



UFF Position Statement: Warehouse Fires and Pre-Fire Planning

Warehouses and large distribution centers today present severe fire risk challenges to the fire service. Because of changes in the way warehouses are operated, storage configurations are often significantly higher with narrower aisles compared to warehouses of only a few decades ago. In addition, the increased use of plastic materials, both as finished products as well as in the packaging of those products, has resulted in a more severe fire challenge for automatic fire sprinklers systems and fire suppression operations by firefighters. Interior firefighting operations must be carefully coordinated without compromising operating sprinklers. The available water supply from public water mains and private fire pumps must be evaluated prior to any incident in order to effectively make use of protection systems during fireground operations.

Continuing research by FM Global demonstrates that, for many storage configurations, in-rack sprinklers are the only way to prevent a fire from rapidly spreading throughout the storage array. Rack storage of combustible material increases the relative fire hazard by providing neatly arranged surfaces across which fire can spread horizontally. This fire hazard becomes more severe for higher racks and building roofs, particularly at warehouses that store commodities that release excessive heat when burned, such as expanded and unexpanded plastic.¹

Ceiling sprinklers alone may not be able to penetrate the fire plume and adequately pre-wet the storage at low levels to prevent the fire from spreading. In-rack sprinklers are designed to discharge directly into areas where the fire will travel, namely the flue spaces between pallet loads and between rack uprights. Because the sprinklers pre-wet storage locally, the fire is prevented from spreading. Operating in conjunction with ceiling sprinklers, in-rack sprinklers will limit fire spread to a minimum.²

Without adequate in-rack sprinklers, the fire may spread both vertically and horizontally in the racks, and radiant heat may cause the fire to jump the aisle between racks. The heat generated will raise the temperature at the roof sufficiently to cause structural steelwork to buckle and distort. Given that roof collapse may be imminent, firefighters will understandably be reluctant to enter the building to fight, other than for life-safety considerations for the occupants. The prompt operation of ceiling and in-rack sprinklers in a rack storage fire will prevent ceiling temperatures from reaching a level where steelwork distortion occurs, thereby preventing roof collapse.³

Effective pre-fire planning in warehouses is not easy. It requires a co-operative working partnership between the warehouse owner/operator, their property insurance carrier/risk consultants and the local fire department. While the level of detail required in a pre-fire plan will vary based on the complexity of each location, the major categories of any pre-incident plan should include, but are not limited to, the following:

- Building designations and heights/areas.
- Building construction features, including fire walls and doors.
- Location and size of underground mains, including water supply sources and test results.
- Types of sprinkler systems (and other fixed protection systems).
- Location of sprinkler control valves and areas controlled by each.
- Location of fire alarm annunciator panel.

- Location of on-site and public fire hydrants.
- Location of fire department connections and areas served by each.
- Location and operational information of on-site fire pumps – often a fire pump is the only source of an adequate water supply for the sprinkler systems.

The Urban Fire Forum supports the research efforts related to warehouse fire protection and the need for effective pre-fire planning in warehouses based on the following recommendations:

1. Identify target warehouse locations within each jurisdiction.
2. Adopt NFPA 1620, *Standard for Pre-Incident Planning* within department policy or local regulatory process.
3. Incorporate pre-fire planning output into effective fireground operating procedures.
4. Develop a co-operative pre-incident planning partnership with warehouse owner/operators and their property insurance carrier/risk consultants.

As part of the overall mission of the Urban Fire Forum, Chief Officers will share this position and associated information with other officers and firefighters in an effort to educate and assist additional departments in implementing safe, efficient and effective operations in warehouses.

Sources:

^{1,2,3}*Understanding the Hazard: Lack of In-Rack Sprinklers*, FM Global Publication P0232, March 2010

Fighting Fire in Sprinklered Buildings, FM Global Publication P9923, September 2012

FM Global Data Sheet 10-1, *Pre-Incident Planning with the Public Fire Service*, May 2003

NFPA 1620, *Standard for Pre-Incident Planning*, 2015 Edition