Fire Engineering®

Construction Concerns: Sprinkler Water Supply
Article and photos by Gregory Havel
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The most common water supply for an automatic fire sprinkler system is by a connection to a city water system. Connection to an overhead water tank or a ground-level pressurized reservoir would be similar.

Photo 1 (*left*) shows an eight-inch water main rising through the floor to supply a sprinkler system in a large school. Two anchor rods are visible; they extend through the floor parallel to the pipe and are bolted into the flange at the top of the lower pipe section. The other ends of these rods are not visible. They pass through, and are attached to, bolt holes in the 90° elbow below the floor and are also anchored into the concrete thrust block, also below the floor. Additional concrete thrust blocks were poured in the excavation at every point where the pipe changed direction. These anchor rods and thrust blocks ensure that the pipe sections and fittings will not pull apart as a result of the energy produced by the high volumes of water that can flow through a sprinkler system while it is operating.

This sprinkler system is connected to the water main in the street by a gate valve operated by a key in a flush street box. The domestic water supply for the building is also connected to the water main in the street by its own smaller gate valve in a flush street box a short distance away.

Photo 1 shows the parts of the sprinkler water supply, beginning at the floor:

- The eight-inch flanged water main, with its anchor rods;
- A flanged eight-inch by six-inch reducer;
- The six-inch sprinkler system control valve connected to the reducer by flanges;
- The six-inch back-flow preventer (blue) connected to the control valve with Victaulic fittings;
- Another six-inch valve, with Victaulic™ connections, so that the backflow preventer can be serviced without draining the sprinkler system;
- Two six-inch 90° elbows, six-inch-pipe, and another 90° elbow, to bring the sprinkler system header to a convenient height for servicing--all with Victaulic fittings;
- The horizontal six-inch sprinkler system header, supported on the floor by two pipe legs;
- Three four-inch sprinkler risers, each with its own valve, pressure gauge, and main drain, and serving a separate part of the building; and
- A four-inch pipe leading to the fire department connection (FDC).

Photo 2 shows the same sprinkler system header from the opposite end. From left to right,

- A four-inch sprinkler riser,
- A second four-inch sprinkler riser,
- The pipe leading to the FDC, with the check valve and ball drip, and
- A third four-inch sprinkler riser.

Each sprinkler control and riser valve is monitored by a “tamper switch,” connected to the fire alarm-monitoring service. Each flow switch is connected to the electric alarm bell and strobe light outside the building near the FDC and to the building fire alarm panel.

These three risers share common main drain piping, which discharges to the pavement outside this utility room.

Also visible on each riser is an inspector’s test fitting and valve, which also discharges into the common main drain. Each of these inspector’s tests is tapped off its riser above the valve and flow switch. Each has an indicating ball valve, a sight glass with an orifice to simulate a fused sprinkler head, and discharge piping connecting to the common main drain.

For complete information on installation of water supplies and risers for automatic fire sprinkler systems, see the following:

- *Fire Protection Handbook,* 20th Edition: NFPA, 2008.
- NFPA 13: *Standard for Installation of Sprinkler Systems,* 2007 Edition.
- NFPA 24: *Installation of Private Fire Service Mains and their Appurtenances,* 2007 Edition.
- *Fire Detection and Suppression System,* Third Edition: IFSTA/FPP, 2005.

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