

SPRINKLER PROTECTION OF MOVABLE STORAGE

This Bulletin provides guidance regarding the City requirements for sprinkler permit applications involving protection of built-in movable storage systems.

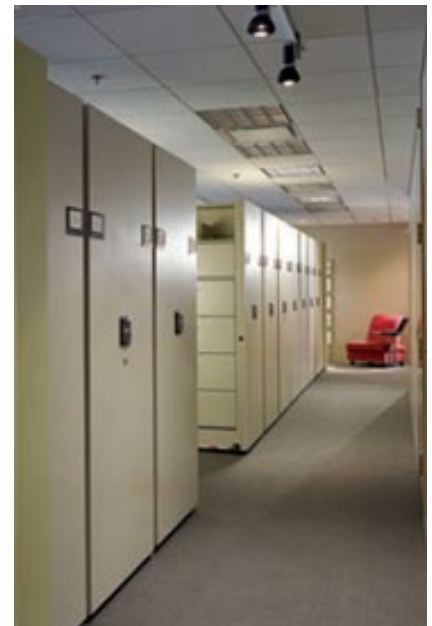
We often observe the installation of mobile storage systems in retail and small industrial occupancies as part of tenant improvement work. These occupancies are typically protected with Ordinary Hazard Group 2 sprinkler systems, which may not always be sufficient to adequately protect the contents on the mobile storage systems. The NFPA 13 sprinkler standard provides only limited specific requirements for the protection of movable storage systems. The City acknowledges the difficulties faced by sprinkler designers in determining the appropriate classification of movable storage systems and the necessary sprinkler design criteria due to the limited nature of information provided for such systems in NFPA 13.

The primary challenge in determining the appropriate NFPA 13 requirements arises from the difficulty of correctly classifying the mobile storage system.

Compact Storage System per Section 20.6 of NFPA 13, Edition 2013

Section 20.6 contains design criteria for compact storage systems intended for the storage of paper files, magazines, books, and similar documents in folders, and miscellaneous supplies. These systems can stand up to 8 ft high and contain no more than 5% plastics. We often find Registered Professionals drawing comparisons between mobile storage shelves or racks—which are typically used to store clothing, shoes, automobile parts, electronics, etc.—and the compact storage systems outlined in Exhibit 20.2 of the NFPA 13 Handbook, 2013 Edition.

However, it is important to clarify that the construction of the shelves designed for paper file storage (as described in Section 20.6) is fundamentally different from an open racking system used for inventory storage. A compact storage system as per Section 20.6 comprises movable metal file cabinets. Comparing this to open racks designed for inventory storage in retail spaces is not practical without taking into account their different contents and commodities.



[Exhibit 20.2, NFPA 13 Handbook, Edition 2013](#)

Mobile Racks

The other type of built-in mobile storage systems addressed NFPA 13 are movable racks. Design criteria for racks, including single, double and multiple (or movable) racks, are provided in Section 13, Miscellaneous Storage of NFPA 13, Edition of 2013. The sprinkler design criteria that apply to miscellaneous storage on racks, including movable racks, are found in Table 13.2.1 of NFPA 13. The commodity in retail and industrial occupancies stored on mobile storage are most commonly classified as either Class IV or Group A plastic. Based on Table 13.2.1, an Ordinary Hazard Group 2 sprinkler system is suitable for protection of Class IV commodities that are stored on racks up to 10 feet in height and Group A plastic commodities stored up to 5 feet in height. Therefore, when Class IV or Plastic Group A commodities are stored on mobile racks up to 10 and 5 feet, respectively, there is no need for further alterations or upgrades to protect movable racks.

In accordance with Table 13.2.1 of NFPA 13, when Group A plastic commodities are stored on mobile racks more than 5 feet high or Class IV commodities stored more than 10 feet high, the sprinkler system must meet Extra Ordinary Group 1 hazard requirements. Recognizing that it may be difficult to upgrade an existing sprinkler system to be an Extra Ordinary Group 1 system, the CBO may be willing to accommodate the existing system on the basis of the letter of professional judgment submitted to the Building Policy Branch (via cbo@vancouver.ca), provided that a Fire Protection Engineer has reviewed and evaluated the risk of storing Class IV and Group A plastic commodities in such configurations. The engineer must specify appropriate precautions necessary to mitigate any potential risks and provide a technical justification of how the proposed design criteria will be sufficient to mitigate the concerns. The design criteria may include, but are not limited to:

- Providing 3-inch bumpers to create longitudinal traverse spaces.
- Limiting the area of the mobile racking system to less than 1,000 ft² permitted for miscellaneous storage.
- Lessening the storage height to less than the maximum permitted for this type of commodities for Extra Hazard Group 1 hazard.
- When there is a mix of Plastic Group A and Class IV commodities locating Group A plastic within 5 feet.
- Decreasing the coverage area per sprinkler to less than 130 ft².
- Increasing the discharge density to more than 0.2 gpm/ft².
- Increasing the design area to more than required by NFPA 13.

Proposed designs for movable storage shelves that do not conform to the limits in Table 13.2.1, should be documented with a letter of engineering judgment identifying the issue requiring engineering judgment, outline the analysis and background information used to arrive at the engineer's design recommendation, and clearly state the professional opinion.

Classification of Commodities in Accordance with NFPA 13

Commodities are to be assessed following the definitions provided in NFPA 13. It is imperative that no assumptions are made to lessen these classifications for the sake of simplifying sprinkler system design. If a commodity is classified as Group A plastics, it must be treated as such. Measures outlined previously in this Bulletin should be utilized to mitigate the risk of sprinkler system not being upgraded to Extra Hazard Group 1. It is not permissible to reclassify Group A plastics as Class IV simply based on their smaller quantities relative to other items in typical high-storage applications or other considerations. Any deviation from the established NFPA classifications is unacceptable.

Summary

In conclusion, the protection of movable storage systems is a complex technical issue, and we hope this technical bulletin would serve as a valuable resource for stakeholders seeking to enhance their understanding of the subject. To ensure adequate sprinkler protection is in place, the City requires that registered professionals reviews the design criteria for sprinkler systems protecting movable shelves, based on their knowledge and expertise. It is essential that the registered professional thoroughly examine that movable racks or shelves meet the protection criteria for Ordinary Hazard Group 2, and upgrade the sprinkler system as required if Extra Hazard Group 1 design criteria is necessary.

If there are any questions or uncertainties, Building Review Branch and Sprinkler Review Group is available to provide assistance and support. This includes the determination of the appropriate permitting stream for Building and Sprinkler Permit issuance. In general, we agree with over-the-counter permit issuance, which is accommodated with the letter of engineering judgment. When a mobile storage includes more complicated configurations, the Building Review Branch and Sprinkler Review Group may invoke the need for full building and sprinkler permit reviews. We highly recommend that registered professionals reach out to us for coordination during the early stages of their design process if they feel the need. This proactive measure would not only facilitate the review process but also expedite the acceptance of sprinkler permit. We are committed to working collaboratively with all stakeholders to ensure that the protection of movable storage systems achieves the necessary level of performance.

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