Author(s): Matt Klaus. Published on November 1, 2011.

Sprinkler [omissions]

Not every space in a structure is required to be protected by sprinklers—and NFPA 13 is very clear on what those spaces need to remain unprotected.

NFPA Journal®, *November/December 2011*

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Everyone wants to save money, builders and building owners included. One way they can do that is to omit sprinklers from areas where the codes say it's okay to leave them out. But it's important to know precisely what those areas are.

Automatic sprinkler systems installed in accordance with NFPA 13, Installation of Sprinkler Systems, are intended to serve two functions: property protection and life safety. In order for the systems to achieve these goals, the general rule is to provide sprinklers to protect all spaces within a building. However, there are several spaces in which sprinklers are not required, as their installation may not be practical based on building geometry. Similarly, there are other spaces where sprinklers can be omitted where the potential for ignition and fire development are not a great cause for concern.

The majority of the spaces from which sprinklers can be omitted from NFPA 13 designs center around the concept of concealed spaces. Concealed spaces are non-occupied spaces that are created by building construction. These spaces may contain piping and wiring for various building systems, or, in many cases, may be void of any and all combustible material. The starting point for all designers, installers, and enforcers who are trying to determine if sprinklers are required in a specific concealed space is that concealed spaces should be sprinklered unless Section 8.15.1 of the 2010 edition of NFPA 13 provides alternate direction.

One of the distinctions this section makes is the type of construction that is used to form the concealed space. Concealed spaces that are constructed of noncombustible or limited combustible material are not required to be protected with automatic sprinklers, provided there is minimal combustible loading and no access to the space. The presence of combustible loading increases the potential for fire growth within the space and would therefore necessitate sprinkler protection. Where access is provided to these spaces, it is common for building occupants to use them for storage, creating a fuel load that would otherwise not be present in the noncombustible space.

Where access to noncombustible or limited combustible concealed spaces is provided, sprinkler protection can be omitted, provided the space is not used for occupancy or storage of combustibles. Often, access panels into noncombustible concealed spaces are present so that maintenance can be performed on building equipment. In these instances, the presence of the access hatch is not intended to trigger a requirement for sprinklers in an otherwise noncombustible space where no goods are being stored.

Noncombustible concealed space without sprinklers

Where combustible concealed spaces are formed, there is a greater concern for fire growth in the cavity. There are, however, certain combustible concealed spaces from which sprinklers can be omitted. Due to the impracticability of installation, sprinklers can be omitted in concealed spaces formed by studs or joists with less than 6 inches (15 centimeters) between the inside edges. Similarly, concealed spaces formed by ceilings that are attached directly to, or within 6 inches (15 centimeters) of, wood joists do not require sprinkler protection.

Combustible concealed spaces formed where ceilings are attached directly to the underside of composite wood joists or onto metal channels no deeper than 1 inch (2.5 centimeters) do not require sprinkler protection where the joist channels are fire stopped at intervals of not more than 160 cubic feet (4.5 cubic meters) and where at least 3.5 inches (8.8 centimeters) of that installation is installed at the bottom of the joist channels. Where wood joist or composite wood joist construction is used in ceilings not attached directly to the joist, sprinklers can be omitted where insulation is used to fill the void from the ceiling to the bottom of the joist and where the joist channels are fire stopped at intervals not exceeding 160 cubic feet (4.5 cubic meters) to the full depth of the joist.

Other combustible concealed spaces from which sprinkler protection can be omitted include spaces that are filled entirely with noncombustible insulation and spaces where the exposed materials are constructed entirely of fire-retardant-treated wood.

It is important to note that where sprinklers are omitted from combustible concealed spaces there may be an impact on the hydraulic design of the system. Often, where buildings have unsprinklered combustible concealed spaces, the minimum design area that must be considered for that portion of the building is 3,000 square feet (279 square meters) or twice what is typically expected for light and ordinary hazard spaces. For more information on when the 3,000-square-foot (279-square-meter) design area comes into play for combustible concealed spaces, refer to Section 11.2.3.1.4 in the 2010 edition of NFPA 13.

Inside + Outside
Sprinkler omissions are not limited to combustible concealed spaces. Stair shafts of noncombustible construction are permitted to have sprinkler protection only at the top of the shaft and underneath the first access landing above the bottom of the shaft.

Other spaces that may remain unsprinklered include spaces beneath ground floors, exterior decks, and platforms. Sprinklers can be omitted from these spaces provided they are not accessible for storage, contain no equipment such as conveyors or fuel-fired heating units, the floor above is not used for handling or storing combustible or flammable liquids, and the floor construction is tight.

Sprinklers can be omitted from several exterior spaces as well. Canopies, balconies, decks, roofs, and porte cocheres that are constructed of noncombustible materials, limited combustible materials, or fire-retardant-treated wood need not have sprinkler protection. Another outdoor space from which sprinklers can be omitted is an exterior exit corridor where the exterior walls of the corridor are at least 50 percent open and the corridor is entirely constructed of noncombustible material. This is a very common egress system for motels and apartment buildings.

Where NFPA 13 systems are installed in residential applications, sprinklers can be omitted from bathrooms that do not exceed 55 square feet (5.1 square meters) in area as long as the walls and ceiling provide a 15-minute thermal barrier. This requirement does not apply to limited-care facilities and nursing homes or to bathrooms that open directly onto public corridors. Other residential applications from which sprinklers can be omitted are clothes closets, linen closets, and pantries in dwelling units in hotels or motels where the space does not exceed 24 square feet (2.2 square meters) and the smallest dimension of the space does not exceed 3 feet (0.9 meters). These closets and pantries must be surfaced with noncombustible or limited combustible construction.

Residential sprinkler standards
NFPA 13R, Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height, and NFPA 13D, Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes, also permit sprinklers to be omitted from certain areas. NFPA 13D and NFPA 13R are developed with a singular fire protection goal: life safety. For this reason, there are several additional areas that can be unsprinklered, as fires in these areas are not linked to a loss of life.

In addition to the permissible omissions already listed for residential applications where NFPA 13 systems have been installed, sprinklers can be omitted in NFPA 13R systems in attics, penthouse equipment rooms, elevator machine rooms, concealed spaces dedicated to dwelling unit ventilation equipment, and other concealed spaces that are not used or intended for living purposes or storage. Sprinklers are not required in closets on exterior dwelling unit balconies or breezeways regardless of the size of the closet, provided the closet does not have doors or unprotected penetrations directly into the dwelling unit. Where fuel-fired equipment is present, at least one quick response sprinkler must be installed above the equipment.

Similar to NFPA 13R systems and residential areas of NFPA 13 systems, sprinklers can be omitted from bathrooms less than 55 square feet (5.1 square meters) and closets no larger than 24 square feet (2.2 square meters) in NFPA 13D systems. Nor are sprinklers required in NFPA 13D systems in attics, penthouse equipment rooms, elevator machine rooms, and concealed spaces containing only dwelling unit ventilation equipment.

NFPA 13D also permits some unique portions of one- and two-family dwellings to omit sprinklers. For example, sprinklers are not required in covered, unheated projections at the entrance and exit as long as the dwelling has another means of egress. In addition, sprinklers are not required in garages, attached porches, carports, and similar structures.

Ideally, all spaces within a structure would be provided with automatic sprinkler protection. However that simply isn't possible. The NFPA technical committees that prepare the sprinkler documents have scrutinized areas from which sprinklers can be omitted and limited them to the greatest extent possible.

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