**Chapter 26 Special Occupancy Requirements**

26.1 General

26.1.1 Application

26.1.1.1

In addition to the requirements of Chapter 8, Chapters 11 through 22, and Chapter 23, the following special occupancy requirements shall apply.

26.1.1.1.1

All provisions of design criteria in this standard, including design area increases and reductions, shall also apply to these special occupancy requirements.

26.1.1.2

Where the requirements of the reference standard differ from the requirements of this standard, the reference standard shall take precedence.

26.1.2 Definitions

For terms not defined in Chapter 3, the definitions of the reference standard shall apply.

26.2 Flammable and Combustible Liquids

26.2.1 Design Requirements

Sprinkler system discharge criteria for the protection of flammable and combustible liquids shall comply with NFPA 30.

26.2.2 Installation Requirements. (Reserved)

26.3 Aerosol Products

26.3.1 Design Requirements

Sprinkler system discharge criteria for the protection of aerosol products shall comply with NFPA 30B.

26.3.2 Installation Requirements. (Reserved)

26.4 Spray Application Using Flammable or Combustible Materials

26.4.1 Design Requirements

26.4.1.1\*

The automatic sprinkler system shall be a wet pipe system, a dry pipe system, a preaction system, or an open-head deluge system, whichever is most appropriate for the portion of the spray operation being protected. [33:9.6.1]

26.4.1.2

The automatic sprinkler system shall be designed as follows:

For spray application of styrene cross-link thermoset resin application areas, sprinklers shall be designed for Ordinary Hazard (Group 2) as defined in this standard.

For powder coating operations, sprinklers shall be designed for Ordinary Hazard (Group 2), as defined in this standard.

For all other spray areas, sprinklers shall be designed for Extra Hazard (Group 2) as defined in this standard.

[33:9.6.2]

26.4.1.3

The sprinkler design area shall not be required to exceed the area of the booth or room in which spraying or resin application is conducted. [33:9.6.2.1]

26.4.1.4

The water supply shall be sufficient to supply all sprinklers likely to open in any one fire incident without depleting the available water for use in hose streams. [33:9.6.3]

26.4.1.5

Where sprinklers are installed to protect spray areas and mixing rooms only, water shall be permitted to be supplied from domestic water systems, provided the domestic supply can meet the design criteria of 26.4.1.2. [33:9.6.4]

26.4.1.6

The sprinkler system shall be controlled by a separate, listed indicating valve(s), operable from floor level. [33:9.6.5]

26.4.1.7

Automated liquid electrostatic spray application equipment that is unlisted shall be protected further by the following:

In addition to meeting the requirements in 9.9.1 of NFPA 33, the optical flame detection system shall also activate one of the following over each zone in which fire has been detected:

An open head deluge system designed to discharge a minimum density of 24.5 mm/min (0.6 gpm/ft2)

A carbon dioxide extinguishing system

A dry chemical extinguishing system

A gaseous agent extinguishing system

A water mist fire protection system

[33:9.9.2(1)]

A wet pipe sprinkler system shall also be provided throughout the spray booth. This system shall meet all the applicable requirements of this standard for Extra Hazard (Group 2) occupancies.

[33:9.9.2(3)]

26.4.2 Installation Requirements

26.4.2.1\*

Sprinkler systems protecting stacks or ducts with widths or diameters equal to or greater than 10 in. (0.25 m) but less than 12 ft (3.7 m) shall meet all of the following requirements:

One sprinkler shall be located at the top of each vertical riser and at the midpoint of each offset. Additional sprinklers shall be spaced on 24 ft (7.3 m) centers if the rise is greater than 24 ft (7.3 m).

Horizontal exhaust ducts shall have sprinklers located on 12 ft (3.7 m) centers beginning no more than 6 ft (1.7 m) from the duct entrance.

If exhaust ducts are manifolded, a sprinkler shall be located in the manifold at the junction of each exhaust duct with the manifold.

Sprinklers shall provide a minimum flow of 30 gpm (114 L/min) per head at a minimum of 15 psi (1 bar) pressure.

