with a 12-volt electric fuel pump in addition to the mechanical fuel pump. The electric pump will be used as a priming pump capable of re-priming the engines fuel system.

3.3.3.2 Fuel filters. Primary and secondary fuel filters will be provided. Fuel filter elements will be easily replaceable by a mechanic without loss of engine prime. All AC 150/5220-10 Class 4/5 vehicle engine oil and transmission fluid filters must be the full-flow type with a replaceable the full-flow type spin-on element.

Where justified, a heated diesel fuel-water separator will be provided. The fuel/water separator will include a water coalescer and a drain valve that is readily accessible by an operator or a mechanic, and will be in accordance with SAE J1839. A combination fuel filter and fuel/water separator may be provided.

<u>JUSTIFICATION</u>
ADO/FAA Approval: ➡ _____

3.3.3.3 Fuel tank. The vehicle will have one or two fuel tanks with a minimum usable capacity in accordance with NFPA 414. Each tank will have a fill opening of 3 inches minimum, readily accessible to personnel standing on the ground and designed to prevent fuel splash while refueling. Each tank will be located and mounted so as to provide maximum protection from damage, exhaust heat, and ground fires. If more than one tank is furnished, means will be provided to assure equalized fuel level in both tanks. An overturn fuel valve will be provided for each tank to prevent spillage in the event of a rollover. Each fuel tank must be prominently labeled “Diesel Fuel Only”.

3.3.4 Exhaust system. The exhaust system will be in accordance with NFPA 414. The exhaust system will be constructed of high grade rust resistant materials and protected from damage resulting from travel over rough terrain. The muffler(s) will be constructed of aluminized steel or stainless steel. Exhaust system outlet(s) will be directed upward or to the rear, away from personnel accessing equipment compartments and the engine air intake, and will not be directed toward the ground.

3.3.5 Transmission. A fully automatic transmission with a hydraulic torque converter and at least five forward speeds and reverse will be provided. The normal driving range selector position will provide at least four gear ratios without movement of the selector. The transmission will be in accordance with NFPA 414.

3.3.6 Driveline. The vehicle driveline will be in accordance with NFPA 414. If the driveline is equipped with a differential locking control, a warning/caution label will be placed in view of the driver indicating the proper differential locking/un-locking procedures. The operator's manual will also include a similar warning/caution. All moving parts requiring routine lubrication must have a means of providing for such lubrication. There must be no pressure lubrication fittings where their normal use would damage grease seals or other parts.

3.3.7 Axle capacity. Each axle will have a rated capacity, as established by the axle manufacturer, in accordance with NFPA 414.

3.3.8 Suspension. The suspension system will be in accordance with NFPA 414 and AC 150/5220-10.

3.3.9 Tires and wheels. Tires and wheels will be in accordance with NFPA 414. The vehicle will be equipped with single tires and wheels at all wheel positions. The vehicle will be equipped with tubeless steel belted radial tires with non-directional on/off-road type tread mounted on disc wheel assemblies. Tire and wheel assemblies will be identical at all positions. Tires and wheels will be certified by the manufacturer for not less than 25 miles of continuous operation at 60 mph at the normal operational inflation pressure. A spare tire and wheel assembly will be provided; however, the spare tire and wheel assembly is not required to be mounted on the vehicle. Tires will be new. Retreads, recaps, or re-grooved tires will not be permitted.

Tire bead locks, where justified, may be installed on all tires and rims.

<u>JUSTIFICATION</u>
ADO/FAA Approval: ➡ _____

3.3.10 Towing connections. The vehicle will be equipped with towing connections in accordance with NFPA 414. The vehicle will be designed for flat towing; the capability to lift and tow the vehicle is not required. The tow connections may intrude into the 30 degree approach angle.

3.3.11 Brake system. The vehicle will be equipped with a multi-channel all-wheel antilock brake system with at least one channel per axle; one channel per wheel is preferred. The brakes will be fully air-

actuated; disc brakes are preferred. Brakes will be in accordance with CFR 49 CFR 393.40 through 393.42(b)), 393.43, and 393.43 through 393.52. The braking system complete with all necessary components will include:

- f. Air compressor having a capacity of not less than 16 standard cubic feet per minute (scfm).
- g. Air storage reservoir(s), each tank equipped with drain (bleed) valves, and with safety and check valves between the compressor and the reservoir tank.
- h. Automatic moisture ejector on each air storage reservoir.
- i. Automatic slack adjusters on cam brakes or internal self-adjusting brakes on wedge brakes on all axles.
- j. Spring set parking brakes.

All components of the braking system will be installed in such a manner as to provide adequate road clearance when traveling over uneven or rough terrain, including objects liable to strike and cause damage to the brake system components. No part of the braking system will extend below the bottom of wheel rims, to ensure, in case of a flat tire, that the weight of the vehicle will be supported by the rim and the flat tire and not be imposed on any component of the braking system. Slack adjusters and air chambers will be located above the bottom edge of the axle carrier.

3.3.11.1 Air dryer. A replaceable cartridge desiccant air dryer will be installed in the air brake system. The dryer will have the capability of removing not less than 95 percent of the moisture in the air being dried. The dryer will have a filter to screen out oil and solid contaminants. The dryer will have an automatic self-cleaning cycle and a thermostatically controlled heater to prevent icing of the purge valve.

3.3.11.2 Compressed air shoreline. A flush mounted, check valved, auto-eject compressed air shoreline connection will be provided to maintain brake system pressure while the vehicle is not running. The shoreline will be flush mounted (not to extend outside the body line), located on the exterior of the vehicle, either on the left side rear corner of the cab, or at the rear of the vehicle. A minimum 50 foot long air supply hose equipped with an appropriate mating shoreline connector and an air fitting will be provided with the vehicle.

3.3.12 Steering. The vehicle will be equipped with power steering.

3.3.12.1 Steering effort. The steering system performance will be in accordance with NFPA 414.

3.3.12.2 Turning diameter. The fully loaded vehicle will have a wall to wall turning diameter of less than three times the overall length of the vehicle in both directions in accordance with NFPA 414.

3.3.13 License plate bracket. A lighted license plate bracket will be provided at the left rear and left front of the vehicle. The location of the left front bracket will be placed so as not to interfere with the operation of fire fighting systems.

