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Changes in the 2016 Edition of NFPA 13 Installation Criteria

The 2016 edition of NFPA 13 has just been published by the NFPA. This new edition of the standard contains a number of new requirements that are important to everyone in the fire sprinkler industry. The list is quite long, so it has been broken into a four-part series of special editions for TechNotes. These summaries will explain the changes that are most important in the opinion of the editor. This will not be a list of every change to the standard, but is intended to help everyone understand the big items with respect to installation, hanging and bracing, discharge, and residential.

This issue is Part 1. It will focus on the changes to the installation criteria rules of NFPA 13. It has been prepared by Roland Asp, NFSA's Manager of Installation Standards. The following items are highlighted from the revisions made in preparation of the 2016 edition:

Metric Conversion (1.6). The 2016 edition has moved to a soft or approximate conversion approach for metric conversions. In the past, NFPA 13 applied an exact conversion process. This change will make the standard more user friendly in regions outside the United States.

Cloud Ceiling Definition (3.3.5.1). A definition has been added for "floating ceilings" which are also referred to as cloud ceilings. This definition reads: "Any ceiling system installed in the same plane with horizontal openings to the structure above on all sides. This does not include sloped ceilings as defined in 3.3.5.4."

This new definition is related to a new design scheme in section 8.15.24 which would allow sprinklers to be omitted above cloud ceilings if certain conditions are met.

Extension Fitting Definition (3.5.6). A new definition was added for extension fittings. These adapters are commonly used to adjust the final fit of a sprinkler installed in finished walls and ceilings. This new definition compliments new requirements for these fittings that have been added in section 6.4.8.

Reinstallation of Sprinklers (6.2.1.1). The 2013 edition of NFPA 13 added language stated that once a sprinkler is removed for any reason, it cannot be reinstalled. The language of this section was revised to state that a sprinkler cannot be reinstalled when it is "removed from a fitting or welded outlet". This revision and related annex language clarifies that when a sprinkler is removed but remains attached to the original fitting it may be reinstalled. The reasoning is that sprinklers may be damaged during removal when torque from a wrench is applied to the sprinkler itself. When a drop including a sprinkler is removed, the wrench will not be used directly on the sprinkler. This will limit the torque applied to the sprinkler itself which could lead to damage. Annex language has been added noting that care must be

taken in handing the removed sprinkler and that flexible hose connections are considered a fitting for the purpose of 6.2.1.1.

Reinstallation of Dry Sprinklers (6.2.1.1.1). New language was added to the 2016 edition clarifying that dry sprinklers may be reinstalled as long as the manufacturer's instructions for removal are followed.

Nonmetallic Pipe (6.3.9). The section dealing with nonmetallic pipe has been reorganized and revised for clarity. Similar changes have been made in section 6.4.3 for nonmetallic fittings.

Extension Fittings (6.4.8). This new section adds guidelines for the use of extension fittings as defined in section 3.5.6. This section restricts the use of extension fittings to sprinklers with a k-factor of 8 and smaller, permits their use in light and ordinary hazard occupancies and restricts the length to 2 inches. Extension fittings in excess of 2 inches are permitted when they are specifically listed. Extension fittings must be included in the hydraulic calculations if they exceed 2 inches in length.

Air Venting (7.1.5 and 8.16.6). A new requirement to provide a single air vent on wet pipe systems utilizing metallic pipe has been added to the standard. The intent of this new requirement is to reduce oxygen induced corrosion in the system. Section 7.1.5 requires a single air vent be installed and specifies that the venting from multiple point of a system is not required. Section 8.16.6 provides design guidance for installing these vents. 8.16.6 specifies that this vent shall be installed near a high point in the system and shall consist of; a manual valve at least ½ inch in size, an automatic air vent, or other approved means. The annex section (which was carried over from the 2013 edition) gives guidance on the purpose of these vents and suggests that an inspector's test valve may be used to comply with this section.

Dedicated Air Maintenance Device (7.2.6.6.3.1). This new section clarifies that each dry pipe system must have its own dedicated air maintenance device.

Non-Fire Protection Connections Section Deleted (7.7 in 2013 edition). Section 7.7 which included circulating closed-loop systems was deleted in its entirety. This section was thought of as outdated and as compatibility issues are an ongoing issue, the committee believes that non-fire connections which may lead to compatibility issues should be avoided.

Floor Control Valve Assemblies (8.2.4). The 2013 edition of NFPA 13 added a requirement for floor control valves in multistory buildings exceeding two stories in height. For the 2016 edition the wording of this section was changed from requiring floor control valve assemblies "on each floor level" to "for each individual floor level" This change allows the required floor control valve assemblies to be located on a level remote from the level being served. It is, at times, more practical to locate all sprinkler equipment in a central location such as a riser room or another area remote from the floor being served.