Sprinklers shall be ordinary temperature rated, unless required to be higher due to operating temperatures measured in the ducts, in which case the operating temperature shall be at least 50°F (28°C) above the inside temperature of the duct.

\* The system demand shall include the discharge from the hydraulically most remote adjacent sprinklers in a common 100 linear ft (30.5 m) area of duct (horizontal and/or vertical).

\* The supply line to the duct sprinklers, if taken from the ceiling sprinkler system, shall be equipped with an accessible listed control valve.

[33:9.6.6]

26.4.2.1.1

Stacks and exhaust ducts shall be provided with access openings for inspection and cleaning of sprinklers. [33:9.6.6.1]

26.4.2.1.2

Sprinkler systems protecting stacks and ducts that are subject to freezing shall be of a nonfreezing type or be a manually controlled open-head system. [33:9.6.6.2]

26.4.2.2

Sprinklers shall be protected against overspray residue, either by location or covering, so that they will operate quickly in event of fire. [33:9.6.7]

26.4.2.2.1

Sprinklers shall be permitted to be covered only by cellophane bags having a thickness of 0.003 in. (0.08 mm) or less or by thin paper bags. These coverings shall be replaced frequently so that heavy deposits of residue do not accumulate. [33:9.6.7.1]

26.4.2.2.2

Sprinklers that have been painted or coated by overspray or residues shall be replaced with new sprinklers. [33:9.6.7.2]

26.5 Solvent Extraction Plants. [NFPA 36]

26.5.1\* Design Requirements

26.5.2 Installation Requirements. (Reserved)

26.6 Installation and Use of Stationary Combustion Engines and Gas Turbines

26.6.1\* Design Requirements

Automatic sprinkler systems shall be designed to provide for a density of 0.3 gpm/ft2 (12.2 mm/min) over the most remote 2500 ft2 (230 m2). [37:11.4.5.1]

26.6.2 Installation Requirements

26.6.2.1

Sprinklers and spray nozzles shall be spaced at a 100 ft2 (9 m2) maximum area of coverage per sprinkler or spray nozzle. [37:11.4.5.1.1]

26.6.2.2

Sprinkler and water spray system coverage shall be provided to all areas within the enclosure located within 20 ft (6 m) of the following:

The engine

The lubricating oil system

The fuel system

[37:11.4.5.1.2]

26.6.2.3

Sprinklers and water spray nozzles shall not be directed at engine components that are susceptible to thermal shock or deformation. [37:11.4.5.2]

26.7 Nitrate Film

26.7.1 Design Requirements

26.7.1.1

Every room, except projection booths and rewinding rooms, where nitrate film is stored or handled in quantities greater than 51 lb (23 kg), or 10,000 ft (3050 m), shall be protected by an automatic sprinkler system that is installed in accordance with the requirements for Group II extra hazard occupancies. [40:5.1.2]

26.7.1.2

Water supplies for automatic sprinklers shall be based on 20 gpm (1.26 L/sec) per sprinkler for 20 minutes for the total number of sprinklers in one vault plus 25 percent of the sprinklers in the communicating fire area. [40:5.2.2]

26.7.1.3\* Vaults Other Than Extended Term Storage Vaults

[40:6.3] (See Figure A.26.7.1.3.) Fire protection in vaults shall be provided by a deluge system with directional nozzles meeting the criteria in 26.7.1.4. [40:6.3.7]

26.7.1.4

For extended term storage vaults in accordance with 6.5.5 of NFPA 40, fire protection shall be provided by a deluge system with directional nozzles installed in accordance with NFPA 15 and meeting the criteria in 26.7.1.4.1 through 26.7.1.4.9. [40:6.5.6]

26.7.1.4.1

Sprinkler systems in existing extended term storage vaults that were in compliance with the provisions of this standard at the time of installation shall be permitted to be continued in use. [40:6.5.6.1]

26.7.1.4.2

High-velocity open water spray nozzles each capable of providing a discharge rate of 20 gpm (1.26 L/sec) at a gauge pressure of 50 psi (345 kPa) shall be installed. [40:6.5.6.2]