3.4 Cab. The vehicle will have a fully enclosed two door cab of all aluminum or all stainless steel construction. Cab door openings will extend for the full vertical height of the side panels. Steps and handrails will be provided for all crew doors, and at least one grab handle will be provided for each crew member, located inside the cab for use while the vehicle is in motion. The lowermost step(s) will be no

more than 20 inches above level ground when the vehicle is fully loaded. A tilt and telescoping steering column will be provided.

3.4.1 Windshield and windows. The windshield and windows will be of tinted safety glass. Each door window will be capable of being opened far enough to facilitate emergency occupant escape in the event of a vehicle accident. If the cab is equipped with power windows, a roof hatch will be provided to facilitate emergency occupant escape in the event of a vehicle accident. If a roof escape hatch is provided, a label reading "Emergency Escape Hatch" will be installed on the cab interior side of the hatch.

3.4.2 Cab interior sound level. The maximum cab interior sound level will be in accordance with NFPA 414.

3.4.3 Instruments and controls. All instruments and controls will be illuminated. Gauges will be provided for oil pressure, coolant temperature, and automatic transmission temperature. In addition to the instruments and controls required by NFPA 414, the following will be provided within convenient reach of the seated driver:

- d. Master warning light control switch,
- e. Work light switch(es), and
- f. Compartment "Door Open" warning light and intermittent alarm that sounds when a compartment door is open and the parking brakes are released or the transmission is in any position other than neutral.

3.4.4 Windshield deluge system. The vehicle will be equipped with a powered windshield deluge system. The deluge system will be supplied from the agent water tank and will have an independent pumping system. The deluge system activation switch will be located within reach of the seated driver and turret operator.

3.4.5 Forward looking infrared. The vehicle will be equipped with a forward looking infrared (FLIR) system in accordance with NFPA 414. The FLIR camera will be identical whether installed on a vehicle equipped with a roof turret or an extendable turret. The FLIR monitor described in NFPA 414 will have a minimum dimension of 10 inches (measured diagonally). The monitor will be so located as to be visible to both the seated driver and turret operator.

Where justified, a FLIR heads-up display located in the cab may be provided.

<u>JUSTIFICATION</u>
ADO/FAA Approval: ➡ _____

3.4.6 Climate control system. The offeror/contractor's standard heater/defroster and air conditioning system will be provided. In 100°F ambient temperature and at maximum compressor speed, the air conditioning system will cool the fully occupied cab to 75°F within 30 minutes. The climate control system will induct at least 60 cubic feet per minute of fresh air into the cab. At least four adjustable panel louvers will be provided, approximately evenly spaced across the width of the cab; each will provide approximately equal flow. Cab mounted components will be protected from inadvertent damage by personnel.

3.4.7 Seats. The driver seat will be adjustable fore and aft and for height. The turret operator's seat, located to the right front of the cab seat will be a fixed (non-suspension) type. If the vehicle is not equipped with independent suspension, air suspension seats will be provided for the driver and turret operator. The turret operator seat will each be provided with a backrest and a bracket designed to store a self-contained breathing apparatus (SCBA) in accordance with 15.5 of NFPA 1901. Each seat will be provided with a Type 2 seat belt assembly (i.e., 3-point retractable restraint) in accordance with CFR 49 CFR 571.209. Seat belts must be of sufficient length to accommodate crew members in full personal protective equipment (PPE).

Where justified, a third fixed (non-suspension) seat for an additional crew member will be provided, located to the left, and possibly behind the driver.

JUSTIFICATION
ADO/FAA Approval: ➡ _____

3.4.8 Windshield wipers and washer. The vehicle will be equipped with electrically powered windshield wipers. The wiper arms and blades will be of sufficient length to clear the windshield area described by SAE J198. Individual wiper controls will include a minimum of two speed settings and an intermittent setting. The wiper blades will automatically return to a park position, out of the line of vision. The vehicle will be equipped with a powered windshield washer system, including an electric fluid pump, a minimum one gallon fluid container, washer nozzles mounted to the wiper arms (wet arms), and a momentary switch.

3.4.9 Warning signs. Signs that state "Occupants must be seated and wearing a seat belt when apparatus is in motion" will be provided in locations that are visible from each seated position in accordance with NFPA 414."

3.4.10 Lateral accelerometer. The vehicle will be equipped with a lateral accelerometer in accordance with 4.11.8 of NFPA 414.

3.5 Body, compartments, and equipment mounting.

3.5.1 Body. The vehicle will have an all-aluminum or all stainless steel body.

3.5.2 Compartments. The vehicle body will have lighted compartments in accordance with NFPA 414 with a minimum of 10 cubic feet of enclosed storage space.

3.5.2.1 Compartment doors. Storage compartments will have clear anodized aluminum, counterbalanced, non-locking, roll-up doors. Door latch handles will be full-width bar type. Door straps will be provided to assist in closing the compartment doors when the rolled up or hinged door height exceeds six feet above the ground.

3.5.2.2 Scuffplates. Replaceable scuffplates will be provided at each compartment threshold to prevent body damage from sliding equipment in and out of the compartments. The scuffplates will be securely attached to the compartment threshold but will be easily replaceable in the event of damage.

3.5.2.3 Drip rails. Drip rails will be provided over each compartment door. If the drip rails are not integral with the body, they will be of anodized extruded aluminum.

3.5.2.4 Shelves. An adjustable and removable compartment shelf will be provided for every 18 inches of each vertical storage compartment door opening. Shelving adjustments will require no more than common hand tools, and will not require disassembly of fasteners. Shelves will support a minimum of 200 pounds without permanent deformation. Each shelf will be accessible to crew members standing on the ground or using a pull out and tip-down configuration for shelving over 54-inches from the ground. Access to any shelf over 54 inches from the ground will be facilitated by the installation of a pull-out step and a grab rail. Each shelf will have drain holes located so as to allow for drainage of any water from the stowed equipment.

3.5.2.5 Drainage mats. Each compartment floor and shelf will be covered with a removable black mat designed to allow for drainage of any water from the stowed equipment.

3.5.3 SCBA storage tubes. Tubes for storage of four SCBA bottles will be provided, two on each side of the vehicle. The tubes will be in accordance with NFPA 1901 and will be of sufficient size to accommodate the procuring agencies SCBA cylinders.

