



LAKE JERICHO FIRE AND RESCUE DEPARTMENT

Pumper Service Test Manual

Conducting Pumper Service Tests

Conditions to Meet Before Annual Service Testing

1. Apparatus must receive approval from maintenance division to conduct service testing.
 - a. No critical service write-ups exist that would prohibit less than optimal performance.
2. All suction intake screens must be replaced prior to conducting the service test.
3. Apparatus must be equipped and loaded as it normally would during fire ground usage.
4. Apparatus scheduled for testing should be considered out of service for the duration of the test and arrangements for coverage for that apparatus will be made prior to the test.
5. Any other tests that may be conducted annually for the apparatus will not take place during the pump service test unless the test does not interfere with the service test.

General Service Test Information / Safety Considerations

- ✓ Crews conducting test should wear appropriate protective equipment for the test according to the a/h/j
- ✓ Hearing protection and gloves should be considered a minimum
- ✓ Unless otherwise noted, all tests must be conducted with all emergency and service lights operating that would normally be used at an actual emergency
- ✓ Wheels should be chocked according to manufacturers instructions

Equipment Needed for Service Test

1. Test gauges
 - a. master discharge
 - b. master intake
2. Pitot tube
3. Speed counter
4. Solid tip nozzles, stands, securing devices
5. Hose
6. Forms (Pumper Service Testing Form)
7. Stopwatch

Engine Speed Check

Used to determine if engine is still operating at the governed speed it was purchased under

Procedure:

1. Under no load, increase throttle to rated rpms.
2. Check with tachometer, handheld tachometer or speed counter
3. Compare to service plate on pump panel

Vacuum Test

Used to check the priming device, pump, and hard intake hose for air leaks

Procedure:

1. Completely drain the pump of water
2. Inspect all gaskets of intake hose and cap
3. Look for foreign objects in the intake hose
4. Connect 20' of hard intake hose – check records for diameter
5. Cap free end of intake hose
6. All intake valves open, tightly capped, discharge valves closed, caps open
7. Connect vacuum gauge – assure correct port
8. Check oil level of priming pump reservoir
9. Run priming device until gauge shows 22" Hg
10. Record difference between test gauge and intake gauge
11. Shut off engine – listen for air leaks
12. Should not lose more than 10" of vacuum within 5 min.

Hard Intake Hose Check* (Optional)

Used to determine performance of intake hose

1. Use same procedure as vacuum test
2. Support hose in direct line from pumper intake
3. Place flashlight inside hose
4. Use lexan cover to male side – use gasket
5. Check hose for bubbles

Pumping Test – Required Information

Test begins when pressure and speed are obtained. Record the following at the beginning and every five minutes

1. Pump discharge pressure
2. Nozzle pressure
3. Engine tachometer
 - a. RPM using counter
4. Engine coolant temperature
5. Oil pressure
6. Auto trans fluid – optional

**Pumping Test
Capacity Test Procedure
100% of pumps rated capacity at 150 psi for 20 minutes**

Used to determine overall condition of pump and engine

1. Correct for NEP

a.
$$\frac{\text{Lift (ft.) + intake hose friction loss}}{2.3} = \text{psi}$$

Procedure:

1. Connect hoselines according to chart
2. Secure water supply
3. Obtain prime
4. Gradually increase pump speed until NEP reaches 150 psi
5. Two stage pumps should be in volume
6. Check flows and gauges for appropriate settings

Pressure Control Test

Used to determine that pressure control devices operate in accordance with manufacturer's specifications

Procedure:

1. While pumping capacity at 150 psi, set control device to maintain this discharge pressure
2. Close each of the flowing valves – one at a time, in no less than 3 seconds, no more than 10 seconds.
3. Observe the pump discharge gauge. It should not rise more than 30 psi when each of the valves are closed.
4. Restore the pump back to capacity at 150 psi.
5. Reduce NEP to 90 psi without altering any valves or nozzle settings
6. Set pressure control device at 90 psi
7. Once control device is set at 90 psi, close each valve in no less than 3 seconds, and no more than 10 seconds.
8. Observe pump discharge gauge. It should not rise more than 30 psi when each of the valves are closed.

Pumping Test
70% test
70% of pump's rated capacity at 200 psi for 10 minutes.

Procedure:

1. Set up hoselines to desired flow
2. Two stage pumps can be in pressure or volume
3. Using same method of capacity test – increase pressure to 200 psi
4. Begin time – record readings every 5 minutes

Pumping Test
50% test
50% of pumps rated capacity at 250 psi for 10 minutes

Procedure:

1. Set up hoselines to desired flow
2. Two stage pump in pressure mode
3. Using same method as capacity test – increase pressure to 250 psi
4. Begin time – record readings every 5 minutes

Pressure Control Test

Procedure:

1. While pumping at 250 psi, set the pressure control device to maintain this pressure.
2. Close each of the valves one at a time, in no less than 3 seconds and no more than 10 seconds.
3. Observe pump discharge pressure. It should not rise more than 30 psi when each valve is closed.