26.7.1.4.3

The design shall be based on a discharge density of 0.68 gpm/ft2 (27 mm/min) over each face of storage racks. [40:6.5.6.3]

26.7.1.4.4\*

The nozzles shall have a combined spray pattern capable of covering the face of the film storage racks. [40:6.5.6.4]

26.7.1.4.5

The nozzles shall be installed at the top of the storage shelf array, aimed at the opposite shelf array. [40:6.5.6.5]

26.7.1.4.6\*

Nozzles shall be installed on opposite faces of the storage shelf array in a staggered pattern such that no nozzles are directly opposite one another. [40:6.5.6.6]

26.7.1.4.7

The water supply duration shall be a minimum of 20 minutes. [40:6.5.6.7]

26.7.1.4.8

The deluge system shall be activated by a signal from one of the following:

An air sampling-type smoke detection system

A fixed temperature heat sensitive cable

[40:6.5.6.8]

26.7.1.4.9

Full water flow shall be discharged from the water spray nozzles within 10 seconds of reaching the set point actuation of the detection system [40:6.5.6.9.6]

26.7.2 Installation Requirements

26.7.2.1

In areas or rooms where nitrate film is handled, the area that is protected per sprinkler shall not exceed 64 ft2 (5.9 m2) with sprinklers not being more than 8 ft (2.4 m) apart. [40:5.1.4]

26.7.2.2 Cabinet Protection

[40:6.2.5]

26.7.2.2.1

Cabinets having a capacity of more than 75 lb (34 kg), or 15,000 ft (4575 m), of film shall be provided with at least one automatic sprinkler. [40:6.2.5.1]

26.7.2.2.2

Where cans are stored on more than one shelf, as shown in Figure 26.7.2.2.2 and as described in 6.2.6.2 or 6.2.6.3 of NFPA 40, one sprinkler shall be provided for each shelf. [40:6.2.5.2]

FIGURE 26.7.2.2.2 Standard Film Cabinet for Other Than Extended Term Storage Film. [40:Figure 6.2.1]

26.7.2.3 Motion Picture Film Laboratories

In all cases, sprinklers shall be arranged so that not more than two machines are protected by any one sprinkler. [40:9.2.5.2]

26.8 Laboratories Using Chemicals

26.8.1 Design Requirements

Automatic sprinkler system protection shall be required for all new laboratories in accordance with the following:

Automatic sprinkler system protection for Class A and Class B laboratories shall be in accordance with this standard for ordinary hazard (Group 2) occupancies.

Automatic sprinkler system protection for Class C and Class D laboratories shall be in accordance with this standard for ordinary hazard (Group 1) occupancies.

[45:6.1.1.1]

26.8.2 Installation Requirements

Fire sprinklers in laboratory units shall be the quick response (QR) sprinkler type installed in accordance with this standard. [45:6.1.1.2]

26.9 Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes

26.9.1 Design Requirements

26.9.1.1

Oxygen cylinders connected to one manifold shall be limited to a total gas capacity of 6500 ft3 (184 m3). [51:5.2.5]

26.9.1.1.1

Two such manifolds with connected cylinders shall be permitted to be located in the same room, provided the building is protected throughout with an approved automatic sprinkler system designed in accordance with this standard, furnishing a sprinkler discharge density of at least 0.25 gpm/ft2 (10.2 mm/min) over a minimum operating area of at least 3000 ft2 (280 m2) with sprinklers located not more than 20 ft (6.1 m) above the floor where the manifolds are located. [51:5.2.5.1]

26.9.1.2

An automatic deluge sprinkler system shall be provided for MATS fire areas used as indoor and outdoor discharging stations. [51:10.5.8.1.1]

26.9.1.3

Automatic deluge sprinkler systems shall be designed in accordance with the requirements of this standard using Extra Hazard Group 1 with a minimum design area of 2500 ft2 (232 m2) for the entire MATS fire area. [51:10.5.8.1.2]

26.9.1.4

The automatic deluge system shall be able to be activated automatically by a fast-acting fire detection system and also by at least one manual pull station in an accessible location at a minimum of 25 ft (7.6 m) from the MATS fire area. [51:10.5.8.1.3]

