



RUSSELLVILLE FIRE DEPARTMENT
POLICY MANUAL

Policy Number:
Section:
Original Date:
Revised Date:

PURPOSE

It is the purpose of this Standard Operating Guideline to maintain a standard procedure for the annual testing of the pumps on all Department apparatus.

POLICY

It is the responsibility of all department personnel to be familiar with the following procedures so that during the course of performing the annual pump test operations, each participant shall understand and contribute to the operations. It is the responsibility of the company officer in charge of the apparatus to oversee the pump test operations and adhere to the following procedures so that the operation is conducted with as precise accuracy as possible using the resources provided in this document, as well as the staffing resources available during the test.

All pumpers in service and reserve shall be tested at least once each year, and after any extensive repairs, to determine their condition. The following testing procedures are in accordance with NFPA 1911 Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Emergency Vehicles. Testing should be completed by a third party testing company.

Tests shall consist of drafting with a lift of not more than 10 feet from the surface of the water to the center of the pump intake, and pumping at net pump pressure for the following lengths of time:

Test 1	100% Rated Capacity	150 psi	20 minutes
Test 2	70% Rated Capacity	200 psi	10 minutes
Test 3	50% Rated Capacity	250 psi	10 minutes

All pumper service tests shall be conducted with the hard suction hose connected to the pump intake and secured in place with ropes so that the barrel strainer is at least 2 feet below the surface in water at least 4 feet deep, otherwise the floating strainer shall be used as directed.

Record Weather Conditions and Other Information

The air temperature, water temperature, vertical lift, and barometric pressure shall be recorded along with the time the test is started. Any significant changes in these conditions during the test should be noted on the test record. The pumper shall be taken "out of service" at this time, and shall not return to service until the test is complete and the pump is back flushed to clean debris from the lake water from the pump.

PRE-TEST Apparatus Fluid Checks

Before testing the following fluid levels need to be checked: engine oil, coolant level, pump primer oil, and transmission fluid level.

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Fire Chief

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Vacuum Test

A vacuum test shall be conducted on the pump. After assuring the pump is drained and all intakes capped and all discharge valves closed and uncapped, a vacuum of at least 22 inches of Hg shall be developed using the pump priming device. The vacuum shall not drop more than 10 inches of Hg in 5 minutes. The pump priming device shall not be operated once the 5 minute test has begun.

Priming Test

A priming test shall be conducted following the Vacuum Test. The priming test is timed from the moment the priming device is actuated until water is flowing onto the ground beneath the pump. This time shall be no more than 30 seconds for pumps rated less than 1500 gpm; 45 seconds for pumps rated 1500 gpm or more. The test shall be conducted with a lift of not more than 10 feet. Close all valves and the transfer valve shall be in the volume position.

Safety Precautions During Service Test

- While participating in the test all personnel shall wear at a minimum helmets, gloves, and protective clothing such as may be required per direction of the officer in charge.
- Prevent water hammer: Open and close all valves and nozzles slowly.
- Do not stand over or straddle the hose.
- Do not change pitot set tips while water is flowing and assure the tip is locked into place.
- Manipulate the engine throttle slowly. Prevent sudden pressure changes, which can damage equipment and injure personnel.
- Tie down test nozzles and devices securely.
- Be aware of the location of all personnel in the test area in relation to hoseline.

Gauges Used for Testing

For testing purposes a set of external test gauges are recommended. These gauges should be attached to the test gauge fittings on the pump operator's panel. If External test gauges are not available, the master discharge gauge on the pump panel shall be used to determine the "Gauge Pressure" of the pump for all testing. The Pitot Gauge(s) shall be used to determine the Nozzle Pressure.

General Apparatus Placement for Test

For apparatus requiring one intake, position the apparatus parallel to the drafting source, with the intake facing the drafting source with sufficient spacing for optimum placement of hard suction hose. For apparatus requiring two intakes, position apparatus perpendicular to the drafting source, so the front of the apparatus is close enough to the drafting source to provide optimum placement of hard suction hoses.

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Ground Monitor and Hose Lay Out

Ground Monitor should be placed in a secure location, with the stream directed back into the drafting source, and securely tied down. Hoses used for the test should have a current hose test and should be marked as you would when service testing the hose, scribe a mark where the hose and couplings meet. While the pump testing is proceeding, regularly check the couplings to make sure that the hose is not starting to pull loose from the coupling. If the scribe mark moves more than 3/8" away from the coupling, stop the test, and replace the hose. Couple hoses in 100' lengths to provide supply to ground monitors.

1000 gpm Pumps

Items needed for testing: Pitot Gauge Set with tips; Two 10' Sections of 6" Hard Suction Hose; Ropes to secure Hard Suction Hose to the pumper; Hard Suction Strainer; Six 50' sections of 3" hose; One three inlet Ground Monitor; One Pump Test Record Form.

The sequence of tests, layouts, and pressures for the 1000 gpm pumps are:

		Tip	Nozzle (p)	GPM	Net (p)	Gauge (p)	Trans. Valve	Time
Test 1	100% Capacity	2 "	71	1001	150	145*	In Volume	20 min.
Test 2	70% Capacity	1 ¾"	60	704	200	195*	In Volume	10 min.
Test 3	50% Capacity	1 ½"	57	504	250	245*	In Pressure	10 min.

