

Reference Material: Note: Exam may contain "accepted practice" type questions not found in the reference material listed below.

Pumping Apparatus DRIVER/OPERATOR Handbook, International Fire Service Training Association (IFSTA) Chapters 3,4,6,10,11,16, Glossary & Appendix A. To order, call (800) 654-4055 or www.ifsta.org

NFPA 1901, **Standard for Automotive Fire Apparatus**, 2003 Edition, Chapters 1-25 & appendix.

NFPA 1911, **Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus** 2007 edition, National Fire Protection Association, Quincy, MA 800-344-3555. Or order online at www.nfpa.org

LEARNING OBJECTIVES FOR THE F-2 EXAM

1. **Definitions:** The Fire Apparatus Technician shall define the terms and phrases commonly used in connection with fire apparatus, apparatus operations and/or testing of apparatus to include the following:

a. Acceptance tests	t. Net pump pressure	kk. Net pump discharge pressure
b. Fire pump	u. No load governed speed	ll. Gross axle weight (GAWR)
c. Fire apparatus	v. Pressure relief device	mm. Gross combination weight (GCWR)
d. Angle of approach	w. Relay pumping	nn. Eductor
e. Angle of departure	x. Static water supply	oo. Intake relief valve
f. Authority having jurisdiction	y. Cavitation	pp. Ground clearance
g. Heat exchanger	z. Initial attack fire apparatus	qq. Combination Fire Apparatus
h. Auxiliary braking systems	aa. Class "A" foam	rr. Preventive Maintenance
i. Ramp breakover angle	bb. Split Shaft PTO	ss. Ironing
j. Contractor	cc. Pump and roll	tt. Powertrain
k. Certification test	dd. Pressure Governor	uu. Severe service
l. Drafting operation	ee. Responsibility of purchaser	vv. Bonding
m. Grade	ff. Automatic electrical load management	ww. Interlock
n. Vehicle carrying capacity	gg. Triple-combination pumper	xx. Override
o. Hard intake hose	hh. Compound gauge	yy. Anti electrocution platform
p. Line voltage circuits	ii. Preservice tests	
q. Intake hose	jj. Gross vehicle weight rating (GVWR)	
r. Lugging		
s. Manufacturer's tests		
2. **General requirement of fire apparatus:** A Fire Apparatus Technician shall understand the design & performance requirements for Aerial, Pumper, and Initial Attack Fire Apparatus such as:

<ol style="list-style-type: none"> a. General design requirements <ol style="list-style-type: none"> (1) seating capacity (2) steps and platforms (3) minimum pump sizes (4) DBA levels cab (5) stability and weight distributions (6) minimum angle of approach & departure (7) DBA back up alarm (8) contractor (9) DBA command area (10) Audible warning devices (11) Pump Panel Controls & Instructions (12) Ground ladder standard NFPA 1931 (13) Reflective stripping (14) Ground clearance (15) Optical warning lights (FMVSS) (16) Driving and crew areas (17) Power Equipment Rack (18) Access Hand Rails (19) Compartmentation (20) Warning Sytems, Instruction Plates, & Signage (21) Serviceability b. Chassis & vehicle components <ol style="list-style-type: none"> (1) Engine cooling system (2) Minimum top speed (3) Fuel tank size (4) Air filter restriction gauge (5) Cab tilt interlock (6) Power Steering (7) Fuel system c. Fire pump and equipment <ol style="list-style-type: none"> (1) Heat exchanger (2) Pressure relief valve (3) Auxiliary cooler (4) Initial Attack (5) Preconnect plumbing size (6) Hard suction hose (7) LDH soft suction hose (8) Bleed valves and drains 	<ol style="list-style-type: none"> (9) Minimum discharge outlets and size (10) Minimum intake outlets and size (11) Pressure control system (12) Slow operating valves (13) Priming pump (14) Interlocks <ol style="list-style-type: none"> (a) Fan (b) Exhaust Brake (c) Engine Brake (15) Pump and roll (16) Pump indicator light (17) Pump & Plumbing access d. Water tanks <ol style="list-style-type: none"> (1) Minimum tank sizes (2) Fill valve sizes (3) Delivery rate (4) Baffles e. Performance requirements <ol style="list-style-type: none"> (1) Roadability f. Breathing air systems & purification <ol style="list-style-type: none"> (1) Compressor shut downs (2) Grade E air (3) Audible warning air volume (4) SCBA Fill Station g. Foam systems <ol style="list-style-type: none"> (1) Air pressure for compressed air foam systems, CAFS (2) Water and foam check valves (3) Minimum pump size (4) Tank pressure and vacuum vents h. Aerial hydraulic systems <ol style="list-style-type: none"> (1) Tubing and fittings minimum burst pressure (2) Minimum rated capacity (3) Rated height and speed (4) Rated capacity i. Brakes & Suspensions <ol style="list-style-type: none"> (1) Hydraulic-activated service brake (2) Service brakes (3) Parking brakes (4) Minimum turning radius
--	--