26.9.1.5

The requirements of 26.9.1.2, 26.9.1.3, and 26.9.1.4 shall not apply to existing indoor or outdoor facilities, equipment, structures, or installations where MATS are charged or discharged that existed or were approved for construction or installation prior to the effective date of this standard, providing the MATS fire area is protected with an automatic sprinkler or deluge system with a minimum design density of not less than 0.25 gm/ft2 (10.1 mm/min). [51:10.5.8.1.4.1]

26.9.2 Installation Requirements

26.9.2.1

In buildings protected by an automatic sprinkler system and water supply designed in accordance with this standard for an Ordinary Hazard Group 2 or more hazardous occupancy, where the occupancy other than the cylinder storage is not more hazardous than ordinary hazard as defined in this standard, the distance between designated storage areas shall be permitted to be reduced to 50 ft (15 m). [51:4.3.4.1]

26.9.2.2

If the occupancy in such protected buildings between the designated storage areas is free of combustible material, the distance shall be permitted to be reduced to 25 ft (7.6 m). [51:4.3.4.2]

26.10 Acetylene Cylinder Charging Plants

26.10.1 Design Requirements

26.10.1.1

An automatic deluge sprinkler system shall be provided for MATS fire areas used as indoor and outdoor charging and discharging stations. [55:15.3.9.1.1]

26.10.1.2

Automatic deluge sprinkler systems shall be designed in accordance with the requirements of this standard using Extra Hazard Group 1 with a minimum design area of 2500 ft2 for the entire MATS fire area. [55:15.3.9.1.2]

26.10.1.3

The automatic deluge system shall be able to be activated automatically by a fast-acting fire detection system and also by at least one manual pull station in an accessible location at a minimum of 25 ft (7.6 m) from the MATS fire area. [55:15.3.9.1.3]

26.10.2 Installation Requirements. (Reserved)

26.11 Compressed Gases and Cryogenic Fluids Code

26.11.1 Design Criteria

26.11.1.1

When sprinkler protection is required, the area in which compressed gases or cryogenic fluids are stored or used shall be protected with a sprinkler system designed to be not less than that required by 19.3.3.1.1 for Ordinary Hazard Group 2 density/area curve. [55:6.11.2.1]

26.11.1.2

Where sprinkler protection is required, the area in which the flammable or pyrophoric compressed gases or cryogenic fluids are stored or used shall be protected with a sprinkler system designed to be not less than that required by 19.3.3.1.1 for Extra Hazard Group 1 density/area curve. [55:6.11.2.2]

26.11.2 Installation Requirements. (Reserved)

26.12 Utility LP-Gas Plants

26.12.1 Design Requirements

26.12.1.1

The design of fire water supply and distribution systems, where used, shall provide for the simultaneous supply of those fixed fire protection systems involved in the maximum single incident expected in the plant, including monitor nozzles, at their design flow and pressure. [59:13.4.2]

26.12.1.2

An additional supply of 1000 gal/min (3800 lpm) shall be available for hand hose streams for a period of not less than 2 hours. [59:13.4.2.1]

26.12.1.3

Manually actuated monitors shall be permitted to be used to augment hand hose streams. [59:13.4.2.2]

26.12.2 Installation Requirements. (Reserved)

26.13 Production, Storage, and Handling of Liquefied Natural Gas (LNG)

26.13.1 Design Requirements

The fire water supply and distribution systems, if provided, shall simultaneously supply water to fixed fire protection systems, including monitor nozzles, at their design flow and pressure, involved in the maximum single incident expected in the plant plus an allowance of 1000 gpm (3800 lpm) for hand hose streams for not less than 2 hours. [59A:12.5.2]

26.13.2 Installation Requirements. (Reserved)

26.14 Protection of Information Technology Equipment

26.14.1 Design Requirements. (Reserved)

26.14.2 Installation Requirements

26.14.2.1

ITE rooms and ITE areas located in a sprinklered building shall be provided with an automatic sprinkler system. [75:9.1.1]

26.14.2.1.1

ITE rooms and ITE areas located in a nonsprinklered building shall be provided with one or more automatic fire suppression systems as permitted by Chapter 9 of NFPA 75.

