A good sprinkler system installation is all about details. This column will take a look at some of the detailed requirements for sprinkler system installations. The sections referenced in NFPA 13 refer to the 1999 edition of NFPA 13, Installation of Sprinkler Systems.

**Minimum Working Pressure Ratings.** NFPA 13 indicates that the rated working pressure of the components of a sprinkler system is required to be a minimum of 175 psi. This requirement means that the rated working pressure of a listed sprinkler is typically 175 psi. Where the working pressures in a sprinkler system will exceed 175 psi, either pressure reducing devices must be installed in the system or sprinklers with a rated working pressure higher than 175 psi must be used. As standard operating procedure, fire departments typically supply sprinkler system fire department connections with 150 psi to avoid exceeding the working pressure ratings of the sprinkler system components. (Section 3-1.2, NFPA 13)

**New Sprinklers.** NFPA 13 indicates that only new sprinklers are permitted to be installed. The reason for this requirement is just common sense — sprinklers that have been previously installed in another system may be damaged during removal and storage, hence the use of “used” sprinklers is prohibited to avoid water leakage from sprinklers. (Section 3-2.1, NFPA 13)

**Small Orifice Sprinklers.** NFPA 13 indicates that small orifice sprinklers are only permitted to be used to protect light hazard occupancies. This section also states that small orifice sprinklers are only permitted to be installed in wet systems. (Section 3-2.4.2, NFPA 13)

**Escutcheons for Recessed Sprinklers.** NFPA 13 indicates that the escutcheons used as part of an installation of recessed or flush-type sprinklers are required to part of a listed sprinkler assembly. In other words, one manufacturer’s recessed escutcheons are not permitted to be used with another manufacturer’s sprinklers. (Section 3-2.7.2, NFPA 13)

**Pipe Identification.** NFPA 13 requires that all piping used in a sprinkler system be continuously marked with the manufacturer’s name and model designation or schedule. How can a sprinkler system inspector differentiate between schedule 40 steel pipe, schedule 10 steel pipe or a specially listed “thin wall” steel pipe in the field? That’s easy — if the pipe is schedule 40, “S40” will be stenciled on the side of the pipe. If the pipe is schedule 10 pipe, “S10” will be stenciled on the side of the pipe and if the piping is a specially listed type of steel pipe, the manufacturer and model will be stenciled on the pipe. Obviously, it doesn’t take a rocket scientist to figure out what type of pipe has been installed in a sprinkler system. (The type of steel pipe installed in a system impacts the hydraulics of the piping system, hence, verifying that the proper type of pipe has been installed is extremely important.) (Section 3-3.7, NFPA 13)

**Bushings.** NFPA 13 prohibits the use of bushings, except where fittings with the outlet sizes required are not available. Although the use of bushing is, in general, prohibited, it is common to see sprinkler installers using bushings. Why? Because sprinkler installers know that most sprinkler inspectors don’t know what a bushing is and don’t know that the use of bushings is not permitted. (Section 3-5.5, NFPA 13) Note: An exception to the general requirement which prohibits the use of bushings is contained in section 5-13.20.1 in NFPA 13.

**Pressure Relief Valves in Gridded Piping Systems.** NFPA 13 indicates that a pressure relief valve is required to be installed in gridded piping systems. The relief valve is required to be a minimum of 1/4 inch in size and is required to be set to operate at a pressure of 175 psi or less. (Section 4-1.2, NFPA 13)

**Gridded Dry Systems.** NFPA 13 indicates that gridded piping systems are not permitted to be used in dry systems. (Sections 4-2.3.2, NFPA 13)

**Upright Sprinkler Installation.** NFPA 13 indicates that upright sprinklers are required to be installed with the sprinkler frame parallel to the piping on which the sprinkler is installed. Again, this is another common sense requirement — the sprinkler frame and piping below an upright sprinkler both create “shadows” in the sprinkler spray. The sprinkler frame is required to be aligned with the pipe supplying the sprinkler to reduce the width of the “shadows” created in the sprinkler spray. (Section 5-3.1.2, NFPA 13)

**Sidewall Spray Sprinklers.** NFPA 13 indicates that sidewall sprinklers are only permitted to be used to protect light hazard occupancies, unless the sidewall sprinkler is specifi-
Fire Protection

cally listed to be used to protect ordinary hazard occupancies. Reviewers of shop drawings for sprinkler system installations should always verify that the sidewall sprinklers specified in the shop drawings are specifically listed to protect ordinary hazard occupancies where sidewall sprinklers are used in this application. (Section 5-4.2, NFPA 13)

Location of Sprinklers With Respect to Walls. NFPA 13 indicates that standard pendent and upright sprinklers are required to be installed a minimum of 4 inches from a wall. (Section 5-6.3.3, NFPA 13)

Sprinkler Deflector Orientation. NFPA 13 indicates that sprinklers are required to be installed so that the sprinkler deflector is parallel to the ceiling above. This requirement applies not only to upright and pendent sprinklers, but also to sidewall sprinklers. (Sections 5-6.4.2 and 5-7.4.2.1, NFPA 13)

Sprinkler Installations in Electrical Equipment Rooms. NFPA 13 specifically indicates that sprinkler protection is required in electrical equipment rooms. An exception to this general requirement permits sprinklers to be omitted from electrical rooms if the electrical room is enclosed in 2-hour construction. See NFPA 13 for additional conditions which must be fulfilled prior to omitting sprinkler protection from electrical rooms. (Section 5-13.11, NFPA 13)

Pipe Drainage. NFPA 13 indicates that sprinkler system installations are required to be installed so that the system can be drained through the main drain. NFPA 13 gets more specific. NFPA 13 states that wet systems are permitted to be installed level, while dry systems are required to be pitched. Branch lines in dry systems are required to be pitched a minimum of 1/2 inch for each 10 feet of pipe length, while mains are required to be pitched 1/4 inch for each 10 feet of pipe length.

NFPA 13 requires that auxiliary drains be provided where offsets in the piping system create “trapped” piping. Where the volume of the trapped piping is less than 5 gallons, an auxiliary drain is permitted to consist of a 1/2-inch plug or nipple and cap. Where the volume of the trapped piping exceeds 5 gallons, a drain valve is required to be provided for the auxiliary drain in a wet system. See NFPA 13 for the requirements for auxiliary drains in dry systems.

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