

AIRE Bulletin

Electric Fire Pumps



Electric fire pumps, also known as “booster pumps,” increase water pressure in fire sprinkler systems. Consider using booster pumps when water supplies do not provide adequate pressure for the operation of a sprinkler system. Fire pumps are connected to a city water main, water tank, reservoir, or ponds that are designed for firefighting purposes. The reliability of a fire protection system depends on the operation of the pump. In some instances, a secondary water source is required. And in most cases, an electric motor driven fire pump drives the system.

Operation

A fire pump consists of a suction port that draws water from the source, and a discharge port that expels water at a higher-pressure rate. A check valve prevents water from leaking back into the source once the pump stops running. Since an electric motor drives the pump, it is important to calibrate both at the same “RPM.” The motor and pump assembly is started by a controller box equipped with a pressure sensing device that will engage when the pressures drop below a preset point. It is possible to change the set point while in the field. It is possible to change the set point while in the field. NFPA 20 (2025) requires setpoint adjustments to follow AHJ and manufacturer guidance.

Pressure Maintenance (Jockey Pump)

A jockey pump is sometimes installed to supplement small pressure changes and low water volume resulting from leaks or expansion within the system. The jockey pump is set to cut in before the main pump and has a field adjustable pressure-sensing device as well.

Pressure Settings

A fire pump engages automatically when the sensing device detects a pressure drop in the sprinkler system. The National Fire Protection Association recommends that the jockey pump (if used) be set to shut off at “pump churn” pressure plus the minimum static pressure on the suction side of the pump.

For the correct pressure settings:

- 1. Set the jockey pump start pressure at approximately 10 psi less than the jockey pump shut off pressure.
 - 2. The main fire pump should be set to kick on about 5 psi less than the jockey pump start pressure, and should be configured for manual stop only to ensure the pump is allowed to run continuously in the event of a fire.
- The prescribed pressure setting recommendations found in NFPA 20 (2025) maintain consistency in system operating pressures and avoid excessive swings or drops, which could cause a “water hammer” effect. This phenomenon can occur if the main pump quickly boosts the system pressure by a large margin during testing or normal operation, and is usually the result of wider set allowing pressure to drop significantly before pump activation. Water hammer puts undue strain on system components and could potentially lead to leaks, but can be easily mitigated by maintaining proper pressure setting for both jockey and fire pumps.

Inspections: Suggested at Weekly Intervals

When more comprehensive coverage is not immediately feasible, prioritization is key. Consider the following factors:

- Check to make sure valves are open between the water source and the sprinkler system (including system bypass valves, if any). The valve to the test connection should remain closed during normal operation.
- Check to make sure the controller power switch is on (closed) and the power light is on. This also applies to the transfer switch, if present.
- Make sure there is a heat source in the pump room/ location. If your area is subject to freezing weather, install a heater that maintains a 40-degree temperature in the pump room.
- Check for leaking pipes. It is normal for the pump to drip water from the two pump shaft seals. This provides lubrication when it is running and helps prevent overheating.
- Check pressure gauges for normal readings. A line on the gauge face or tag for the suction side gauge and system side (after the check valve) gauge is helpful to show normal pressure.
- If the alarm panel/control box has visual or audible alarms, they should not be in the alarm mode when inspecting or servicing equipment.

- Verify ventilating louvers operate freely and pump room ventilation is unobstructed.
- For electric fire pumps, NFPA 25 (2025) permits monthly inspections unless AHJ requires weekly.
- NFPA 20 (2025) introduces expanded remote/automatic monitoring and testing capabilities; where installed, ensure monitoring signals are normal.

Maintenance: Suggested Annual Intervals

- Inspect and lubricate pump bearings and coupling.
- Check gauge and pressure switch accuracy on both the main pump and jockey pump.
- Tighten all electrical connections.
- Verify alignment of pump and driver coupling.
- Calibrate or replace pressure gauges/pressure switches if deviation exceeds 5%.
- Inspect electric motors and lubricate motor bearings annually.

Testing: Intervals as Indicated

Transfer Switch Operation – Annually

Test the manual or automatic transfer of the power supply annually to ensure the fire pump can switch seamlessly between normal and alternate sources. This check confirms that the controller, transfer switch, and electrical components respond correctly under real conditions

Pump Churn Test – Monthly

Start the pump by creating a pressure drop and allow it to run with no water flow, recording suction and discharge gauge readings during operation.

NFPA 25 (2025) requires monthly churn tests for electric driven pumps unless the AHJ or insurer mandates weekly testing. NFPA 20 (2025) also introduces expanded automatic/remote test capabilities.

Pump Alarm Test – Quarterly

Test alarms for pump running status, power failure, and valve tamper on a quarterly basis. Alarm signals should be verified for proper transmission to the central monitoring station to ensure compliance with NFPA requirements.

Pump Flow Test – Annually

Operate pump with water flowing through the unit. Test the pump at churn, at 100% of its rated GPM capacity, and at 150% of its rated capacity. The resulting pressure should equal the pump-rated pressure. The resulting pressure at 150% of the rated flow should be no less than 65% of the rated pressure at 100% flow. It is advisable to have a contractor equipped to perform this function. Some pumps have a flow gauge built into the system, which allows for testing without a water discharge on the property.

Test annually. The National Fire Protection Association has additional details on inspection, testing, and maintenance procedures listed in NFPA 25 Standard for the Inspection Testing and Maintenance of Water Based Fire Protection Systems (2020 Edition, Chapter 8 Fire Pumps, Sections 8.2 Inspection and 8.3 Testing) that can serve as an additional resource for help.

References

NFPA 25 (2025 Edition) – Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.

NFPA 20 (2025 Edition) – Standard for the Installation of Stationary Pumps for Fire Protection.

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