

view from the code floor

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13R and Mixed Occupancies

There are situations ... that may present problems when selecting a NFPA 13R system.

“To use or not to use?” That is the question, when deciding to employ a NFPA 13R system instead of a NFPA 13 system. The International Building Code (IBC) and the NFPA 5000 *Building Construction and Safety Code* have readily accepted the use of a NFPA 13R system, to provide automatic fire sprinkler protection for residential type occupancies up to four stories in height. The benefit of using a NFPA 13R system is that it provides a reasonable level of fire protection at a lower cost than provided by a full automatic fire sprinkler system installed to a NFPA 13 standard.

There are situations, however, that may present problems when selecting a NFPA 13R system.

Neither the IBC nor the NFPA 5000 provide clear guidance when it comes to mixed occupancies and the allowed use of a NFPA 13R system. A common problem, which may occur when providing a NFPA 13R fire sprinkler system for a building of mixed use, is that it may be the wrong standard. As stated in NFPA 5000-6.2.3.2: “The means of egress facilities, type of construction, protection, and other safeguards in the building shall comply with the most restrictive fire and life safety requirements of the occupancies involved.”

Because of this, means of egress will be established by the most stringent occupancy encountered. This requirement, which is repeated similarly in the egress chapter, is not repeated in the chapter on fire sprinkler systems. The IBC has an allowance in Section 903 dealing with R Occupancies. The allowance indicates the use of a NFPA 13R system in portions of buildings containing a R Occupancy.

Because the building codes provide ambiguous

guidance on this issue, the 2002 Edition of NFPA 13R provided guidance. The Annex A.1.1 of 2002 Edition of NFPA 13R now states that if it is appropriate to use NFPA 13R, that it be used throughout the entire building. Portions of the building can contain an occupancy that is incidental to the operations of the residential occupancy. Such incidental occupancy would be considered part of the predominant (residential) occupancy and subject to the provisions of the predominant (residential) occupancy by 6.1.14.2 of NFPA 101®, *Life Safety Code*®, and similar provisions in many local building and fire codes. Use of NFPA 13R throughout the entire building in this case is allowed. This would allow the omission of sprinklers from closets and pantries in the residential portions of the building. It would also allow for the attic, floor/ceiling spaces and other combustibles concealed spaces where it is permissible by NFPA 13R to omit sprinklers. Additionally it allows for a water supply to be based upon a 30 minute duration for the sprinkler system demand and does not require the inclusion of hose stream requirements.

To illustrate how the decision to use a NFPA 13R system over a NFPA 13 system can become confusing, I will use the following scenario: a sprinklered four-story building of Type V (III) construction. The first floor contains retail shops, a lobby area and a restaurant; the upper floors are residential occupancies similar to a hotel or condominiums (typical for inner cities). The issue, which needs to be resolved regarding the use of a NFPA 13R system in this building, is the status of the shops and restaurant on the first floor. Is the businesses incidental to the operations of the residential occupancy? If the shops and restaurant are dependent upon and derive the bulk of their income from the tenants of the building they are in, then they are incidental to the building use. Thus, NFPA 13R applies. On the other hand, if they are fully capable of operating and staying in business without or with limited patronage of the building occupants, they are not incidental.



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Where the shops or the restaurant derives the bulk of their business from the general public and are not dependent on the building occupants, the entire building will have to be sprinklered in accordance with NFPA 13. This does not exclude portions of the building being protected as a residential occupancy. NFPA 13R: A.1.1 of 2002 Edition also clarifies this issue by stating where the residential portion of the building is not the predominant occupancy, residential portions of such buildings should be protected with residential or quick-response sprinklers in accordance with 8.4.5 of NFPA 13. Other portions of such buildings should be protected in accordance with NFPA 13.

Additional guidance is also provided on mixed occupancies that are separated into distinct portions of the building. As stated in the Annex of NFPA 13R, where a structure of mixed use can be totally separated so that the residential portion is considered a separate building under the local code, NFPA 13R can be used in the residential portion, while NFPA 13 is used in the rest of the building. With the exception of the first-story parking garage, the building will have to have been separated by rated fire walls to allow the use of a NFPA 13R system. If these conditions cannot be satisfied, a

NFPA 13 system must be used.

The building codes will allow a single structure to be divided into and treated as separate buildings. This requires vertical separation as found in NFPA 5000:8.3 and in IBC: 705.1. They state that each portion or part of a building separated by one or more fire walls shall be permitted to be considered a separate building. Where buildings of mixed use can be totally separated by a vertical fire wall so that, as in our case, the residential portion is considered a separate building under the local code, then a NFPA 13R system can be used in the residential portion (which really isn't a portion since it is a separate building) and a NFPA 13 system can be used in the other building. To meet the requirement of a separate building, a vertical fire wall must separate the residential occupancies from the non-residential occupancies.

The only allowance of a building being permitted to be considered as horizontally separated is found in IBC: 508.2 and NFPA 5000:7.4.3.6.5. These sections will allow a first-story parking garage to be considered as a separate and distinct building from the stories above if separated by a 3-hour horizontal fire barrier assembly. This type of separation is limited only to parking garages.

In conclusion, the entire building must

allow the use of a NFPA 13R system or a NFPA 13 system will be required. Where buildings of mixed use can be totally separated so that the residential portion is considered a separate building under the local code, NFPA 13R can be used in the residential portion while NFPA 13 is used in the rest of the building. The building will have to be separated by rated fire walls to allow the use of a NFPA 13R system. If these conditions cannot be satisfied, a NFPA 13 system must be used. The only other exception to the vertical rated fire wall requirement will be the separation by a 3-hour horizontal fire barrier between the first story-parking garage located under a Residential Occupancy. ♣

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