3.5.4 Ladder, handrails, and walkways. Ladder, stepping, standing, and walking surfaces will be in accordance with NFPA 414. Handrails will be provided in accordance with NFPA 414. The lowermost step(s) or ladder rungs will be less than 20 inches (51 cm) above level ground when the vehicle is fully loaded. The lowermost steps may extend below the angle of approach or departure or ground clearance limits if they are designed to swing clear. The tread of the bottom steps must be at least 8 inches (20 cm) in width and succeeding steps at least 16 inches (40 cm) in width. The full width of all steps must have at least 6 inches (15 cm) of unobstructed toe room or depth when measured from, and perpendicular to, the front edge of the weight-bearing surface of the step.

3.5.5 Ancillary equipment. Ancillary equipment listed in NFPA 414 A.4.2.1 (1)-(17) is not covered by this purchase description in accordance with AC 150/5220-10.

NOTE: Equipment funding will be obtained as a separate contract under the provisions of AC 150/5210-14, *Aircraft Rescue and Fire Fighting Equipment, Tools, and Clothing*.

3.6 Agent system.

3.6.1 Agent (fire) pump. The vehicle will be equipped with a centrifugal pump capable of providing the performance specified herein as prescribed by NFPA 414. The pump will have a bronze body and impeller and a stainless steel shaft.

3.6.1.1 Agent system piping. All metallic surfaces of the piping and associated components that come into contact with the agent will be of brass, bronze, or passivated stainless steel.

3.6.1.2 Tank to pump connection. A check valve and shutoff valve will be provided in each tank to pump line.

3.6.1.3 Intake connections. The vehicle will be equipped with two valved 4½-inch intake connections, one on each side of the vehicle. The vehicle will be equipped with two valved 2½-inch intake connections, one on each side of the vehicle, adjacent to the 4½-inch intake connections and fitted with either 30° or 45° turn-down fittings. Each 4½-inch intake connection will have male National Hose threads, a quarter-turn control valve, a bleeder valve, a strainer, a cap, and a slow-operating valve and an automatic pressure relief device in accordance with NFPA 1901. Each 2½-inch intake connection will have rocker lug female National Hose threads, a quarter-turn control valve, a bleeder valve, a strainer, and a plug in accordance with NFPA 1901. The vehicle will be capable of filling its water tank by pumping from a draft, a hydrant, or a nurse truck through any of the intake connections without the use of a hose from a discharge connection to a tank fill connection.

3.6.1.4 Discharge connections. Two 2½-inch discharge connections with male National Hose threads will be provided. One 2 ½ - inch discharge will be provided on each side of the vehicle. Each connection will be equipped with a cap, a quarter-turn control valve, a bleeder valve, and a pressure gauge in accordance with NFPA 1901. Each connection will be rated at 250-gpm minimum.

3.6.1.5 Piping, couplings, and valves. The agent system piping will incorporate groove type couplings to the maximum practical extent. All piping sections between agent system components will be readily removable without disturbing the components.

3.6.1.6 Overheat protection. The agent system will be equipped with an overheat protection system in accordance with NFPA 414.

3.6.1.7 Pressure relief valves. The agent system will be equipped with pressure relief valves in accordance with NFPA 414.

3.6.1.8 Drains. The agent system will be equipped with a drainage system in accordance with NFPA 414.

3.6.1.9 Priming pump. The vehicle will be equipped with a priming pump in accordance with NFPA 1901.

3.6.2 Water tank. The vehicle will have a water tank with a manufacturer certified minimum capacity of at least 3000 gallons.

3.6.2.1 Water tank construction. The water tank will be constructed of passivated stainless steel or polypropylene. All materials used will be capable of storing water, foam concentrate, and water/foam solutions.

3.6.2.2 Water tank manhole cover and drain. The water tank will be equipped with an easily removable manhole cover with a minimum opening diameter of 20 inches. The water tank will incorporate a drain and drain valve. The valve will be on the left side of the vehicle and controlled by a crew member standing on the ground. The drain line will be 2-inch internal diameter (I.D.) minimum. The point for discharge for the water tank drain will be below the under vehicle body panels.

3.6.2.3 Water tank overflow system and venting. The water tank will incorporate a venting system to relieve pressure on the tank during fill and discharge operations at maximum flow rates. It will have an overflow system to relieve excess fluid in the event of tank overflow. The vent and overflow system will prevent leakage of water when the tank is filled to capacity and the vehicle is operating on the maximum side slopes and grades specified herein. Drainage from the vent and overflow system will not flow over body panels or other vehicle components and will not be in the track of any of the tires. Tank vent hoses will be of the non-collapsible type.

3.6.2.4 Water tank top fill opening. A top fill opening of not less than 8 inches internal diameter with a readily removable ¼-inch mesh strainer will be provided. The fill opening may be incorporated as part of the manhole cover, and will be sized to accommodate a 2½-inch fill hose.

3.6.2.5 Water tank fill connections. The water tank will incorporate one 4½-inch male National Hose thread connection and one 2½-inch rocker lug female National Hose thread connection on each side of the vehicle. Each connection will be fitted with a 30° turn-down fitting. The water fill will allow external re-supply of the water tank during discharge pumping operations. Each tank fill connection will be in accordance with NFPA 414.

3.6.3 Foam system.

3.6.3.1 Foam concentrate tank. The foam concentrate tank(s) will have a manufacturer certified working capacity sufficient for two tanks of water at the maximum tolerance specified in NFPA 412, *Standard for Evaluating Aircraft Rescue and Fire-Fighting Foam Equipment* for 6-percent foam concentrate (i.e., 7.0-percent).

3.6.3.1.1 Foam tank construction. The foam tank will be constructed of passivated stainless steel or polypropylene. All materials used will be capable of storing foam concentrate.

3.6.3.1.2 Foam tank drain. The foam tank will incorporate a drain and drain valve. The valve will be on the left side of the vehicle and controlled by a crew member standing on the ground. The drain line will have a minimum 1½-inch I.D. The foam tank drain outlet will be located so that the contents of the tank can be drained into 5-gallon cans and 55-gallon drums.

3.6.3.1.3 Foam tank top fill trough. The foam tank will incorporate a top fill trough mounted in the top of the tank readily accessible to at least two crew members on top of the vehicle. The top fill trough will incorporate a cover, latch, and sealed so as to prevent spillage under any operating condition. The top fill trough will be designed to allow two standard 5-gallon foam concentrate containers to be emptied simultaneously. The top fill trough neck will extend sufficiently close to the bottom of the tank to reduce foaming to a minimum during the fill operation. The top fill trough will incorporate readily removable, rigidly constructed 10 mesh stainless steel or brass strainers. All components in and around the top fill trough will be constructed of materials that resist all forms of deterioration that could be caused by the foam concentrate or water.