- (5) Stopping distance
 - (6) Air brake quick buildup time
 - (7) Auxiliary brake systems
 - (8) Anti-lock brakes
 - (9) Pressure protection valve system
 - j. Electrical
 - (1) Lower level optical warning
 - (2) Line voltage electrical systems
 - (a) instrumentation
 - (b) power distribution box
 - (3) Upper level optical warning
 - (4) Minimum continuous load for starting
 - (5) Minimum continuous load discharge
- 3. Test requirement for fire apparatus:** The Fire Apparatus Technician shall understand the test and delivery data requirements for a Pumper Fire Apparatus
- a. Certification test
 - (1) Pumps less than 750 gpm (initial attack)
 - (2) Pumps greater than 750 gpm (pumper)
 - (3) Certification of pump test gauges
 - (4) Water temperature conditions
 - (5) Tank to pump flow test
 - (6) 50% rated capacity and time
 - (7) 70% rated capacity and time
 - (8) 100% rated capacity and time
 - (9) Hard suction hose
 - (10) Overload test
 - (11) Pump engine driven auxiliary systems
 - b. Data required of the contractor
 - c. Hydrostatic test
 - (1) of discharge outlets
 - (2) of pump and time
 - d. Manufacturer predelivery tests
 - e. Pressure control tests
 - (1) Tested at pressures
 - (2) Maximum rise in pressure
 - f. Priming tests
 - (1) Maximum times
 - (2) Auxiliary intakes
 - g. Pump tests
 - h. Road tests
 - (1) Acceleration time & distance
 - (2) Stopping time & distance
 - (3) Top speed and time
 - i. Overload test
 - j. Tests on delivery
 - k. Vacuum test
 - (1) Check for leaks
 - l. Water tank to pump flow test
 - (1) Flow rate
 - m. Electrical test
 - n. Gauges and instruments
- 4. Principles of servicing and maintenance:** The Fire Apparatus Technician shall understand the principles of proper servicing and preventive maintenance programs for fire apparatus.
- 4.1 Identify the elements of servicing and preventive maintenance as listed in IFSTA's Pumping Apparatus Driver/Operator Handbook, to include the following:
- a. Daily inspections
 - b. Weekly inspections
 - c. Monthly inspections
 - d. Periodic inspections
 - (1) Lubrication
 - (2) Air filters
 - (3) Power steering
 - e. Documentation
 - (1) Pump test
 - (2) Major and minor repairs
 - (3) Preventive maintenance records
 - (4) Repair records
 - (5) Testing records
 - (6) Data recorded
- 4.2 Identify fire apparatus maintenance problems, according to IFSTA's Pumping Apparatus Driver/Operator Handbook, including:
- a. Electrical components
 - (1) Voltage drop test
 - (2) Master battery disconnect
 - (3) Precautions (battery charging)
 - (4) Testing open circuits
 - b. Engine maintenance
 - (1) Recommended extended idle rpm
 - (2) Unnecessary short durations
 - (3) Oil change intervals
 - (4) Long idling periods
 - c. Hydraulic components
 - (1) Filter change intervals
 - (2) Cylinder leaks
 - d. Pump maintenance
 - (1) Pump packing leakage rate
 - (2) Relief valve intake
 - (3) Trouble shooting
 - (4) Transfer case seals
 - (5) Leakage checks
 - (6) Pump packing
 - (7) Primer valve
 - (8) Primer vent
 - e. Pump valves
 - (1) Linkage
 - (2) Seals
 - f. Transmission
 - (1) Interlocks
 - (2) Fluid color inspection
 - (3) Checking fluid leaks
 - g. Air systems
 - (1) Pressure protection valves
 - h. Test equipment
 - (1) Using a test light
 - (2) Using a volt meter
 - i. Power train components
 - (1) Drive line vibration
 - (2) Poor braking response
 - (3) Drive line seals
 - j. Priming system components
 - (1) Primer valves and lines
- 4.3 Identify Out of Service Criteria as listed in NFPA 1911.
- a. Low air Warning
 - b. Tire Wear
 - c. Windshield
 - d. Tires