

The following issue of TechNotes has been written by Roland Asp, C.E.T., Manager of Installation Standards for the NFSA. Roland serves on the Technical Committee on Sprinkler System Installation Criteria.

NFPA 13 has, for many years, required sprinklers to be installed below obstructions over 4 ft in width. As a reference, the 2013 edition of NFPA 13 states in section 8.5:

8.5.5.3.1* *Sprinklers shall be installed under fixed obstructions over 4 ft (1.2 m) in width.*

This wording is not much different in the 1961 edition of NFPA 13 (this is the earliest edition that I have access to) which states:

4316. Ducts. *Sprinklers should be installed under ducts which are over 4 feet wide, and under ducts of less width if distribution from ceiling sprinklers is obstructed.*

What has not been included in the standard is guidance on where to position these sprinklers and what type of sprinkler is required. At the First Draft Meeting for the 2016 edition of NFPA 13, the Installation Committee was made aware of installations in which the sprinkler(s) under the obstruction was located off to the side of the obstruction or was located too far below the bottom of the obstruction. In cases like this, the sprinkler(s) below the obstruction may not activate in a timely manner and this sprinkler may be cold-soldered by sprinklers activated at the roof. Technically, these installations were not prohibited by the language in NFPA 13.

Based upon Public Inputs and Public Comments submitted during the 2016 revision cycle the following rules were added to Section 8.5, which apply to all sprinkler types:

A new section was added that states that the required sprinkler located below the wide obstruction must be installed directly below the obstruction and is permitted to be positioned up to 3 inches beyond the outside edge of the obstruction. The committee stated that by having the sprinkler directly below the obstruction, it will activate promptly to a fire below. The committee also stated that a sprinkler installed no more than 3 inches beyond the outside edge will still be in the heat plume of a fire and will be activated promptly.

It must be noted the wording of this section may be misinterpreted. It states that the sprinkler must be installed “not more than 3 inches from the outside edge of the obstruction”. A strict reading of these words may be interpreted to mean that the sprinkler must be installed no more than 3 inches from the inside or the outside of the outer edge of the obstruction. This is not the intent. The sprinkler may be installed anywhere directly under the obstruction and is allowed up to 3 inches beyond the outer edge of the obstruction. This section reads:

8.5.5.3.1.1 *Sprinklers shall be located below the obstruction and not more than 3 in. (75 mm) from the outside edge of the obstruction.*

Obviously, if the sprinklers are installed beyond the outside edge of the obstruction, it would be subject to the discharge of the ceiling sprinkler above. In order to address this concern of cold-soldering, a new section was added that requires that the sprinklers installed adjacent to the obstruction must be of the intermediate rack type. The water shield of these sprinklers will prevent cold soldering. This section reads:

8.5.5.3.1.2 *Where sprinklers are located adjacent to the obstruction, they shall be of the intermediate level rack type.*

Another issue that was not specifically addressed in previous editions of NFPA 13 was the deflector distance of the sprinkler below the obstruction. Again, the concern is that a sprinkler installed too far below the obstruction will not activate in a timely matter. To provide guidance, a new section was added that would require the sprinkler deflector to be installed within 12 inches from the bottom of the obstruction similar to the distance between sprinklers and the ceiling. This section reads:

8.5.5.3.1.3 *The deflector of automatic sprinklers installed under fixed obstructions shall be positioned no more than 12 in. (300 mm) below the bottom of the obstruction.*

Another long standing issue that has been addressed in the 2016 edition of NFPA 13 is dealing with obstructions that are close to the floor. In past revision cycles, the Installation Committee was asked to address these low obstructions and chose not to put any minimum height in the standard. Regardless of how high (or how low) the obstruction, sprinklers are required under obstructions more than 4 ft wide. The Committee did state that you have the option of attaching limited combustible or non-combustible material (like sheet metal or gypsum board) vertically to the side of the obstruction to extend down to the floor, which can create a noncombustible concealed space under the duct. Provided such a concealed space would not allow the accumulation of combustibles or storage, it would not be required to be sprinklered.

During this revision, the committee chose to address this issue and a new section was added to NFPA 13 that states that sprinklers are not required under obstructions over 4 ft wide that are within 24 inches of the floor as long as the obstruction is noncombustible. This section reads:

8.5.5.3.1.4 *Sprinklers shall not be required under noncombustible obstructions over 4 ft (1.2 m) wide where the bottom of the obstruction is 24 in. (600 mm) or less above the floor or deck.*

Another issue that NFPA 13 was not clear about is the type of sprinkler that is required under these obstructions. There was nothing in the standard that stated the sprinkler below the obstruction must be the same type that is installed at the ceiling. A new section was added to clarify this issue. This section reads:

8.5.5.3.3 *Sprinklers installed under obstructions shall be of the same type (spray, CMSA, ESFR, residential) as installed at the ceiling except as permitted by 8.5.5.3.3.1*

There is an exception to this rule (section 8.5.5.3.3.1) that applies to overhead doors. Spray sprinklers are permitted to be installed below overhead doors without consideration to the type of sprinklers at the ceiling. This exception states that even if the overhead system uses ESFR or

CMSA type sprinklers, the required sprinkler protecting under the overhead door is permitted to be sidewall type spray sprinkler (or any spray sprinkler).

A final change highlighted in this TechNote's is the new rules for sprinklers protecting under round ducts over 4 feet in width. These sprinklers must meet the rules listed above with the additional requirement that this sprinkler must be of the intermediate rack type sprinkler or otherwise shielded regardless of the sprinkler's location below the round duct. The concern with round ducts is that the overhead sprinklers will discharge water onto the duct and surface tension will cause the water to cling to the outside of the duct. The water may flow around the duct and drop off at the bottom which could cold-solder the sprinkler below. For this reason all sprinklers installed below round ducts must have a water shield. It also must be noted that this requirement is only found in section 8.6 (Standard Spray Upright) and Pendants, section 8.8 (Extended Coverage Upright and Pendent Spray Sprinklers) and section 8.10 (Residential Sprinklers). This section reads:

8.6.5.3.7 *Sprinklers installed under round ducts shall be of the intermediate level/rack storage type or otherwise shielded from the discharge of overhead sprinklers.*

In summary, sprinklers need to be located under wide obstructions so that the floor area is properly protected. Clarity has been added to the language in NFPA 13 so that spacing those sprinklers below obstructions is now easier to understand. This will improve the protection for any possible fire incidents.