Main Drain Test

Purpose

The purpose of conducting a main drain test is to determine the adequacy of the connected water supply and detect significant reductions that might adversely impact system operation by comparing the results of the current test to a previous baseline test pressure. The test does not provide absolute assurance of an unobstructed waterflow or fully opened valves, but it provides a reasonable check against gross changes in the water supply conditions. This testing is required for each water supply lead-in to the building. Where a single lead-in supplies multiple risers, a single main drain test is acceptable, except that additional main drain tests must be conducted so that every system backflow preventer and/or pressure-regulating valve is exercised. These additional tests would be necessary for situations such as those that include individual floor control valves equipped with pressure-regulating valves.

Tools/Equipment

No special tools are required.

Procedure Steps

Systems Supplied by a Fire Pump

1. Prior to any testing, notify the fire department and/or the alarm monitoring company, as well as the facility representatives, that testing is going to be conducted.
2. The pressure gauge readings collected on the suction side of the fire pump during the annual fire pump test can be used for comparison purposes at a common flow rate in lieu of conducting a separate annual main drain test.
   a. During the annual fire pump test, record the static pressure (no flow) reading on the pressure gauge on the suction side of the fire pump.
   b. During the rated flow (or other common flow rate) of the annual fire pump test, allow the pressure to stabilize and then record the residual pressure reading on the pressure gauge on the suction side of the fire pump.
3. Where the sole supply of water to the fire pump is through a backflow preventer and/or pressure-regulating valve requiring a quarterly main drain test, the test should be conducted in accordance with the following procedure with the fire pump in the operating position:
   a. Check the area surrounding the main drain outlet to ensure that there are no obvious conditions that would prevent water from being discharged safely or cause direct damage in the immediate vicinity. Where the discharge of water is to an area subject to potential freezing conditions, the facility representative should be advised of the potential for icing conditions.
   b. On systems where the main drain is connected to an alarm valve or other arrangement where the flow of water from the main drain will result in the activation of an alarm device or water motor gong, the shutoff valve (where equipped) in the connection to the alarm sensing line should be closed to avoid unnecessary sounding of the alarm.
   c. Record the static pressure (no flow) reading on the pressure gauge on the suction side of the fire pump.
   d. Open the main drain valve slowly until it has reached the fully open position, initiating the operation of the fire pump. Allow the pressure to stabilize, then record the residual pressure reading on the pressure gauge on the suction side of the fire pump.
   e. Slowly close the main drain valve to avoid water hammer, record the time needed for the pressure to stabilize, and record the return static pressure reading on the pressure gauge on the suction side of the fire pump.
   f. Allow the fire pump to operate for 10 minutes for an electric fire pump or 30 minutes for a diesel fire pump, then shut down the fire pump and restore it to automatic operating condition.
   g. Return any shutoff valves in alarm sensing lines that were closed during Step 3b to the normal operating position.
4. Upon completion of all testing, notify the fire department and/or the alarm monitoring company, as well as the facility representatives, that testing is complete. Reset the fire alarm system as necessary.

Systems Not Supplied by a Fire Pump

1. Prior to any testing, notify the fire department and/or the alarm monitoring company, as well as the facility representatives, that testing is going to be conducted.
2. Check the area surrounding the main drain outlet to ensure that there are no obvious conditions that would prevent water from being discharged safely or cause direct damage in the immediate vicinity. Where the discharge of water is to an area subject to potential freezing conditions, the facility representative should be advised of the potential for icing conditions.
3. On systems where the main drain is connected to an alarm valve or other arrangement where the flow of water from the main drain will result in the activation of an alarm device

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or water motor gong, the shutoff valve (where equipped) in the connection to the alarm sensing line should be closed to avoid unnecessary sounding of the alarm.

4. Record the static pressure reading on the supply pressure gauge. Note that gauge readings are to be taken at a supply water gauge on the supply side of any alarm valves or check valves on the system riser.
5. Open the main drain valve slowly until it has reached the fully open position. Allow the pressure to stabilize, then record the residual pressure reading on the supply pressure gauge.
6. Slowly close the main drain valve to avoid water hammer, record the time needed for the pressure to stabilize, and record the return static pressure reading on the supply pressure gauge.
7. Return any alarm valves and shutoff valves in alarm sensing lines that were closed during Step 3 to the normal operating position.
8. Upon completion of all testing, notify the fire department and/or the alarm monitoring company, as well as the facility representatives, that testing is complete. Reset the fire alarm system as necessary.

Evaluation of Results

The recorded results of the residual pressure reading on the supply pressure gauge during the main drain test or the gauge on the suction side of the fire pump should be compared to the baseline reading from the original acceptance test of the system or previously performed tests. Where the main drain residual test pressure is found to be more than 10 percent less than the baseline test pressure, the conditions warrant further investigation and correction as necessary. Additionally, a slow return in the static pressure reading after the closing of the main drain valve could also be indicative of a water supply issue, such as a partially closed valve. It is important to note the differences between a degraded water supply resulting from a closed or partially closed valve or an obstruction in the piping from normal water system fluctuations. For example, a partially closed valve or obstruction will result in an increased drop between the static and residual pressure readings during the main drain test. However, a water system fluctuation might result in both lowered static and residual pressure, as well as a similar drop in pressure under flowing conditions during the main drain test.

The procedure(s) outlined above is not mandated by NFPA 25 and represents only one approach to conducting this test.

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