26.14.2.2

Sprinkler systems protecting ITE areas shall be valved separately from other sprinkler systems. [75:9.1.3]

26.14.2.3

The requirement of 9.1.1.1 of NFPA 75 shall be permitted to be evaluated as part of the fire risk assessment as outlined in Chapter 4 of NFPA 75. [75:9.1.1.2]

26.14.2.4\*

An automatic fire suppression system, as permitted by Chapter 9 of NFPA 75, shall be provided for the protection of the area below a raised floor in an ITE room or ITE area where the area below the raised floor contains combustible material other than what is permitted in 26.14.2.5. [75:9.1.1.3]

26.14.2.5

An automatic fire suppression system shall not be required for the protection of the area below a raised floor in an ITE room or ITE area where combustible material under the floor is limited to the following:

Cables listed for plenum use

Listed plenum communications raceways

Listed equipment power cords up to 15 ft (4.6 m) each

Cables installed in metallic raceways

Installations in compliance with Section 300.22(C) of NFPA 70

Listed cooling hoses

[75:9.1.1.4]

26.15 Standard on Incinerators, and Waste and Linen Handling Systems and Equipment

26.15.1 Design Requirements. (Reserved)

26.15.2 Installation Requirements

26.15.2.1

Automatic sprinklers shall be provided in incinerator rooms in accordance with this standard. [82:5.2.7.3]

26.15.2.2\* Waste and Linen Chutes and Transport Systems

[82:Chapter 6]

26.15.2.2.1 Gravity Waste or Linen Chutes

[82:6.2]

26.15.2.2.1.1

Lined metal chutes that comply with 6.2.2.6.1 of NFPA 82 shall not require automatic sprinkler protection. [82:6.2.2.6.2]

26.15.2.2.1.2

A sprinkler shall be installed at or above the top chute intake of the chute. [82:6.2.6.1.2]

26.15.2.2.1.3 Chute Sprinkler Protection

Automatic sprinklers installed in gravity chute intakes shall be recessed out of the chute area through which the material travels. [82:6.2.6.1.3]

26.15.2.2.1.4

A sprinkler shall be installed within the chute at alternate floor levels in chutes connecting more than two stories, with a mandatory sprinkler located at the lowest service level. [82:6.2.6.1.4]

26.15.2.2.1.5

Gravity chutes shall be protected internally by automatic sprinklers unless the chute is in accordance with 6.2.2.5 or 6.2.2.6 of NFPA 82. [82:6.2.6.1.1]

26.15.2.2.1.6 Chute Room Automatic Sprinklers

Automatic sprinklers shall be installed in chute discharge rooms. [82:6.2.6.2.1]

26.15.2.2.2 Full Pneumatic Waste and Linen Conveying Systems

[82:6.3]

26.15.2.2.2.1

Full pneumatic-type risers shall be protected internally by automatic sprinklers. [82:6.3.4.1]

26.15.2.2.2.2

A sprinkler shall be required at or above the top chute intake door and at alternate floor levels in buildings over two stories, with a mandatory sprinkler located at the lowest chute intake door. [82:6.3.4.2]

26.15.2.2.2.3

Sprinklers shall be recessed out of the station area through which the material travels. [82:6.3.4.3]

26.15.2.2.3 Gravity Pneumatic Trash or Linen Conveying Systems

[82:6.4]

26.15.2.2.3.1 Chute Automatic Sprinklers

Where material is to be stored at the bottom of the chute and above the riser discharge damper (above the transport tee), automatic sprinklers shall be installed below the last service door on the chute. [82:6.4.2.3]

26.15.2.2.3.2

Automatic sprinklers shall be installed in chute discharge rooms. [82:6.4.2.4.3]

26.15.2.3 Automatic Sprinklers. [82:7.4]

26.15.2.3.1

Automatic sprinklers shall be installed in rooms where waste handling systems and equipment are used to transport waste from interim storage areas to waste processing equipment, such as incinerators. [82:7.4.1]

