



Fire Pump Inspection Checklist

Your Fire Pump Is the Heart of Your Fire Protection System

A booster pump reinforces the public water supply when the public water main cannot provide the volume or pressure needed to supply an automatic sprinkler system.

A fire pump and tank with a self-contained water supply can be used either to supplement public water or as a source of water where no public supply is available.

A Pump Must Not Fail

If the water demand exceeds the capability of the public supply, or if no public water is available, the pump will need to start promptly in an emergency situation (such as when sprinklers are activated). So, it is essential to test your pump regularly and keep it maintained at all times. Otherwise, a fire could cause severe property damage and shut down your operations.

A Pump Needs Constant Care

Establish a program of regular inspection, testing and maintenance to ensure your fire pump performs its critical function during a fire.

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Fire Pump Testing and Maintenance Checklist

Ask an FM Global Engineer To Take These Steps

- Fill out the essential information on this form.
- Mark the correct settings.
- Provide flow test results.

An FM Global engineer also can provide the characteristic curve for the annual flow test (FM Global Form 105, *Pump Acceptance Test Data*).

Weekly Tests

Valves, piping

- Check pump suction, discharge and bypass valves to ensure they are open and piping is free of leaks. (In most cases, valves should be locked.)

Automatic Start

- Test the automatic start by opening a test line to reduce system pressure.

For Diesel Engines

- Run the engine at rated speed for at least 30 minutes. This allows all running components to warm up and stabilize, which drives off condensation and moisture that can shorten the life of important engine components.

For Electric Motors

- Check operation of the starting devices, and allow the pump to run for at least 10 minutes.

Pump Controller

- Check for alarm conditions.
- Check that controller is in automatic start mode.
- Verify receipt of remote-monitoring alarms during automatic start test.

Pressure Relief

- Verify that relief valves operate properly. Usually, this means water should not be flowing through them. Relief valves are designed to keep pressure from exceeding the system's design pressure in the event a pump driver experiences an over-speed condition, or if the public water supply pressure increases.

Pump Cooling

- Check water flow out of the shaft seal packing in the stuffing box. Slight leakage is normal and indicates water lubrication and cooling is adequate. Also check the pump casing and bearings for overheating and signs of excess vibration.

Water Supplies

- Overflow the suction tanks or check them visually. In cold weather, make sure heat is provided to the supply lines and the suction source. For open bodies of water, check the suction intake for possible obstructions. Verify drought or dry conditions have not significantly reduced the water supply. For public supply booster pumps, check all valves on the suction line.

Pump Room Temperature

- Minimum temperature should be 40° F (4° C). For internal combustion engines, the recommended minimum temperature is 70° F (21° C). Provide an engine jacket water heater set at 120° F (49° C) or a lubricating oil heater if room temperature is not maintained above 70° F (21° C).

Diesel Engines

- Make sure the engine is clean, dry and running smoothly.

Check:

- Fuel tank levels: when it is below three-quarters full, the tank must be refilled.
- Any valves in the fuel supply lines from the tank to the driver filter or pump system to ensure they are locked in the open position
- Oil level using the dipstick on the engine crankcase
- Battery charger and batteries: are they operating properly?
- Cleanliness of the strainer in the engine cooling system
 - Clean the strainer when necessary.
 - Note the temperature of the cooling system.
 - Make sure water flow through the heat exchanger (if present) is adequate.
- Proper operation of engine instruments: rpm, oil pressure, temperature, amps

Monthly Tests

- Check level and specific gravity of the diesel engine battery electrolyte.
- Check for corrosion of diesel engine battery terminals and condition of cable lines and connections.

Biannual Tests

- Change engine oil.

Weekly Fire Pump Test Form

Test all fire pumps weekly. Enter correct settings in the shaded column. Make sure all test results are within normal limits. If you find that repairs are needed, make them immediately and follow manufacturer's instructions.