Gauge and Flowmeter Test

Used to determine if discharge pressures are accurate

Procedure:

1. Cap all discharge ports – including preconnects
2. Open each discharge valve slightly
3. Increase throttle to 150 psi.
4. Compare individual gauges with master discharge gauge.
5. Any gauges with a psi pressure difference needs repair.

Tank to Pump Flow Test

Used to determine if the piping between the tank and the pump is sufficient to supply the minimum amount of water specified by NFPA 1901.

- ❖ **Pumpers with capacity of 500 GPM or less must flow 250 GPM from booster tank**
- ❖ **Pumpers with capacity of 500 GPM or greater must flow 500 GPM from booster tank.**
(Departments may have specified greater flow rates)

Procedure:

1. Make sure water tank is filled to overflowing
2. Close tank fill line, bypass cooling line, and all intake valves
3. Attach sufficient hoselines to flow the required discharge rate
4. With the pump in gear, open the discharge to the hose(s) attached and begin flowing water
5. Increase the throttle until the maximum consistent pressure is obtained on the discharge gauge.
6. Close the discharge valve without changing the throttle setting, and refill the tank (usually through top fill opening. Bypass valve may be opened to prevent overheating
7. Reopen the discharge valve, and check the flow through the nozzle using a pitot tube or flowmeter. Adjust the engine throttle if the pressure needs to be brought back to desired setting
8. Compare the flow rate being measured to NFPA or manufacturer-designed rate.
9. Flow rate should be continued until at least 80% of the capacity of the tank is discharged.

Test Results

- ❖ At no time during the test should the pumping system or engine show signs of overheating, power loss, or any other mechanical problems.
- ❖ Pump test results below 90% of the original test and rating of the pump requires the pump to be rated at a lower classification or taken out of service.
- ❖ Compare test results with results of previous years to determine possible system failures
- ❖ Report any problems to maintenance officer. Forward test results to proper person(s)

LAKE JERICO FIRE AND RESCUE

Annual Pumper Service Test Record

Service Test Date	Apparatus No.	Serial Number	Manufacturer	Year Built	Pump GPM
Test Location		Tested By:			

Test 1 – Engine Speed Check: Compare hand tachometer reading to engine service plate on pump panel Pass _____ Fail _____

Test 2 - Vacuum Test: _____
 (20' 6" hard suction capped for 5 minutes with less than 10mm hg drop)

Test 3 – Pumping Test – Capacity Test: 10 Minutes at 100% of Rated Capacity at 150psi
 Hose Layout Used: _____ Tip Size: _____

TIME	Oil Pressure	Engine Temp.	Engine RPM	Pump Speed	Pump Pressure	Vacuum Pressure	Tip Size	Tip Pressure	Total GPM
Start									
10 Minutes									
15 Minutes									
20 Minutes									
Spurt Test									

Test 4 – Pressure Control Test: (Pressure Control Device Type): _____
 (Conduct before shutting down capacity test-shut valves, 30 psi increase maximum allowable)

Test 5 – Pumping Test - 10 Minutes at 70% of Rated Capacity at 200 PSI.
 Hose Layout Used: _____

TIME	Oil Pressure	Engine Temp.	Engine RPM	Pump Speed	Pump Pressure	Vacuum Pressure	Tip Size	Tip Pressure	Total GPM
Start									
5 Minutes									
10 Minutes									

Test 6 – Pumping Test - 10 Minutes at 50% of Rated Capacity at 250 PSI.
 Hose Layout Used: _____

TIME	Oil Pressure	Engine Temp.	Engine RPM	Pump Speed	Pump Pressure	Vacuum Pressure	Tip Size	Tip Pressure	Total GPM
Start									
5 Minutes									
10 Minutes									

Test 7 – Pressure Control Test – (Conduct at conclusion of 250 psi Pumping Test)

Valve / Discharge (Lines used for test)	Discharge Pressure	Master Intake Pressure	Master Intake Pressure with Valve Closed	Pass / Fail (No more than 30 psi each)
Discharge 1				
Discharge 2				
Discharge 3				

Test 8 – Tank to Pump Flow Test:

Pump Size In GPM's	Flow Requirement	Line Arrangement for Flow Requirement	Flow tank to gpm requirement (Tip Size)	Pass / Fail (Meet flow rate requirement)
500 GPM or less	250 gpm from booster tank	1 – 3" line		
500 GPM or greater	500 gpm from booster tank	2 – 2 ½" lines		

Remarks _____

LAKE JERICO FIRE AND RESCUE DEPARTMENT
MAINTENANCE DIVISION

Vehicle Malfunction Report

Vehicle # _____

Date: _____

Mileage: _____

Engine Hours: _____

Pump Hours: _____

Description of problem(s):

1. _____

2. _____

3. _____

4. _____

5. _____

Circle: In Service Out of Service

Name: _____

Signature: _____

Title: _____

Officer: _____

Signature: _____

Rank: _____