3.6.3.2 Foam tank fill connections. The foam tank will incorporate a 1½-inch National Hose thread female hose connection on each side of the vehicle to permit filling by an external transfer hose at flow rates up to 75-gpm. The connections will be provided with chained-on long handled plugs or rocker lug plugs. The top of the connections will be no higher than 48 inches above the ground and readily accessible. The fill lines will incorporate check valves and readily removable, rigidly constructed ¼-inch mesh strainers. All components in the foam tank fill system will be constructed of materials that resist all forms of deterioration that could be caused by the foam concentrate or water.

3.6.3.2.1 Foam tank vent and overflow system. The foam tank will incorporate a vent system to relieve pressure on the tank during fill and discharge operations at maximum flow rates and an overflow system to relieve excess liquid in the event of tank overfill. The vent and overflow system will prevent leakage of foam when the tank is filled to capacity and the vehicle is operating on the maximum side slopes and grades specified herein. Drainage from the vent and overflow system will not flow over body panels or other vehicle components and will not be in front of or behind any of the tires. Tank vent hoses will be of the non-collapsible type.

3.6.3.3 Foam transfer pump. An electric motor driven or pneumatic, self-priming, diaphragm pump will be provided and mounted in a compartment on the vehicle. The pump will be driven from the vehicle electrical or air system. The pump will be capable of transferring and drawing foam liquid concentrate at adjustable flow rates up to 25-gpm directly through the pump and loading connections (see 3.6.3.2). All materials and components that come in contact with the foam will be compatible with the foam concentrate. The pump and its plumbing will have provisions for flushing with water from the water tank. The pump will be removable as an assembly without disturbing other components. A suitable length of hose with appropriate connections will be provided for filling the foam tank from an external foam storage container.

3.6.3.4 Foam flushing system. The foam concentrate system will be designed in accordance with NFPA 414 so that the system can be readily flushed with clear water.

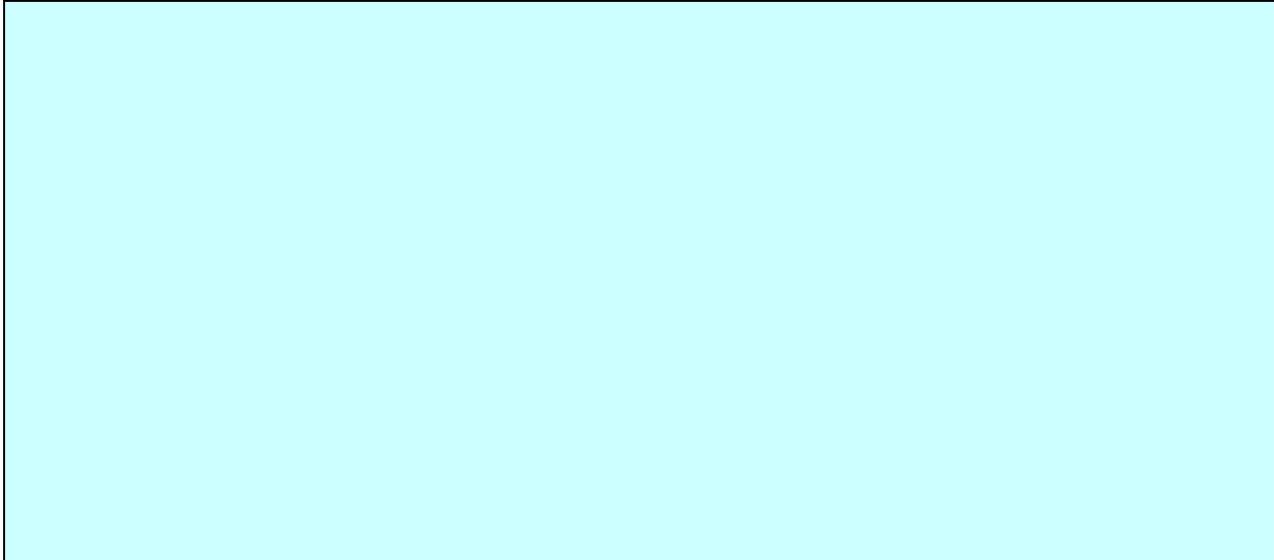
3.6.3.5 Foam concentrate piping. All metallic surfaces of the piping and associated components that come into contact with the foam concentrate will be of brass, bronze, or passivated stainless steel. The foam concentrate piping will be in accordance with NFPA 414.

3.6.4 Foam proportioning system. The vehicle will have an around-the-pump or a direct injection foam proportioning system for Aqueous Film-Forming Foam (AFFF). The system will automatically and uniformly proportion water and 3-percent foam concentrate within a minimum ratio of 2.8-percent to a maximum ratio of 3.5-percent foam concentrate to water by volume. The system will also be capable of proportioning 6-percent foam concentrate (5.6-percent minimum, 7.0-percent maximum). If a fixed orifice plate system is used, a plate will be provided for each percentage foam concentrate; the additional plate will be securely mounted in a protected location on the vehicle. A fire vehicle mechanic will be able to interchange the plates using common hand tools.

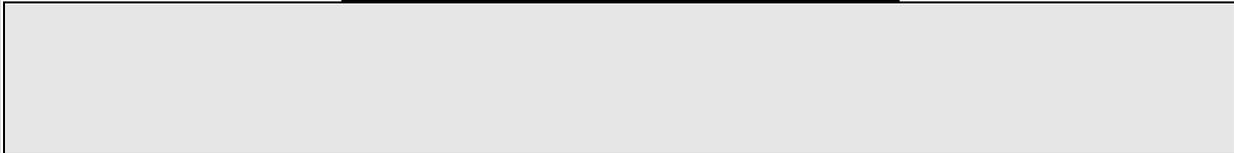
straight stream to fully dispersed. The bumper turret will be capable of automatic oscillation, with the range of oscillation fixed at 45° each side of center (left and right) and elevation/depression.

3.6.7 Preconnected handlines. A 200 foot, 1¾-inch pre-connected woven jacket handline, with a 1½-inch control valve and a pistol grip nozzle, will be located on each side of the vehicle. A safety system will be provided to prevent charging of the hose until the hose has been fully deployed. The handlines and nozzles will be in accordance with NFPA 414, and will provide 95-125 gpm at 100 psi nozzle pressure. A control for charging each handline will be provided for operation by both the driver and the turret operator.