26.15.2.3.2

In locations or rooms where waste handling systems and equipment are used for interim storage of waste only, the rooms shall be sprinklered in accordance with requirements specified in 26.15.2.4. [82:7.4.2]

26.15.2.4 Waste Compactors. [82:chapter 8]

26.15.2.4.1

All chute-fed compactors shall have an automatic sprinkler with a minimum 1/2 in. (13 mm) orifice installed in the hopper of the compactor. [82:8.2.1]

26.15.2.4.2

Sprinklers shall be ordinary temperature-rated sprinklers. [82:8.2.1.1]

26.15.2.4.3

Sprinklers shall be supplied by a minimum of 1 in. (25 mm) ferrous piping or 3/4 in. (20 mm) copper tubing line from the domestic cold water supply or by the building fire sprinkler system. [82:8.2.1.2]

26.15.2.4.4

Sprinkler water pipe shall be protected from freezing in outdoor installations. [82:8.2.1.3]

26.15.2.4.5

Hand-fed compactors located within a building and not operated in conjunction with a chute shall not require installation of an automatic sprinkler in the hopper. [82:8.2.2]

26.15.2.5

Waste and recyclables storage rooms shall be provided with automatic sprinklers in accordance with this standard. [82:9.3]

26.15.2.6

Rooms in which waste processing equipment is located shall be installed with automatic sprinklers. [82:10.4.1]

26.16 Standard for Ovens and Furnaces

26.16.1 Design Requirements. (Reserved)

26.16.2 Installation Requirements

26.16.2.1\*

Where automatic sprinklers are provided, they shall be installed in accordance with this standard unless otherwise permitted by 26.16.2.2. [86:9.2.1]

26.16.2.2

Where sprinklers that protect only ovens are installed and connection to a reliable fire protection water supply is not feasible, a domestic water supply connection shall be permitted to supply these sprinklers subject to the approval of the authority having jurisdiction. [86:9.2.2]

26.16.2.3

Where sprinklers are selected for the protection of ovens, furnaces, or related equipment, systems with only open sprinklers shall be installed where the following conditions exist:

In equipment where temperatures can exceed 625°F (329°C)

Where flash fire conditions can occur

[86:9.3.3]

26.16.2.4

Furnaces shall be located so as to minimize exposure to power equipment, process equipment, and sprinkler risers. [86:5.1.3.1]

26.16.2.5

Where water from a fixed protection system could come in contact with molten materials, such as molten salt or molten metal, shielding shall be provided to prevent water from contacting the molten material. [86:9.3.1]

26.16.2.6\*

Galvanized pipe shall not be used in sprinkler or water spray systems in ovens, furnaces, or related equipment. [86:9.3.2]

26.17 Health Care Facilities Code, Class A Hyperbaric Chambers

26.17.1 Design Requirements

26.17.1.1

A fixed water deluge extinguishing system shall be installed in all chamber compartments that are designed for manned operations. [99:14.2.6.2]

26.17.1.2

In chambers that consist of more than one chamber compartment (lock), the design of the deluge system shall meet the requirements of 26.17.1.1 when the chamber compartments are at different depths (pressures). [99:14.2.6.2.1]

26.17.1.3

The deluge system in different compartments (locks) shall operate independently or simultaneously. [99:14.2.6.2.2]

26.17.1.4

Fixed deluge systems shall not be required in chamber compartments that are used strictly as personnel transfer compartments (locks) and for no other purposes. [99:14.2.6.2.3]

26.17.1.5\*

Manual activation and deactivation deluge controls shall be located at the operator's console and in each chamber compartment (lock) containing a deluge system. [99:14.2.6.2.4]

26.17.1.6

Controls shall be designed to prevent unintended activation. [99:14.2.6.2.4.1]

26.17.1.7

Water shall be delivered from the fixed discharge nozzles as specified in 26.17.1.9 within 3 seconds of activation of any affiliated deluge control. [99:14.2.6.2.5]

