FIRE PROTECTION FOR STORAGE

INTRODUCTION

National Fire Protection Association (NFPA) documents describe a level of fire protection agreed on by persons representing a variety of interests. The guidance in these documents does not reflect unique conditions or special considerations nor does NFPA guidance reflect the increased level of protection that AXA XL Risk Consulting recommends for high valued properties

This AXA XL Risk Consulting Guideline takes a position on the provisions of NFPA 1 that AXA XL Risk Consulting believes require clarification or changes. To understand the position, this AXA XL Risk Consulting Guideline must be read with a copy of NFPA 1. The provisions of the NFPA document are not repeated.

Sprinkler system design information for general storage, rack storage, baled cotton storage, rubber tire storage, and roll paper storage can be found in NFPA 13.

Storage occupancies covered by this standard must also be protected in accordance with NFPA 13 and PRC.12.1.1.0.

POSITION

NFPA 1 does not address requirements for palletized, solid pile, bin box, and on-shelf storage in this section. AXA XL Risk Consulting recommends the following when dealing with palletized, solid pile, bin box, and on-shelf storage.

General

Yard Hydrants

Provide private hydrants with two or three 2½ in. (65 mm) outlets. Do not provide pumper outlets except when used to allow emergency cross connections between two normally separate water systems. Provide gate valves on each 2½ in. (65 mm) outlet.

When possible, use hydrant outlet threads compatible with those of the local fire department. If the threads are not compatible, provide suitable adapters. Maintain a supply of adapters at the facility and at the local fire department.

Space hydrants on private fire mains at approximately 250 ft (75 m) intervals, and provide building access doors at intervals that allow all protected areas to be reached with a minimum of hose. Where there is yard storage or congestion that would limit access to an area of the facility, additional hydrants may be needed. Where mains extend to remote areas of a facility, hydrant spacing may be increased to 300 ft (90 m). Locate hydrants a minimum of 40 ft (12.2 m) from structures.

Maintain a sufficient length of 2½ in. (65 mm) woven-jacketed lined hose and accessories to allow the following:

- Providing emergency water supplies to impaired sprinkler systems through the 2 in. (50 mm) drain connection supplied by a hydrant, adjacent sprinkler system or domestic water supply. (Refer to PRC.1.1.0 and OVERVIEW.)
- Testing of fire pumps.

Do not use unlined hose. When hose is subjected to corrosive environments or materials, provide suitable covers.

Maintain a supply of listed, woven-jacketed lined hose and equipment for use by the facility's Interior Structural Fire Brigade when any of the following conditions exist:

- There is no public fire department coverage in the area.
- The facility is located more than 5 mi (8 km) from the first responding fire department.
- The hazards of the facility are such that the fire department cannot respond fast enough to halt the spread of fire.
- The facility relies heavily on manual fire suppression.
- The fire department is poorly equipped to handle the special hazards of the facility.

The amount of hose necessary depends on the hydrant layout, facility hazards and manpower availability. Provide enough hose to reach all interior building areas with at least two hose lines.

In areas inaccessible to motorized apparatus and in facilities without vehicles to carry hose, provide hose houses equipped with a minimum of 250 ft (75 m) of 2½ in. (65 mm) hose and 150 ft (45 m) of 1½ in. (38 mm) hose and associated equipment.

Public fire departments may be unfamiliar with the type and condition of equipment and hose provided in a specific facility, and many will not use it. It is not necessary to supply equipment solely for use by the public fire department.

Indoor Storage

Construction Type

NFPA 220 describes most types of buildings, some of which may be subject to underwriting restrictions, i.e., Types III and V. When sprinkler protection is provided in accordance with NFPA 13, fireproofing of roof supporting steel is not necessary.

Limit construction of tire storage buildings to Type I as defined in NFPA 220. When sprinkler protection is provided in accordance with NFPA 13, roof construction (including beams, girders, trusses, arches) need not have a specific fire resistance rating except for one specific spray sprinkler protection scheme. In this case, the fireproofing must be provided. Construct nonloadbearing walls, either exterior or interior, of noncombustible or limited-combustible construction.

Fire Walls

Separate warehousing from manufacturing with 4 h fire rated firewalls in accordance with NFPA 221 and PRC.2.2.1. Equip each wall opening with two automatic-closing, 3 h rated fire doors, one on each side of the wall opening.