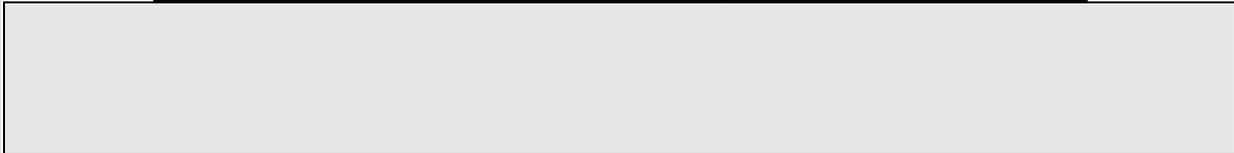
JUSTIFICATION (Dry Chemical Agent)



ADO/FAA Approval: ➡ _____

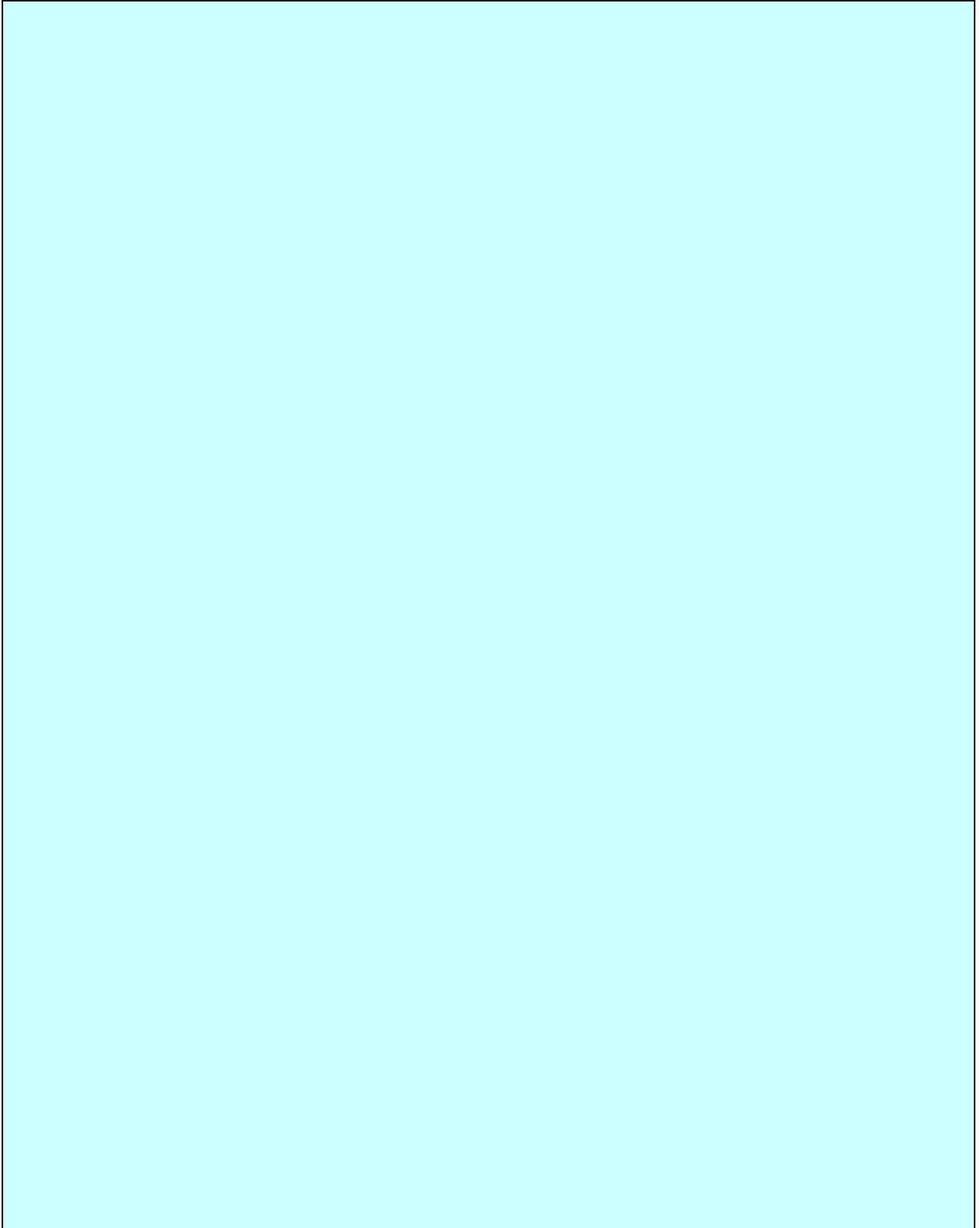


JUSTIFICATION (Dry Chemical Primary Turret Discharge Nozzle)



ADO/FAA Approval: ➡ _____





JUSTIFICATION

ADO/FAA Approval: ➡ _____

3.9 Electrical systems and warning devices. The vehicle will have a 12-volt electrical and starting system.

3.9.1 Alternator. A single or dual alternator charging system in accordance with NFPA 1901 will be provided. The minimum continuous electrical load will include operation of the air conditioning system.

3.9.2 Batteries. Batteries will be of the maintenance-free type; addition of water will not be required during normal service life. The battery cover and vent system will be designed to prevent electrolyte loss during service and to keep the top of the battery free from electrolyte.

3.9.2.1 Battery compartment. The batteries will be enclosed in a weatherproof box or compartment and be readily accessible.

3.9.3 Battery charger or conditioner. The vehicle will have a DC taper type battery charger or an automatic battery conditioner, providing a minimum 12 amp output. The charger/conditioner will be permanently mounted on the vehicle in a properly ventilated, accessible location. The charger/conditioner will be powered from the electrical shoreline receptacle (see 3.9.1). A charging indicator will be installed next to the receptacle. When a battery conditioner is provided, the conditioner will monitor the battery state of charge and, as necessary, automatically charge or maintain the batteries without gassing, depleting fluid level, overheating, or overcharging. A slave receptacle will be provided at the rear of the vehicle.

3.9.4 Electromagnetic interference. The vehicle electrical system will be in accordance with SAE J551-2 for electromagnetic interference.

3.9.5 Work lighting.

3.9.5.1 Cab interior lights. Cab interior light levels shall be sufficient for reading maps or manuals. At least one red and one white cab interior dome light shall be provided.