26.17.1.8\*

Average spray density at floor level shall be not less than 2 gpm/ft2 (82 mm/min), with no floor area larger than 10.76 ft2 (1 m2) receiving less than 1 gpm/ft2 (40.75 L/min/m2). [99:14.2.6.2.6]

26.17.1.9

Water shall be available in the deluge system to maintain the flow specified in 26.17.1.8 simultaneously in each chamber compartment (lock) containing the deluge system for 1 minute. [99:14.2.6.2.7]

26.17.1.10

The limit on maximum extinguishment duration shall be governed by the chamber capacity (bilge capacity also, if so equipped) or its drainage system, or both. [99:14.2.6.2.7.1]

26.17.1.11

The deluge system shall have stored pressure to operate for at least 15 seconds without electrical branch power. [99:14.2.6.2.8]

26.17.2 Installation Requirements. (Reserved)

26.18 Fixed Guideway Transit and Passenger Rail Systems

26.18.1 Design Requirements

26.18.1.1

Other fire suppression systems, if approved, shall be permitted to be substituted for automatic sprinkler systems in the areas listed in 26.18.2.1. [130:5.4.4.5]

26.18.2 Installation Requirements

26.18.2.1

An automatic sprinkler protection system shall be provided in areas of stations used for concessions, in storage areas, in trash rooms, and other similar areas with combustible loadings, except trainways. [130:5.4.4.1]

26.18.2.2

Sprinkler protection shall be permitted to be omitted in areas of open stations remotely located from public spaces. [130:5.4.4.2]

26.18.2.3

Installation of sprinkler systems shall comply with this standard or applicable local codes as required. [130:5.4.4.3]

26.18.2.4

A sprinkler system waterflow alarm and supervisory signal service shall be installed. [130:5.4.4.4]

26.19 Motion Picture and Television Production Studio Sound-Stages, Approved Production Facilities, and Production Locations

26.19.1 Design Requirements. (Reserved)

26.19.2 Installation Requirements

26.19.2.1

The requirements of this standard prohibiting obstructions to sprinkler discharge shall not be applicable if approved mitigation is employed. [140:4.11.1.3.1]

26.19.2.2

The requirements of this standard prohibiting obstructions to sprinkler discharge shall not be applicable if the building sprinkler system meets the design criteria for Extra Hazard, Group 2. [140:4.11.1.3.2]

26.19.2.3

In any production location building protected by an existing automatic sprinkler system, where solid- or hard-ceiling sets or platforms are introduced and create an obstruction to sprinkler discharge, the provisions of 26.19.2.4 or 26.19.2.5 shall be met. [140:5.11.3]

26.19.2.4\*

The requirements of this standard prohibiting obstructions to sprinkler discharge shall not be applicable if approved mitigation is employed. [140:5.11.4]

26.19.2.5\*

The requirements of this standard prohibiting obstructions to sprinkler discharge shall not be applicable if the building sprinkler system meets the design criteria for Extra Hazard, Group 2. [140:5.11.5]

26.20 Animal Housing Facilities

26.20.1 Design Requirements. (Reserved)

26.20.1.1 (Reserved)

26.20.2 Installation Requirements. (Reserved)

26.20.2.1

Quick-response sprinklers shall be utilized in animal housing facilities. [150:9.2.3]

26.21 Water Cooling Towers

26.21.1 Design Requirements

26.21.1.1 Types of Systems

26.21.1.1.1\*

The following fire protection systems shall be permitted to be used in counterflow cooling towers:

Wet pipe sprinkler system

Dry pipe sprinkler system

Preaction sprinkler system

Deluge sprinkler system

[214:5.2.2.1]

26.21.1.1.2\*

A deluge sprinkler system shall be used in crossflow towers. [214:5.2.2.2]

26.21.1.2 Minimum Rate of Application

[214:5.2.3]

26.21.1.2.1

Under the fan decks of counterflow towers, the rate of application of water shall be 0.5 gpm/ft2 (20.4 mm/min), including fan opening. [214:5.2.3.1]

26.21.1.2.2

Under the fan decks of crossflow towers, the rate of application of water shall be 0.33 gpm/ft2 (13.4 mm/min), including fan opening. [214:5.2.3.2]