Driver type, make and model _____

Pump manufacturer _____

Year installed _____

Manufacturer's model no. _____

gpm/psi rating

gpm

psi

RPM

FM Global office

Phone no. _____

Pump on

psi/bar/kPa

Jockey pump on

psi/bar/kPa

Fax no. _____

Pump off

psi/bar/kPa

Jockey pump off

psi/bar/kPa

Date tested

Tested by

Pressure at pump startup

Method of start

Motor running time (min.)

Suction pressure

Discharge pressure

Temperature and tightness
of shaft seal packing

Level of water supplies
(suction tank should be overflowed)

Water temperature in
suction tank/reservoir

Pump room temperature

Engine instrument readings RPM

Oil pressure

Temperature

Crank case oil level

Last oil change/Next oil change

Amps

Fuel tank level should be
at least ¾ full

Condition of battery charger

Last time battery charged

Battery electrolyte level normal

Cooling system strainer condition

Cooling system temperature

Operation of room ventilation
dampers and fans (if provided)

Inspection of drive belts/hose;
replace per manufacturer's
recommended frequency

For Diesel Only

Annual pump flow test results

Satisfactory

Unsatisfactory

Explain findings

- Provide a work order for immediate repair.
- Follow impairment procedures detailed in *Managing Fire Protection System Impairment* (P9006).
- Keep records on file for review by appropriate personnel.
- Sign off when pump is restored to automatic:

_____ (sign here)

Fire Pump Testing and Maintenance Checklist

Annual Tests

Water Flow Test

Perform a water flow test every year. Ask an FM Global engineer for assistance if you have any questions. Here are some steps to take:

- Record water flow measurements, suction readings and discharge readings for several different flow volumes. These can be plotted on a rating chart as a way to help gauge pump performance from year to year. The performance of any given test can be compared with the pump acceptance test, other yearly tests, and the pump manufacturer's characteristic pump curve.
- Take flow and pressure readings for at least three well-spaced points on the pump curve (at churn or no-flow, near the pump rating and at the 150-percent flow point). If required flow cannot be met, or if there is more than a slight change in performance, find the problem and correct it without delay.
- Run water flow through a hydrant or hose header, or through an FM Approved flow meter discharging to a safe location.

Pump Coupling

- Pump coupling alignment
- Lubrication of coupling

Diesel Engines

Diesel Engine Fuel

- Tank level switches
- Fuel solenoid valve operation
- Strainers, filters, etc.
- For water and foreign material in fuel tank
- Flexible hose lines and connectors
- Tank vents and overflow piping for obstructions
- General condition of piping
- Speed governor and over-speed shutdown operation

Diesel Engine Lubrication System

- Change engine oil and filter. This should be done regardless of the number of hours in operation.
- Lube oil heater (if provided)
- Low oil pressure switch

Diesel Engine Cooling System

- During the flow test, check water discharge rate from the heat exchanger and exhaust manifold. Compare the cooling-water discharge rate with previous observations and the recommended rate.
- Antifreeze level/quality; change as necessary.
- Heat exchanger; clean (rod out) as necessary.
- Water pump
- Condition of flexible hose lines and connections
- Jacket water heater
- Water strainer
- High water temperature switch
- Cooling water solenoid valve operation

Exhaust System

- For leakage
- Condensate trap; drain as necessary.
- For excessive back pressure
- Exhaust system hangers and supports
- Flexible exhaust section

Battery System

- Charger and charge rate/equalize charge

Intake System/Ventilation

- Air filter
- Room louver operation
- Obstructions (debris, insects, etc.)

Troubleshoot Problems

- Identify deterioration in pump performance, and correct problems before the pump becomes incapacitated. A loss of more than 10 percent of capacity requires investigation and possible repair.

Other related publications:

- *Controlling the Shut-Valve Hazard* (P7133)
- *Managing Fire Protection System Impairment* (P9006)
- *Fire Protection Inspection Checklist* (P9116)
- *Pocket Guide to Inspecting, Testing and Maintaining Fire Protection Equipment* (P0418)
- *Inspecting Fire Protection Valves* (online training)*

* Online courses are for clients only. For information or to register, visit <http://training.fmglobal.com>.



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