3.9.5.2 Compartment lights. White lighting sufficient to provide an average minimum illumination of 1.0 footcandle shall be provided in each compartment greater than 4.0 cubic feet and having an opening greater than 144 square inches. Where a shelf is provided, this illumination shall be provided both above and below the shelf. All compartments shall be provided with weatherproof lights that are switched to automatically illuminate when compartment doors are opened and the vehicle master switch is in the 'on' position. Light switches shall be of the magnetic (non-mechanical) type.

3.9.5.3 Ladder, step, walkway, and area lights. Non-glare white or amber lighting shall be provided at ladders and access steps where personnel work or climb during night operations. In addition, ground lighting in accordance with NFPA 1901 shall be provided. Ground lights shall be activated when the

parking brake is set in accordance with AC 150/5220-10. These area lights shall be controlled with three-way switches on the cab instrument panel and near the light sources. The switch located in the cab shall be a master switch and must be turned on before auxiliary switches near the light sources are operational.

3.9.5.4 Floodlights. Two halogen spot/floodlight(s) shall be attached at the end of the roof turret or at the end of the ET assembly. The floodlight(s) shall illuminate the area covered by the turret. The floodlight(s) shall be switched from the instrument panel.

3.9.5.5 Telescoping Flood Lights. Two 110-volt, 1,000 watt halogen floodlights will be provided. One light will be mounted on the left and right side of the vehicle on extension tubes. Both lights will be controlled from switches in the cab. The floodlights will be powered by the auxiliary generator.

3.9.5.6 Scene lights. A total of six 110-volt or 12-volt HID high mounted floodlights will be provided to illuminate the work areas around the vehicle: two on each side and two in the front. Each pair of side mounted lights will be controlled by a switch mounted on the side of the vehicle and by a switch mounted on the instrument panel. A switch will also be mounted on the instrument panel to control the lights at the front.

3.9.6 Audible warning devices.

3.9.6.1 Siren. The vehicle will be equipped with an electronic siren system. The amplifier unit will include volume control and selection of "Radio," "PA," "Manual," "Yelp," "Wail," and "Hi-Lo" (European) modes, and a magnetic noise canceling microphone. The amplifier, microphone, and controls will be within reach of the driver and the turret operator. Siren activating foot switches will be located in front of the driver and the turret operator. The siren speaker will be rated at 100 watts minimum and will be located in a guarded position as low and as far forward on the vehicle as practical.

3.9.6.2 Horn. Dual forward facing air horns will be installed in protected locations near the front of the vehicle. Air horn activating foot switches will be located in front of the driver and the turret operator.

3.9.7 Emergency warning lights. All emergency warning lights will use light emitting diode (LED), strobe, or rotating beacon elements and will meet the requirements of FAA Advisory Circular 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport*, August 2007. Lighting bars will be installed on the top front, sides, and rear of the vehicle. A switch will be provided on the instrument panel to control all of the top, side, front and rear emergency warning lights. A switch will also be provided on the instrument panel to disable all lower emergency warning lights when desired.

3.9.7.1 Emergency warning light color. All emergency warning lights will meet the requirements of AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport*, August 2007.

3.9.7.2 Headlight flashing system. A high beam, alternating/flashing, headlight system will be provided. The headlight flasher will be separately switched from the warning light panel.

3.9.8 Radio circuit. The vehicle will have two separate 30 amp circuits, with breakers and at least 6-foot long wires, routed to a space provided adjacent to the driver and turret operator for purchaser provided radios and other electrical equipment. The wiring will be tagged indicating its purpose. ***Radios are an airport responsibility and not part of this specification.***

3.9.9 Power receptacles.

3.9.9.1 Primary power receptacles. The vehicle will have 2-110-volt power outlets mounted on the exterior of the vehicle. Each outlet will have 2-110-volt female receptacles. One duplex outlet will be located on each side of the vehicle and will be mounted adjacent to the cab entry doors.

3.9.9.2 Auxiliary power receptacles. The vehicle will have 2-12-volt auxiliary power receptacles mounted adjacent to the driver and crew member positions, preferably in the instrument panel.

3.9.9.3 Cable reels. The vehicle will be equipped with an electrical cable reel, located within a compartment. The reel will be equipped with 200 feet of 20 amp, 600 volt, 90°C insulated electrical cable. The electrical cable will be equipped with a rubber ball stop to prevent cable pull through during rewinding operations. A four-way roller guide will be provided on the cable reel to prevent chafing of cable insulation. The cable reel will have an electric rewind motor with provisions for manual rewind in the event of motor failure; the manual rewind handle will be securely stored near the cable reel. A portable weatherproof duplex outlet box, with built-in circuit breakers and twist-lock receptacles, will be provided for on the cable end. The cable reel will be powered by the auxiliary generator.

3.9.10 Auxiliary generator. A minimum [redacted] kilowatt (KW) (continuous rating), 120/240 volt, 60 hertz, split shaft power takeoff (PTO) driven generator will be provided. The PTO will be activated from the driver's position and will have a monitor light to indicate engagement. The PTO will operate only when the vehicle is out of gear and the parking brake is engaged; it will automatically disengage if the transmission is placed in gear or the parking brake is released. A governor will regulate engine speed to match the generator output to the connected load. Gauges will monitor the operation of the generator system and indicate the connected load. Access for maintenance will be provided above and below the generator. Individual circuit breaker tripping or failure will not affect operation of other active circuits.

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3.10 Line voltage electrical system.

3.10.1 Electrical shoreline connection. The battery charger/conditioner will be powered from a covered, polarized, insulated, labeled, recessed (flush mounted), male, 110 volt AC auto-eject receptacle. The connection will be located on the exterior of the vehicle at the rear. A weatherproof charge meter will be installed next to the receptacle. A 50 foot long, three wire, 15 amp rated, 110 volt, AC power cable, with straight blade (non twist-lock) connectors, will be provided.

3.11 Air systems.

3.11.1 Air hose reel. An air hose reel will be provided on the right side of the vehicle. The hose reel will be equipped with 200 feet of 3/8-inch I.D. hoseline. A 3/8 inch National Pipe Taper (NPT) fitting and female style quick disconnect will be connected to the end of the hoseline. A four-way roller guide will be

provided for the hose reel to prevent hose chafing and kinking. The hoseline will be equipped with a rubber ball stop to prevent hose pull through on roller guides during rewinding operations. The hose reel will have an electric rewind motor and provisions for manual rewind in the event of motor failure; the manual rewind handle will be securely stored near the hose reel. A pressure protected air supply from the chassis air system will be connected to the hose reel. The air supply lines will be routed with minimum bends and located or guarded from damage from the carried equipment.

