

ARFF-1 Design & Performance Standards and Preventive Maintenance of Aircraft Rescue and Fire-Fighting Vehicles

Reference Material: Note: Exam may contain some "accepted practice" type questions not found in the reference material. When an inconsistency arises between NFPA 1900 and FAA 10F, NFPA 1900 will take precedence.

FAA Advisory Circular, AC No: 150/5220-10F, *Guide Specification for Aircraft Rescue and Firefighting Vehicle*, U.S. Department of Transportation, Federal Aviation Administration, available at www.faa.gov

NFPA 1900: Standard for Aircraft Rescue and Firefighting Vehicles, Automotive Fire Apparatus, Wildland Fire Apparatus, and Automotive Ambulances (**NFPA 414 Chapters and Chapter 21**) 2024 edition

NFPA 1910: Standard for the Inspection, Maintenance, Refurbishment, Testing and Retirement of In-Service Emergency Vehicles and Marine Firefighting Vessels (**NFPA 1911 Chapters**) 2024 edition

NFPA 460: Standard for Aircraft Rescue and Firefighting Services at Airports (**NFPA 412 Chapters**) 2024 edition

Selective Catalytic Reduction <https://www.dieselforum.org/about-clean-diesel/what-is-scr>

Any recognized Manufacturer's Training manual, Operator's manual or Service manuals. Must cover recommended methods, procedures, work instructions and maintenance intervals.

LEARNING OBJECTIVES

- 1. Definitions:** The Aircraft Rescue Vehicle Technician shall be familiar with the definition of terms and phrases commonly used in connection with the design, performance, testing and preventative maintenance of Aircraft Rescue and Fire-Fighting vehicles to include the following:

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|---|--|---------------------------------------|
| a. Operational tests | q. Fully loaded vehicle | gg. Preventive maintenance |
| b. ARFF | r. Ramp angle | hh. Service |
| c. Vehicle classification | s. Listed | ii. Manufacturer's certification test |
| d. Vehicle types | t. Off-pavement performance | jj. No load condition |
| e. Ambient temperature | u. Percent grade | kk. Foam expansion ratio |
| f. Angle of approach | v. SCR - Selective Catalytic Reduction | ll. LSG-Limiting Speed Governor |
| g. Angle of departure | w. Clean agent | mm. VSG-Variable Speed Governor |
| h. Authority having jurisdiction | x. Dry chemical | nn. Driver's enhanced vision system |
| i. Foam concentrate | y. All wheel drive | oo. Forward looking infrared |
| j. Center of gravity | z. Under body clearance | pp. Interior access vehicle |
| k. Complimentary extinguishment agent | aa. Wall to wall turning diameter | qq. Power source rating |
| l. Component manufacturer's certification | bb. water agent fire pump | |
| m. Prototype vehicle | cc. Side slope stability | |
| n. In service condition | dd. Gradeability | |
| o. Structural kit | ee. Cornering stability | |
| p. Radio Suppression | ff. Pump drive/pump & roll | |

- 2. General Requirements of Aircraft Rescue and Fire-Fighting Vehicles:** The Aircraft Rescue Vehicle Technician shall understand the Design & Performance Requirements for Aircraft Rescue and Fire-Fighting Vehicles as stated in the reference material listed above:

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|--------------------------------------|-------------------------------------|
| a. General design requirements | i. Winterization systems |
| (1) Engine coolant preheater system | j. Complimentary agent system |
| (2) Engine Emissions | (1) Dry Chemical |
| (3) Fuel Systems | (2) Pressure Regulator |
| b. Chassis, Cab & Vehicle components | k. Water systems |
| (1) Power assist steering | l. Hand lines |
| (2) Crew allowance | m. Nozzles and turrets |
| c. Water agent pump and pump drive | n. Independent suspension |
| d. Water (tank) reservoir | o. Documentation |
| e. Performance requirements | p. Approved Options |
| (1) Suspension system | q. Lateral acceleration indicator |
| f. Foam systems | r. Aircraft Interior Access Vehicle |
| g. Foam (tank) reservoir | s. Lighting & electrical |
| h. Braking systems | t. Additional Vehicle Options |
| (1) Reservoir capacity | |

3. Test Requirements for Aircraft Rescue and Fire-Fighting Vehicles: The Aircraft Rescue Vehicle Technician shall understand the operational test procedures and delivery data requirements for Aircraft Rescue and Fire-Fighting Vehicles.

- a. Piping, valves and fittings
- b. Pump tests
- c. Road tests
- d. Complimentary agent tests
- e. Water agent discharge tests
- f. Clean agent discharge test
- g. Water tank flow tests
- h. Pump and roll tests
- i. Brake system performance tests
- j. Foam concentration/Foam quality test
- k. Electrical charging system tests
- l. Body and chassis flexibility tests
- m. Test requirements & procedures
 - (1) Water tank fill and overflow test
- n. Test instrument requirements
- o. Low voltage & warning devices
- p. Cab interior noise test
- q. Acceleration
- r. Water tank fill & overflow test
- s. Air system/air compressor test

4. Principles of Service and Preventive Maintenance: The Aircraft Rescue Vehicle Technician shall understand the principles of service and preventive maintenance as applied to Aircraft Rescue and Fire-Fighting Vehicles.

a. Identify the elements of service and maintenance:

- (1) Types of inspections and procedures
- (2) Visual inspections (define)
- (3) Maintenance records
- (4) Use of maintenance schedules
- (5) Manufacturer's "Accepted Practice" methods
- (6) Operational tests
 - (a) hydraulic fluid

b. Identify the frequency of service and preventive maintenance activities to include the following:

- (1) Daily inspections
- (2) Weekly inspections
- (3) Monthly inspections
- (4) Periodic inspections
- (5) Annual inspections

c. Identify areas where maintenance problems are most commonly found:

- (1) Electrical system (low voltage)
 - (a) starter wiring test
- (2) Engine system
- (3) Vehicle air system
- (4) Hydraulic system
- (5) Fire/Water pump system
- (6) Fire fighting system
- (7) Drive train system
- (8) Water/Foam agent systems
- (9) Foam pump system
- (10) Chassis and Body
- (11) Complimentary agent system
- (12) Control valve and plumbing
- (13) Brake system
- (14) SCR/DEF fluid