

Storage Protection



Miscellaneous storage is defined by NFPA 13, *Standard for the Installation of Sprinkler Systems*, as “Storage that does not exceed 12’ in height, is incidental to another occupancy use group, does not constitute more than 10% of the building area or 4,000 ft² of the sprinklered area, whichever is greater, does not exceed 1,000 ft² in one pile or area, and is separated from other storage areas by at least 25’.” All of these conditions must exist for the storage to be classified as “miscellaneous.” The key statement is “incidental to another occupancy group.” This is intended to allow for storage areas in other occupancies, such as mercantile where the primary focus is sales and not storage, to not have to provide the increased levels of protection associated with a facility dedicated to storage. Because of the restrictions in storage height, pile depth, and separations, the increase in hazard is considered to be lower, and thus the lower protection criteria.

As products have developed over the past decades, so has the need for proper storage for those products. As such, the ability to arrange these commodities so that they qualify as Miscellaneous Storage has decreased. For example, many mercantile occupancies are considered ‘big box’ because the

storage of the commodities is not separated from the items for sale. Separate storage rooms are sometimes provided, but exceed the limitations required to be considered Miscellaneous Storage. It is these occupancies that require unique protection schemes to provide for adequate protection.

Protection schemes for storage are outlined in Chapters 14 through 20 of NFPA 13. However, for miscellaneous storage schemes, the protection requirements are outlined in Chapter 13 of NFPA 13. Again, the protection requirements are for storage not exceeding 12’ in height. This storage can be solid-piled, on shelves, on racks, or in bin boxes. The critical factor is the 12’ storage height limitation regardless of whether the commodity is Class I – IV or Group A plastic, rubber tires, or rolled paper. In each of these cases, the design criteria is outlined as either Ordinary or Extra Hazard occupancy, and are specified in Table 13.2.1 and on the design curves in Figure 13.2.1.

This essentially means that the protection criteria outlined in Chapter 11 for ordinary and extra hazard occupancies applies to the protection of miscellaneous storage. This gives the owner/occupant a great deal of flexibility in designing

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a fire suppression system. Along with the requirements and allowances found in Chapter 11, the use of K-11.2 or larger orifice sprinklers allows a reduction in the design area of 25% when using the extra hazard design curves, provided the reduction in area ends up to be no less than 2,000 ft².

An area of some confusion comes with use of in-rack sprinklers with miscellaneous storage. The 2013 edition of NFPA 13 provides specific direction regarding the use of in-rack sprinklers for miscellaneous storage. The installation of in-rack sprinklers is not required for miscellaneous storage, but, where provided, can result in some significant trade-off benefits.

In-rack sprinklers used with storage occupancies that qualify as Miscellaneous must meet certain parameters. For example, they must have a K-factor of at least 5.6 and cannot be arbitrarily spaced. Spacing is subject to commodity class, encapsulation, and aisle width, so these factors must be known prior to utilizing the table and laying out the in-rack system. In-rack sprinklers must be spaced in accordance with Table 13.3.4.2, which only addresses Class I through IV commodities. Plastic commodities utilizing in-rack sprinklers must follow the requirements outlined in Chapter 17, even though it is miscellaneous.

Further, in-rack sprinklers must be located in the longitudinal flue space at the intersection of the transverse and longitudinal flues. Additional sprinklers may be required in order to not exceed the spacing limitations. And, similar to the requirements of Chapter 16, the water demand for the in-rack system must balance with the demand for the overhead system at the point of connection of the two systems.

In summary, miscellaneous storage does not require the same level of protection that is required for other storage arrangements — palletized, rack, shelf, bin box, or solid-piled. The protection criteria is not as proscriptive and is more in line with that for Ordinary and Extra Hazard occupancies and is limited to storage 12' or less in height.

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