1250 gpm Pumps

Items needed for testing: Pitot Gauge Set with tips; Two 10' Sections of 6" Hard Suction Hose; Ropes to Secure Hard Suction Hose to the pumper; Hard Suction Strainer; Five 50' sections of 3" hose; One three inlet Ground Monitor; One two inlet Ground Monitor, One Pump Test Record Form.

The sequence of tests, layouts, and pressures for the 1250 gpm pumps are:

Test 1 layout; Two 100 ft. lines with a 1¾" tip and one 50 ft. line with a 1½" tip.

		Tip	Nozzle (p)	GPM	Net (p)	Gauge (p)	Trans. Valve	Time
Test 1	100% Capacity	1 ¾ "	64	727	150	145*	In Volume	20 min.
		1 ½"	64	533				
Test 2	70% Capacity	2"	54	875	200	195*	In Volume	10 min.
Test 3	50% Capacity	1 ½"	88	625	250	245*	In Pressure	10 min.

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1500 gpm Pumps

Items needed for testing: Pitot Gauge Set with tips; Two 10' Sections of 6" Hard Suction Hose; Ropes to Secure Hard Suction Hose to the pumper; Hard Suction Strainer; Seven 50' sections of 3" hose; One three inlet Ground Monitor; One two inlet Ground Monitor; One Pump Test Record Form.

The sequence of tests, layouts, and pressures for the 1500 gpm pumpers are:

Test 1 layout; Three 100 ft. lines with a 2" tip and one 50 ft. line with a 1 1/2" tip.

		Tip	Nozzle (p)	GPM	Net(p)	Gauge (p)	Trans. Valve	Time
Test 1	100% Capacity	2"	72	1008	150	145*	In Volume	20 min.
		1 1/2"	56	499				
Test 2	70% Capacity	2"	78	1050	200	195*	In Volume	10 min.
Test 3	50% Capacity	1 3/4"	68	750	250	245*	In Pressure	10 min.

* This is an approximation; adjust so that gauge pressure plus intake pressure equals net pressure. These readings should be recorded for future reference. Variables include lift height, temperature, and barometric pressure.

2000 gpm Pumps

Items needed for testing: Two Pitot Gauge Sets with tips; Six 10' Sections of 6" Hard Suction Hose; Ropes to Secure Hard Suction Hoses to the pumper; Hard Suction Strainer; Eight 50' sections of 3" hose; One three inlet Ground Monitor; One two inlet Ground Monitor; One Pump Test Record Form.

The sequence of tests, layouts, and pressures for the 2000 gpm pumpers are:

Test 1 layout; Two sets of twin 100 ft. lines each supplying a 2" tip.

		Tip	Nozzle (p)	GPM	Net(p)	Gauge (P)	Trans. Valve	Time
Test 1	100% Capacity	2"	71	1001	150	145*	In Volume	20 min.
		2"	71	1001	150	145*		
Test 2	70% Capacity	2 1/4"	87	1404	200	195*	In Volume	10 min.
Test 3	50% Capacity	2"	71	1001	250	245*	In Pressure	10 min.

* This is an approximation; adjust so that gauge pressure plus intake pressure equals net pressure. These readings should be recorded for future reference. Variables include lift height, temperature, and barometric pressure.

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Pressure Relief Valve Test

Equipment needed: Ground Monitor, pitot test kit.

Procedure: The test is performed during the first capacity test @ 150 psi and 90 psi and during the third capacity test @ 250 psi. While flowing the appropriate pressure close appropriate discharge valve/s in no less than 3 seconds and no more than 10 seconds to prevent water hammer and provide a realistic test of the relief valve. During all of these tests the pump discharge pressure should rise no more than 30 psi when the hydrant valve is closed.

Adjusting Pressures

If the pump pressure is correct, but the nozzle pressure is too high, it will be necessary to introduce additional friction loss by closing the discharge gate on the lines feeding the ground monitor. This in effect also decreases velocity and brings about a lower pitot reading at the nozzle, since a pitot gauge actually reads velocity as pressure. However, when the gate is restricted, the pump pressure is increased, so the engine throttle must be decreased to keep the desired net pump pressure.

Items to Watch For During Pump Testing

The pump operator shall be alert to changes in performance of the apparatus during the pump testing procedure. Close attention should be paid to engine temperature, oil pressure, fuel level, engine RPM's, and pump prime. If any adverse change among the above items occurs, the pump test shall be terminated, and the problem attended to before pump testing resumes.

Failure of Apparatus to Pass Test

In the event that the pumper fails to pass any or all of the testing procedures, the discrepancy shall be reported to the Fire Chief. Such apparatus should be considered for major repairs, or should be considered for replacement.

After any major equipment replacement in the pump, drivetrain, or motor, a pump test should be performed according to this policy.

Testing Site Rules

All testing should be completed by a third party testing company. If a test must be performed by the fire department, the current testing site is the Lake Dardanelle Lock and Dam Site. Since RFD units are not to be driven off paved surfaces under normal circumstances, care shall be taken to assure the ground is hard enough to drive the apparatus without getting stuck.

Approved

Fire Chief