3.12 Quality of Workmanship. The vehicle, including all parts and accessories, will be fabricated in a thoroughly workmanlike manner. Particular attention will be given to freedom from blemishes, burrs, defects, and sharp edges; accuracy of dimensions, radii of fillets, and marking of parts and assemblies; thoroughness of welding, brazing, soldering, riveting, and painting; alignment of parts; tightness of fasteners; et cetera. The vehicle will be thoroughly cleaned of all foreign matter.

4. REGULATORY REQUIREMENTS.

4.1 Recoverable Materials. The contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with Title 48: Federal Acquisition Regulations System, Part 2823—*Environment, Conservation, Occupational Safety, and Drug-free Workplace*, Subpart 2823.4 *Use of Recovered Material*, 403 *Policy* and 404 *Procedures*.

4.2 Green Procurement Program. Green Procurement Program (GPP) is a mandatory federal acquisition program that focuses on the purchase and use of environmentally preferable products and services. GPP requirements apply to all acquisitions using appropriated funds, including services and new requirements. FAR 23.404(b) applies and states the GPP requires 100% of EPA designated product purchase that are included in the Comprehensive Procurement Guidelines list that contains recovered materials, unless the item cannot be acquired:

- a. competitively within a reasonable timeframe;
- b. meet appropriate performance standards, or
- c. at a reasonable price.

The prime contractor is responsible for ensuring that all subcontractors comply with this requirement.

5. PRODUCT CONFORMANCE PROVISIONS.

5.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. Performance inspection (see 5.2).
- b. Conformance inspection (see 5.3).

5.2 Performance inspection. The vehicle will be subjected to the examinations and tests described in 5.6.3.1 through 5.6.3.5 (if applicable). The contractor will provide or arrange for all test equipment, personnel, schedule, and facilities.

5.3 Conformance inspection. The vehicle will be subjected to the examinations and tests described in 5.6.3.1 through 5.6.3.5 (if applicable). The contractor will provide or arrange for all test equipment, personnel, and facilities.

5.4 Product conformance. The products provided will meet the performance characteristics of this PD, conform to the producer's own drawings, specifications, standards, and quality assurance practices, and be the same product offered for sale in the commercial marketplace. The purchaser reserves the right to require proof of such conformance.

5.5 Technical proposal. The offeror/contractor will provide an itemized technical proposal that describes how the proposed model complies with each characteristic of this PD; a paragraph by paragraph response to the characteristics section of this PD will be provided. The offeror/contractor will provide two copies of their commercial descriptive catalogs with their offer as supporting reference to the itemized technical proposal. The offeror/contractor will identify all modifications made to their commercial model in order to comply with the requirements herein. The vehicle furnished will comply with the "commercial item" definition of FAR 2.101 as of the date of award. The purchaser reserves the right to require the offeror/contractor to prove that their product complies with the referenced commerciality requirements and each conformance/performance characteristics of this PD.

5.6 Inspection requirements.

5.6.1 General inspection requirements. Apparatus used in conjunction with the inspections specified herein will be laboratory precision type, calibrated at proper intervals to ensure laboratory accuracy.

5.6.2 Test rejection criteria. Throughout all tests specified herein, the vehicle will be closely observed for the following conditions, which will be cause for rejection:

- a. Failure to conform to design or performance requirements specified herein or in the contractor's technical proposal.
- b. Any spillage or leakage of any liquid, including fuel, coolant, lubricant, or hydraulic fluid, under any condition, except as allowed herein.
- c. Structural failure of any component, including permanent deformation, or evidence of impending failure.
- d. Evidence of excessive wear.
- e. Interference between the vehicle components or between the vehicle, the ground, and all required obstacles, with the exception of normal contact by the tires.
- f. Misalignment of components.
- g. Evidence of undesirable roadability characteristics, including instability in handling during cornering, braking, and while traversing all required terrain.
- h. Conditions that present a safety hazard to personnel during operation, servicing, or maintenance.
- i. Overheating of the engine, transmission, or any other vehicle component.
- j. Evidence of corrosion.
- k. Failure of the fire fighting system and sub-systems.

5.6.3 Detailed inspection requirements.

5.6.3.1 Examination of product. Each vehicle will be examined to verify compliance with the requirements herein. Attention will be given to materials, workmanship, dimensions, surface finishes, protective coatings and sealants and their application, welding, fastening, and markings. Proper operation of each vehicle function will be verified. A copy of the vehicle manufacturer's certifications will be provided with each vehicle in accordance with NFPA 414. Each vehicle will be inspected.

5.6.3.1.1 Roadability test. The fully loaded vehicle will be driven over ten miles of paved and ten miles of cross country terrain consisting of open fields, broken ground, and uneven terrain. After completing the driving portion of the roadability test, all loads will be removed and all structure and surfaces will be visibly inspected for failure or permanent deformation.

5.6.3.1.2 Gradeability test. The fully loaded vehicle will be tested in accordance with NFPA 414 to demonstrate compliance with 3.1.6.2.

5.6.3.1.3 Tilt table test. The fully loaded vehicle will be tested in accordance with NFPA 414 to demonstrate compliance with 3.1.6.3. A slip/trip rail with a maximum height of 2-inches may be used. If an adjustable height suspension system is provided, the suspension system may be set to the height normally used on hard pavement.

5.6.3.1.4 Cornering stability test. The fully loaded vehicle will be tested in accordance with NFPA 414 to demonstrate compliance with 3.1.6.4.

5.6.3.1.5 Weight and weight distribution measurement. Each vehicle will be weighed (full and empty) to demonstrate compliance with NFPA 414.

5.6.3.1.6 Dimension measurement. The vehicle will be measured in accordance with NFPA 414. In addition to the dimensions listed in NFPA 414, the overall length, width, and height will be measured to demonstrate compliance with 3.2.1.

5.6.3.1.7 Angles of approach and departure measurement. The angles of approach and departure of the fully loaded vehicle will be measured to demonstrate compliance with 3.2.2.

5.6.3.1.8 Acceleration test. Each vehicle will be tested in accordance with NFPA 414 to demonstrate compliance with 3.3.1.2. A time-distance recorder or GPS based electronic data collection system will be used to record data for this test.

