

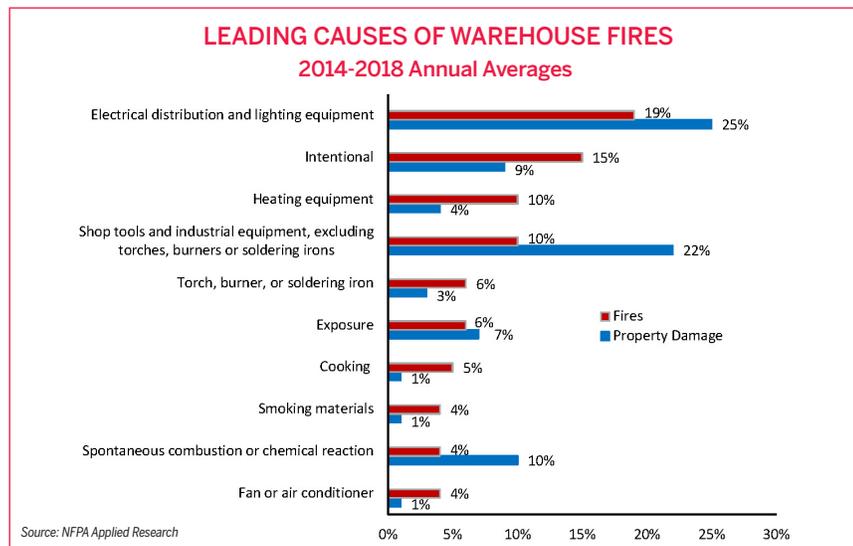
# WAREHOUSE FIRE SAFETY

Warehouse fire safety has always been an important topic. Recently, multiple large warehouse fires have brought this topic to the forefront of people’s minds. Large-loss fires in warehouses can risk the lives of occupants and first responders, cost millions of dollars, and negatively impact the environment. More widespread understanding of how fire protection is provided for these buildings can help decrease the likelihood of major warehouse fires; this includes identifying responsibilities of the involved parties, commodity classification, understanding sprinkler design and limitations, management of change, and appropriate inspection, testing, and maintenance (ITM).

## Warehouse Fire Data

Warehouse fires are not uncommon. From 2014 to 2018, an estimated 1,410 warehouse structure fires per year were reported to US fire departments. These fires caused an annual average of two civilian deaths, 20 civilian injuries, and \$159 million in direct property damage. See [nfpa.org/warehousefires](http://nfpa.org/warehousefires) for more details.

use of the space, including the contents that will be stored in the space, the packaging of the contents and the storage arrangements of the warehouse. It is essential that they have accurate information from the building owner provided up front in the form of an Owner’s Information Certificate, such as is found in Annex A of NFPA® 13, *Standard for the Installation of Sprinkler Systems*.



It is the responsibility of the authority having jurisdiction to review the plans based on the initial assumptions for compliance based on the edition of NFPA 13 that is used by the jurisdiction.

Once the building becomes operational, it is the responsibility of the building owner—or their designated representative—to maintain compliance with codes and standards. This compliance includes ITM, management of change, and upholding fire prevention measures.

## Commodity Classification

Sprinkler protection in warehouses is typically driven by classifying the specific materials that will be stored in the space as opposed to classifying the occupancy, as is done in other building types. Commodity is defined by

NFPA 13 as the combination of products, packing material, and containers that determines the commodity classification.

The classification of the commodity stored in the warehouse is the first major decision made in the design of the sprinkler

## Responsibility for Safety

The initial design of a fire protection system for a warehouse is the responsibility of the engineer of record and the sprinkler designer. The design is based on information about the intended



## WAREHOUSE FIRE SAFETY *CONTINUED*

system—and it can have a huge impact on the effectiveness of the system during a fire. When the storage commodity has been improperly classified, the sprinkler system's capability to control a fire in a warehouse environment can be compromised, allowing for unabated horizontal spread. Commodities will be classified as Class I – IV or Group A, B, or C plastics.

To begin the classification process, determine the following:

- Materials used in the makeup of the product
- What type of container or packaging, if any, the product will be placed in
- If a container is used, whether any plastic material will be used to protect the product
- Whether a plastic pallet will be used. If so, determine if it is listed. If not, determine if the plastic pallet is reinforced or not.

For additional information on commodity classification, review the definition for each within NFPA 13. The annex of NFPA 13 contains lists of examples of various commodities that can be referred to but must be used with caution and the understanding that two of the same stored products can vary significantly based on the composition, packaging, pallet type, etc. The *Automatic Sprinkler Systems Handbook* also includes a flowchart to help determine commodity classification in Exhibit 20.6.

### Sprinkler Design and Limitations

Sprinkler design criteria is based on documented fire test data and is very specific to the material that is being stored, the height to which it is being stored, and the way in which it is being stored. Changing any one of these variables can significantly impact how effectively the sprinkler system can control a fire.

### Management of Change

When changes in business structure, philosophy, and operation result in a change in hazards and are not properly evaluated, they can have a major impact on the effectiveness of fire protection systems. Fire inspectors and ITM providers are not expected to identify where these changes occur. It is imperative that the building owner identify any changes that might impact fire protection so that the change can be evaluated by a qualified person.

### Importance of Inspection, Testing, and Maintenance

The best designed sprinkler system would be of no use without the proper ITM. Inspection, testing, and maintenance are undertaken to ensure that the water supply will be available, the system will function, and water will be able to reach a fire when needed.

### Fire Prevention Measures

The building owner or designated representative must establish protocols to limit the potential for fires. This will involve training staff on fire hazards, implementing measures to reduce the potential ignition sources, and exercising fire response plans.



#### Learn More

- ▶ Get free digital access to the codes by visiting:
  - [nfpa.org/13](https://nfpa.org/13)
  - [nfpa.org/20](https://nfpa.org/20)
  - [nfpa.org/25](https://nfpa.org/25)
- ▶ Gain a deeper understanding of the code requirements with code handbooks, training, and certifications by visiting [nfpa.org/warehousefiresafety](https://nfpa.org/warehousefiresafety) to explore these and other resources:
  - NFPA 13 *Automatic Sprinkler Systems Handbook* (2019)
  - NFPA 20 *Stationary Fire Pumps and Standpipe Systems Handbook* (2019)
  - NFPA 25 *ITM of Water-Based Fire Protection Systems Handbook* (2020)
  - NFPA 13, *Standard for the Installation of Sprinkler Systems* (2019) Online Training Series
  - NFPA 20, *Installation of Stationary Pumps for Fire Protection* (2019) Online Training Series
  - NFPA 25, *Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems* (2020) Online Training Series
  - ITM for Fire and Life Safety Online Training
  - Certified Fire Inspector I and II
  - Certified Water-Based Systems Professional Credential

