



# Fire Pump Testing Guidelines

## The City of Oklahoma City Fire Department

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### General:

- ✓ This guideline was developed to assist both service contractors and fire personnel with the procedures and methods of witnessing, performing, and documenting the testing of fire pumps.
- ✓ Fire pumps are required to be tested upon installation and annually. The performance evaluation test is in accordance with the requirements of NFPA 20, NFPA 25, and the International Fire Code.

### Definitions:

- ✓ Field performance test:
- ✓ A fire pump test made after a new installation and where major pump repairs have been performed.
- ✓ Tests should be witnessed by fire department personnel.
- ✓ Installing contractors or manufacturer representatives of the system should conduct the test.

### Test Criteria:

NFPA Standard 20 has three specific flow checkpoints that must be performed before a fire pump system can be approved.

These are:

- ✓ At churn, shutoff, or zero flow, the net pressure should not exceed 140 percent of the rated pressure of the horizontal split-case pumps.
- ✓ The net pressure should not exceed 140 percent of the rated pressure of end-suction and vertical shaft turbine-type fire pumps.
- ✓ At 100 percent of the rated pump capacity, the net pump pressure should be 100 percent of the rated pressure.
- ✓ At 150 percent of the rated pump capacity, the net pump pressure should be at least 65 percent of the rated pump pressure.

### Test Equipment:

All test instruments shall have been calibrated within the last 12 months.

- ✓ Sufficient 2 ½-inch or greater diameter fire hose to reach from the pump test header to either the playpipe nozzles or portable monitor.
- ✓ One underwriter-style playpipe for each 250 GPM of pump capacity.
- ✓ One pitot tube with a calibrated 150 PSI pressure gauge.
- ✓ Two calibrated pressure gauges incremented for a 0-300 PSI range.
- ✓ One hand-held tachometer.
- ✓ Voltage amperage meter.
- ✓ Fire line barrier tape.
- ✓ Two portable radios.



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### Fire Pump Performance Test:

- ✓ Inspect the room or building housing the fire pump to ensure compliance with the adopted codes and plan design.
- ✓ Inspect the fire pump, driver, piping, jockey pump and the controller to ensure compliance with the adopted codes and plan design.
- ✓ Survey the site of the pump test to determine how the pump discharge will drain or be disposed of.
- ✓ The discharge from the smallest fire pump can approach 750 GPM and contain rocks and debris. If necessary, secure the discharge area from vehicular or pedestrian traffic.
- ✓ If the pump is monitored, notify the monitoring company that a fire pump test is being conducted and that an alarm condition will be transmitted.
- ✓ During the pump test, verify that an alarm condition is being received.
- ✓ Isolate the fire pump from the fire protection system by closing the discharge OS&Y valve, and opening either the indicating control valve to either the pump test header or pump flow loop, depending on the type of installation.
- ✓ If a test header is used, connect the playpipes with nozzles and hose lines to the pump test header.
- ✓ The playpipes should be secured to a test bracket near the test header.
- ✓ If a permanent playpipe bracket is not provided, a portable playpipe bracket can be used.
- ✓ Replace the pump's suction and discharge gauges with calibrated test gauges.
- ✓ Teflon tape should be wrapped around the gauge threads to ensure an adequate seal.
- ✓ Inspect the suction line to ensure that the control valves are in their proper positions and that the pump is primed with water.
- ✓ If the pump needs priming, follow the manufacturer's directions for priming the pump.
- ✓ If the pump utilizes an electric driver, a volt-amperage meter will be used to measure the amperage for each of the three conductors connected to the driver. These conductors are located in the pump controller.
- ✓ Depending on the type of equipment used, access to the driver end plate may be required to measure the motor's RPM.
- ✓ Allow approximately 30 seconds between each successive manual start. During this portion of the test, verify that an alarm condition is being transmitted.
- ✓ To begin the automatic start portion of the test, open the fire protection system control valve slowly allowing a drop in the system pressure. The pump should start automatically.
- ✓ Upon completion of the automatic start portion of the test, slowly open the 2-inch main drive valve of the automatic sprinkler system to cause a water-flow condition. This test should activate the pump.



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- ✓ During the time period that Steps 11, 12, and 13 are being performed, check the pump for excessive noise, vibration, and leaks. Other areas to check include the following:
  - Operation of the circulating relief valve.
  - Pump packing is emitting one drop of water per second.
- ✓ While operating, record the pressure registered at the discharge and intake gauges, the driver RPM, and if applicable, the amperage measurements.
- ✓ Fire Pump Standpipe Test: The roof personnel will remove the hose valve caps and notify the test coordinator to start the fire pump and allow water to flow in the standpipe. This is to allow for flushing of the system. Personnel should be located behind the hose valve to avoid being struck by debris. Continue flushing until the water is clear. Upon completion, notify the Control Officer to shut down the pump.
- ✓ Connect the hoselines, playpipes, and gate valves to the hose valve connection. When discharging water, attempt to direct the water discharge toward the roof drains, or toward an open perimeter area. If discharge is above the building, secure the discharge area from vehicles and pedestrians.
- ✓ If applicable, open the indicating control valve to the floor test loop. This is located between the suction and discharge piping below the pump bypass. Activate the flow meter; do not attempt to calibrate or adjust the device.
- ✓ Open the fire protection system indicating control valve to charge the system.
- ✓ Fully open a 2-1/2 inch gate valve slowly and pitot the flow. Notify the Control Officer of the pitot measurement. During this period, the drive RPM, discharge pressure, suction pressure, flow meter measurement, and amperage (if applicable) should be recorded.
- ✓ Open each successive hoseline as instructed by the Control Officer and measure the flow using the pitot tube.
- ✓ After opening each hoseline, measure the flow from each hoseline previously opened. EXAMPLE: If opening hose valve number 3; pitot hose valves one and two after measuring the flow from hose valve three. Record the pitot measurements and calculate the total flow.
- ✓ Review the discharge information of hoseline number 1 in comparison to the flow meter reading. Evaluate the two measurements and, if necessary, have the test site representative calibrate the flow meter.
- ✓ Determine the net pump pressure from the flow measurements taken.
- ✓ Adjust the gate valve on each hose valve so that the total flow equals 100 percent of the pumps' rated capacity. Adjust the individual gate valves so that the pitot measurements equals the data calculated by the Control Officer.
- ✓ Once the specified pitot pressure is achieved, notify the Control Officer. Measure the driver RPM, discharge and suction pressures, flow meter reading, and amperage, if applicable.



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- ✓ Once the necessary measurements are recorded and the field calculated results satisfy the Control Officer, shut down the roof hoselines and remove all of the equipment.
- ✓ Remove the calibrated test gauges and the volt-ammeter after closing the indicating control valve to the flow test loop.
- ✓ Ensure that the fire protection system control valve is open and electrically supervised. Place the fire pump controller in the automatic mode and reinspect the entire installation to verify that the system is operative and will function in case of fire.
- ✓ Notify the property representative that the test is complete and that the test results will be forwarded.
- ✓ Notify the alarm monitoring agency and Fire Dispatch that the test is complete.