5.6.3.1.9 Maximum speed test. Each vehicle will be tested in accordance with 5.4.4 of NFPA 414 to demonstrate compliance with 3.3.1.3. A time-distance recorder or GPS based electronic data collection system will be used to record data for this test.

5.6.3.1.10 Pump and roll on a 40-percent grade test. The fully loaded vehicle will be tested in accordance with NFPA 414.

5.6.3.1.11 Service brake system test. Each vehicle will be tested in accordance with NFPA 414. A time-distance recorder or GPS based electronic data collection system will be used to record data for this test.

5.6.3.1.12 Air system and air compressor test. Each vehicle will be tested in accordance with NFPA 414.

5.6.3.1.13 Turning diameter test. The fully loaded vehicle will be tested in accordance with NFPA 414 to demonstrate compliance with 3.3.12.2.

5.6.3.1.14 Evasive maneuver test. The fully loaded vehicle will be tested in accordance with NFPA 414 at 35 miles per hour (mph) (56 kilometers per hour (kph) to demonstrate compliance with AC 150/5220-10.

5.6.3.2 Cab interior sound level test. The cab interior sound levels of the vehicle will be measured in accordance with NFPA 414 to demonstrate compliance with 3.4.2.

5.6.3.3 Agent system tests.

5.6.3.3.1 Agent discharge pumping test. Each vehicle will be tested in accordance with NFPA 414.

5.6.3.3.2 Pump and maneuver test. Each vehicle will be tested in accordance with NFPA 414.

5.6.3.3.3 Hydrostatic pressure test. Each vehicle will be tested in accordance with NFPA 414.

5.6.3.3.4 Priming device test. Each vehicle that is equipped with a priming pump will be tested in accordance with NFPA 1901.

5.6.3.3.5 Agent tank capacity test. The vehicle will be tested in accordance with NFPA 414 to demonstrate compliance with the capacity requirements of 3.6.2 and 3.6.3.1.

5.6.3.3.6 Water tank fill and overflow test. The vehicle will be tested in accordance with NFPA 414 to demonstrate compliance with 3.6.2.3.

5.6.3.3.7 Foam concentration test. Each vehicle will be tested in accordance with NFPA 414 at the 3-percent concentration setting to demonstrate compliance with the foam concentration quality requirements of 3.6.4.

5.6.3.3.8 Primary turret flow rate test. The vehicle will be tested in accordance with NFPA 414. Each vehicle will be tested to demonstrate compliance with NFPA 414.

5.6.3.4 Electrical system tests.

5.6.3.4.1 Electrical charging system test. The vehicle will be tested in accordance with NFPA 414 to demonstrate compliance with Annex B.4 of NFPA 414.

5.6.3.4.2 Electromagnetic interference test. The vehicle will be tested in accordance with NFPA 414 and SAE J551 to demonstrate compliance with 3.8.4.

5.6.3.5. Extendable turret. Each vehicle equipped with an extendable turret nozzle will be tested in accordance with NFPA 414 (2007 Edition) and NFPA 1901 (2009 Edition) as specified in AC 150/5220-10.

5.6.3.6 Piercing/penetrating nozzle test. Each vehicle equipped with a piercing/penetrating nozzle will be tested in accordance with NFPA 414.

6. PACKAGING.

6.1 Preservation, packing, and marking will be as specified in the purchase description, contract or delivery order.

6.2 The vehicle must be delivered with full operational quantities of lubricants, brake and hydraulic fluids, and cooling system fluid all of which must be suitable for use in the temperature range expected at the airport.

6.3 The vehicle must be provided with all fire fighting agents and propellants to make it operational upon delivery.

6.4. The vehicle manufacturer must provide initial adjustments to the vehicle for operational readiness and mount any ancillary appliances purchased through the vehicle manufacturer as part of the vehicle.

7. TRAINING.

7.1 Upon delivery of the vehicle to the airport, the manufacturer must, at no additional cost, provide the services of a qualified technician for up to a maximum of 5 consecutive days (or up to 8 days for an extendable turret) for training. This is considered sufficient time for the purchaser to adjust shift work schedules to get maximum employee attendance to training sessions at some point during the training period. During this time sufficient repetitive learning opportunities must be provided by the manufacturer to allow various shifts to complete the training requirements.

7.2 The technician must provide thorough instruction in the use, operation, maintenance and testing of the vehicle. This setup must include operator training for the primary operators, which will give them sufficient knowledge to train other personnel in the functional use of all fire fighting and vehicle operating systems. Prior to leaving the vehicle, the technician should review the maintenance instructions with the purchaser's personnel to acquaint them with maintenance procedures as well as how to obtain support service for the vehicle.

7.3 Training must include written operating instructions that depict the step-by-step operation of the vehicle. Written instructions must include materials that can be used to train subsequent new operators.

8. REFERENCED DOCUMENTS.

8.1 Source of documents.

8.1.1 The CFR may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington DC 20402.

Title 49, Transportation, CFR Part139, *Certification and Operations: Land Airports Serving Certain Air Carriers*

Section 315, *Aircraft Rescue and Firefighting: Index Determination*

Section 317, *Aircraft Rescue and Firefighting: Equipment and Agents*

Title 49: Transportation, 49 CFR, [Part 393—Parts and Accessories Necessary for Safe Operation: Subpart C—Brakes](#)

Sections: 393.40 through 393.42(b)), 393.43, and 393.43 through 393.52

Title 49; Transportation, 49 CFR *Federal Motor Vehicle Safety Standards*, Part 209, *Seat Belt Assemblies*

8.1.2 SAE documents may be obtained from SAE, Inc., 400 Commonwealth Drive, Warrendale PA 15096.

8.1.3 National Fire Protection Association (NFPA): NFPA documents may be obtained from NFPA, Batterymarch Park, Quincy MA 02269-9101.

NFPA 412, *Standard for Evaluating Aircraft Rescue and Fire-Fighting Foam Equipment* (2009 Edition)

NFPA 414, *Standard for Aircraft Rescue and Fire Fighting Vehicles* (2007 Edition)

NFPA 1901, *Standard for Automotive Fire Apparatus* (2009 Edition)

8.1.4 Federal Aviation Administration (FAA): FAA documents may be obtained from FAA,

FAA Advisory Circular 150/5220-10, *Guide Specification for Aircraft Rescue and Fire Fighting (ARFF) Vehicles*, September 2007

FAA Advisory Circular 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport*, August 2007