An additional revision was made to this section to exempt dry systems in parking garages from the requirement for floor control valves for each level. This change recognizes the difficulty in protecting unheated parking garages with a single dry-pipe valve and then installing separate floor control valves downstream of the dry pipe valve.

Finally, this section was moved from section 8.16.1.5 in the 2013 edition to section 8.2.4 on the 2016 edition.

Sprinklers in Light Hazard Occupancies (8.3.3.1). This section was revised to specifically allow the use of ESFR and Quick Response CMSA sprinklers in light hazard occupancies.

Sprinklers in Light Hazard Occupancies (8.3.3.5). This section was added to deal with extended coverage sprinklers with fast response operating elements that are listed for both quick response and standard response at different spacings. This section allows these sprinklers to be installed in a single compartment at both the spacing for quick response and standard response without separation.

Extended Coverage Sprinklers below overhead doors (8.4.3(7)). This section now specifically allows extended coverage sidewall sprinklers to protect below a single overhead door(s).

Galvanized Pipe for CMSA systems (8.4.7). The requirement to use galvanized pipe for dry systems and preaction systems utilizing CMSA sprinklers has been removed. The committee felt that there is no reason to mandate the extra expense for galvanized pipe, since it may corrode just as rapidly as black steel pipe.

Sprinklers under obstructions over 4 feet in width (8.5.5.3). Multiple changes have been made to section 8.5.5.3 which deals with sprinklers under fixed obstructions over 4 ft in width. These changes include:

- Sprinklers installed under obstructions may be located up to 3 inches from the outside edge of the obstruction. This is stating that the sprinkler is not required to be located directly under the obstruction and sprinklers within 3 inches to the side of the obstruction will activate to a fire under the obstruction without significant delay.
- Sprinklers located adjacent to the obstruction shall be of the intermediate rack type to protect it from water spray from sprinklers above.
- The deflector of sprinklers installed under obstructions must be positioned no more than 12 inches below the bottom of the obstruction.
- Sprinklers are not required under noncombustible obstructions over 4 ft. wide when the bottom of the obstruction is no more than 24 in. above the floor. The committee felt that when obstructions are close to floor the potential fuel load is small enough that supplemental sprinkler protection is not necessary.
- Sprinklers installed under obstructions shall be the same type (spray, CMSA, ESFR, residential) than those installed at the ceiling. Prior to this change the standard did not include guidance on the type of sprinklers installed under obstructions. Sprinklers protecting under overhead doors are an exception and may be spray sprinklers regardless of the type of sprinkler at the ceiling.

Skylights (8.5.7.1.1). For sprinklers that are installed directly below a skylight not exceeding 32 sq. ft., the deflector distance is measured to the ceiling plane as if the skylight was not present.

Sprinkler Placement in Combustible Concealed Space (8.6.4.1.4). The requirements for locating sprinklers in respect to hip roofs and eaves have been clarified and new annex figures were added.

Minimum Distance from an Obstruction in the Vertical Orientation (8.6.5.2.1.3). When applying the rules of 8.6.5.2.1.3, commonly known as the “three times rule”, the maximum clear distance of 24 inches has been eliminated for obstructions in the vertical orientation such as columns. Work by the NFSA E&S committee task group on shadow areas and fire testing has shown that there is an issue with the maximum clear distance of 24 inches allowed by the "three times rule". This testing showed that when this maximum clear distance allowance is used to locate sprinklers from large obstructions, the

fire may not be controlled. As this testing was limited to vertical columns the elimination of the maximum clear distance is limited to obstructions in the vertical orientation.

Similar changes were made to this rule ("three times rule" and "four times rule") for other sprinkler types as well.

It is important to note that this revision does not change the base three times rule or four times rule but will only remove the maximum clear distance to obstructions in the vertical orientation such as columns. This proposed change would only become applicable when applying this rule to large vertical obstructions in excess of 8 inches (or 9 inches for the four times rule). The three times or four times rule may still be applied to these large columns without utilizing a maximum clear distance allowance of 24 or 36 inches.

Lintels and Soffits (8.7.4.1.3 and 8.9.4.1.3). The 2013 edition required that sidewall sprinklers located on the face of a soffit must be installed with the deflector located within 4 inches of the bottom of the soffit. The 4 inch minimum requirement was eliminated as there are times when the sprinkler cannot be located within 4 inches of the bottom of the soffit and there is no need to install a pendent sprinkler under such a small soffit.

Soffits and Cabinets (8.7.4.1.4). The existing soffit and cabinets rules from the residential section were extended to apply to standard spray sidewall sprinklers.

Lintels and Soffits (8.7.4.1.3)
Clear Space above EC and Residential Sidewall Sprinklers (8.9.5.1.3 and 8.10.7.1.3). When positioning standard spray and residential sidewall sprinklers to avoid obstructions in accordance with sections 8.8.5.1.3 and 8.10.7.1.3, there needs to be some clear space above the sprinkler deflector for the discharge to arc up. The figures were modified to indicate that a 4 inch minimum clear space is needed above the sprinkler deflector.