Fire Protection of Steel Columns

When general commodity storage height exceeds 15 ft (4.6 m) and ceiling only sprinkler protection is provided, AXA XL Risk Consulting recommends protection of steel columns located within the storage arrangement (rack and piled storage) with one-hour fireproofing.

Where rolled paper is being stored, protect steel columns with one-hour fireproofing whenever the storage exceeds the following heights:

- 15 ft (4.6 m) for tissue in any type of vertical array;

- 15 ft (4.6 m) for lightweight hard paper (except in closed array);
- 20 ft (6.1 m) for mediumweight paper in open array or unbanded, standard array.

Specific column protection is not needed for any vertical arrays of heavyweight paper or for closed arrays of any roll paper (except tissue) if the sprinkler protection recommended for these arrays is provided.

When fireproofing is not provided, protect steel columns in accordance with PRC.12.1.1.0. When ESFR, large drop or specific application sprinklers are installed, protection of columns is not needed.

Emergency Smoke And Heat Venting

Apply the protection outlined in this standard to buildings with or without heat and smoke venting and draft curtains. Where heat and smoke vents are installed in buildings protected by ESFR sprinklers, use manually operated vents or vents with a standard response fusible element rated at no less than 360°F (181°C). Results of large-scale fire tests indicate that the impact of automatic vents on sprinkler performance is neutral when sprinkler design is adequate for the occupancy hazard. The tests also indicate that draft curtains could have a potentially negative impact on sprinkler performance. Select the placement of draft curtains carefully. When required, align draft curtains with aisles or other clear spaces in storage areas.

Storage Above Bottom Of Roof Trusses

The minimum 1 ft (0.3 m) horizontal clearance was not verified by any tests and therefore is acceptable only when sprinklers are no farther from the truss than 4 ft (1.2 m) horizontally. Otherwise, the top of the stock may interfere with the discharge pattern of the sprinkler and prevent proper wetting of the truss members.

When sprinklers are more than 4 ft (1.2 m) from the truss, increase the minimum 1 ft (0.3 m) horizontal clearance by the amount the sprinkler clearance exceeds 4 ft (1.2 m). If the sprinklers are 6 ft (1.8 m) from the truss, provide a minimum 3 ft (0.9 m) horizontal clearance between the stock and the truss.

High Expansion Foam

AXA XL Risk Consulting does not recommend high expansion foam as the sole protection.

Carefully study the overall acceptability of high expansion foam on the basis of possible contamination of the product being stored, unacceptable discoloration, delamination or other damage to containers. High expansion foam can cause failure of carton joints sealed without waterproof glue and can result in the need to repackage the stored product. Besides the potentially undesirable moisture problem with the package and contents, the residue left by the high expansion foam may also be unacceptable from the standpoint of appearance or potential contamination of the product. Food products, empty glass bottles or tin cans, pharmaceuticals, and electronic parts or equipment are particularly susceptible to such residue contamination.

Consider reliability of power supply and pollution problems in disposing of the foam. See NFPA 11 and PRC.12.3.2.1 for further information.

Outdoor Storage

Protection of Outdoor Roll Paper Storage

Arrange yard storage of roll paper as follows:

- Limit pile sizes to 2500 ft^2 (230 m^2).
- Provide minimum 50 ft (15 m) clear aisles between piles, other yard storage, streets, power lines, electrical substations and buildings.
- Limit pile height to 15 ft (4.6 m).
- Locate yard hydrants about the storage area so no point in the storage area is more than 100 ft (30 m) from a hydrant. Equip the hydrants with standard hose cabinets.

Protection of Idle Pallets

Protectes the storage of idle pallets as follows:

- Limit the pile height to 15 ft (4.6 m)
- Limit the area per pile to 400 ft² (37 m²)
- Separate pile at least 8 ft (2.4 m) from each other
- Maintain an open space of at least 25 ft (7.6 m) between the piles and fences and property lines.

Management Programs

Fire Organization

See PRC.1.7.0.2 for additional information on Emergency Response Teams and Incident Management Systems.

Fire Protection System Impairments

Maintain a fire watch when any fire protection system is not in service. See PRC.1.1.0 regarding the handling of impairments to fire protection systems.

Cutting And Welding Operations

Follow the procedures found in PRC.1.9.0 to properly safeguard cutting, welding and other hot work operations.

Smoking

Establish smoking regulations in accordance with PRC.1.2.0.

Maintenance And Inspection

Inspect and maintain all fire protection features, including fire walls, fire doors and fire protection systems with PRC.1.12.0.