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BACK TO BASICS: MAIN DRAIN TEST

By Richard Schulte

The standard for sprinkler system installations, NFPA 13, requires that sprinkler systems be provided with drains to facilitate drainage of the overhead portion of the system. Sprinkler systems are required to be provided with a main drain and, in the event that the overhead piping includes “trapped piping” (portions of the overhead system which will not drain through the main drain), auxiliary drains.

Typically, NFPA 13 requires that the main drain be 2 inches in size.

While the main drain is utilized to drain the overhead portion of a sprinkler system, the main drain also performs another function—the main drain is used to verify that the underground portion of the system is in proper working order. NFPA 13 requires that a pressure gauge be provided on the riser and a main drain test is conducted by opening the main drain with the system water supply control valves open and taking pressure readings.

On a recent project, the tag attached to the sprinkler riser indicated the following results for a main drain test conducted in October 2010.

Static Pressure:	58 psi
Residual Pressure:	45 psi

The overhead portion of the sprinkler system was supplied by 8 inch underground piping. Inside the building, the system transitioned to 6 inch piping with a 6 inch detector check valve. The original system installation included a 6 inch sprinkler riser, however, this riser had been replaced with 8 inch piping when the building was occupied by a plastics manufacturer.

Based upon the results of the main drain test, it was obvious that there was a problem with the underground portion of the system. Either, a control valve in the underground portion of the system was partially closed, or the underground supply piping was obstructed by some foreign material. Another possibility was that there was something wrong with the detector check valve between the underground stub into the building and the sprinkler riser.

Typically, the flow through a 2 inch drain valve will be between 100 gpm and 200 gpm, depending upon the pressure in the system. The friction loss in 8 inch underground piping with 200 gpm flowing should be zero and the pressure drop through a 6 inch detector check valve with 200 gpm flowing should be 1 or 2 psi. Based upon this, the residual pressure at the main drain should have been around 55 psi, rather than 45 psi.

A few weeks later, a sprinkler contractor doing work on the system found a partially-closed control valve in the valve pit at the connection to the municipal distribution system.

That's how the main drain test is conducted and how the results of the test are used. Without conducting a main drain test and understanding the results of the test, no one would have been aware that there was a partially closed control valve in the underground supply piping.

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