Residential Sprinklers and Sloped Ceilings (8.10.2.2). This new section clarifies that residential sprinklers are not permitted to protect ceilings with a slope greater than 8 in 12 or ceilings higher than 24 feet unless they are specifically listed for this use.

Grouped Small Obstructions – ESFR sprinklers (8.12.5.3.3). The 2013 edition of NFPA 13 is silent on when multiple small obstructions grouped together should be treated a single large obstruction. These small obstructions include pipes and conduits. As ESFR sprinklers are particularly sensitive to obstructions the following guidance has been added to the standard for ESFR sprinklers. For these small obstructions to be treated as individual obstructions, they must be separated from the closest small obstructions by a minimum of three times the width of the adjacent pipe, conduit, etc.

Small Openings in Concealed Spaces (8.15.1.2.1.2). Small openings are permitted in concealed spaces not requiring sprinkler protection but size limitations were not included in the standard. This new section limits allowable openings in concealed spaces to 20 percent of the ceiling area and if the opening exceeds 4 feet in length the width is limited to 8 inches maximum.

Openings in Cloud Ceilings (8.15.1.2.1.3). This section limits the openings in a cloud ceiling to a maximum of 20 percent of the ceiling area. This requirement relates to new design scheme in section 8.15.24 which would allow sprinklers to be omitted above cloud ceilings if certain conditions are met.

Combustible Concealed Space Sprinklers (8.15.1.6.2). Language was added to allow sprinklers listed to protect combustible concealed spaces to protect the space when a portion of the space exceeds 36 inches.

Fabric Canopies (8.15.7.2). Flame resistant fabric canopies have been added to the list of exterior projections that do not require sprinkler protection.

Dwelling Unit Bathrooms (8.15.8.1). The 2013 edition of NFPA 13 allowed sprinklers to be omitted from bathrooms 55 sq. ft and less in hotels and motels only. For the 2016 edition, this exception was extended to small bathrooms in all dwelling units, not just those in hotels and motels. Sprinklers are still required in bathrooms of limited care facilities and nursing homes.

Closet and Pantries (8.15.8.2). The 2013 edition of NFPA 13 allowed sprinklers to be omitted from closets 24 sq. ft. and smaller but limited the least dimension of the closet to 3 feet. For the 2016 edition the least dimension requirement was eliminated. This change will correlate with NFPA 13R when it comes to closet criteria.

Hoods to Protect Electrical Equipment (8.15.11.2). The requirement that hoods and shield protecting important electrical equipment be non combustible was eliminated from the standard.

Cloud Ceilings (8.15.24). This new section provides guidance on when sprinklers may be omitted from above a cloud ceiling. This section is based upon the results of a Fire Protection Research Foundation project on this subject. The basic premise is that under a certain set of circumstances, sprinklers located below the clouds only will provide adequate fire protection.

Revolving Door Enclosures (8.15.25). This new section clarifies that sprinklers are not required within revolving doors.

Sprinkler-Protected Glazing. (8.15.26). This new section of NFPA 13 provides guidance for situations where sprinklers are used in combination with glazing as an alternative to a required fire-rated wall or window assembly. Although this concept is new to NFPA 13, it is being used as an alternate arrangement to a fire resistance rating in the building codes when approved by the building official. It is important to note that this section does not override the use of standard spray sprinklers for the protection of glass atriums as permitted by NFPA 101.

Main Drain Sizing (8.16.2.4.2). The size of the main drain has traditionally been limited to a maximum size of 2 inches. In order to use the main drain as a method for performing forward flow tests for backflow preventions devices, the language restricting the main drain size to 2 inches has been eliminated. The 2016 edition does not mandate a maximum size for main drains.

Fire Department Connection Size (8.17.2.3). The 2013 edition of NFPA 13 stated in section 8.17.2.3(3) that for hydraulically calculated systems, the FDC could be less than 4 inches but “no less than the size of the system riser, where serving one system riser”. This section was changed to state that the FDC is permitted to be less than 4 in. “but not less than the largest riser being served by that connection”.

Automatic Drain Valve (8.17.2.6.1). Language was added to require that the automatic drain valve serving the FDC must be installed in a location that permits inspection and testing.

Backflow Prevention Valves (8.17.4.5.1). The 2013 edition of NFPA 13 stated that a "means shall be provided downstream of all backflow prevention valves for flow tests at system demand". System demand refers to flow rate and pressure. This test is only concerned with testing at the proper flow rate. The wording of this section was changed to: "for forward flow tests at a minimum flow rate of the system demand including hose allowance where applicable". This change clarifies that flow testing measuring pressures is not required and this revised terminology is consistent with NFPA 25.

Electrical Bonding and Grounding (8.18). This new section specifically prohibits the sprinkler system piping from being used to ground the electrical system. Bonding of the sprinkler system piping to the lightning protection system is not prohibited.