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:

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

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:

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

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