26.21.1.2.3

Over the fill areas of crossflow towers, the rate of application of water shall be 0.5 gpm/ft2 (20.4 mm/min). [214:5.2.3.3]

26.21.1.3 Extended Fan Decks

On towers having extended fan decks that completely enclose the distribution basin, the discharge outlets protecting the fill area shall be located over the basin, under the extension of the fan deck. [214:5.2.4.3]

26.21.1.3.1

These discharge outlets shall be open directional spray nozzles or other approved spray devices arranged to discharge 0.35 gpm/ft2 (14.3 mm/min) directly on the distribution basin and 0.15 gpm/ft2 (6.11 mm/min) on the underside of the fan deck extension. [214:5.2.4.3.1]

26.21.1.3.2

On towers having extended fan decks that do not completely enclose the hot-water basin, outlets protecting the fill shall be located under the distribution basin in accordance with 5.2.4.2.2 of NFPA 214. [214:5.2.4.3.2]

26.21.1.4 Combustible Fan Decks

For deluge systems using directional spray nozzles in the pendant position, provisions shall be made to protect the underside of a combustible fan deck at a minimum of 0.15 gpm/ft2 (6.1 mm/min), which shall be included as part of the application rate specified in 5.2.3 of NFPA 214. [214:5.2.4.4]

26.21.1.5\* Water Basin Covers

On film-filled towers that have solid, hot-water basin covers over the complete basin, the discharge outlets protecting the fill area shall be permitted to be located under the basin covers. [214:5.2.4.5]

26.21.1.5.1

These discharge outlets shall be open directional spray nozzles or other approved devices arranged to discharge 0.50 gpm/ft2 (20.4 mm/min) into the distribution basin horizontally, with some of the spray splashing up and on the underside of the water basin covers. [214:5.2.4.5.1]

26.21.1.6 Exposure Protection

[214:5.2.10]

26.21.1.6.1

Where any combustible exterior surfaces of a tower, including the fan deck and distribution basins, are less than 100 ft (30 m) from significant concentrations of combustibles such as structures or piled material, the combustible exposed surfaces of the tower shall be protected by an automatic water spray system. [214:5.2.10.1]

26.21.1.6.2

Systems for exterior protection shall be designed with the same attention and care as interior systems. [214:5.2.10.2]

26.21.1.6.2.1

Pipe sizing shall be based on hydraulic calculations. [214:5.2.10.2.1]

26.21.1.6.2.2

Water supply and discharge rate shall be based on a minimum 0.15 gpm/ft2 (6.1 mm/min) for all protected surfaces. [214:5.2.10.2.2]

26.21.1.7 Sprinkler System Water Supply

26.21.1.7.1 Deluge Systems

26.21.1.7.1.1\*

Where all cells of a cooling tower are protected by a single deluge system, the water supply shall be adequate to supply all discharge outlets on that system. [214:5.6.1.1]

26.21.1.7.1.2

Where two or more deluge systems are used to protect a cooling tower and fire-resistant partitions are not provided between the deluge systems, the water supply shall be adequate to supply all discharge outlets in the two most hydraulically demanding adjacent systems. [214:5.6.1.2]

26.21.1.7.1.3\*

Where two or more deluge systems are separated by fire-resistant partitions, the water supply shall be adequate to supply all discharge outlets in the single most hydraulically demanding system. [214:5.6.1.3]

26.21.1.7.2 Wet, Dry, and Preaction Systems

26.21.1.7.2.1\*

Where each cell of the cooling tower is separated by a fire-resistant partition, the water supply shall be adequate to supply all discharge outlets in the hydraulically most demanding single cell. [214:5.6.2.1]

26.21.1.7.2.2\*

Where fire-resistant partitions are not provided between each cell of a cooling tower, the water supply shall be adequate to supply all discharge outlets in the two most hydraulically demanding adjoining cells. [214:5.6.2.2]

26.21.1.7.3 Hose Streams

Water supplies shall be sufficient to include a minimum of 500 gpm (1900 lpm) for hose streams in addition to the sprinkler requirements. [214:5.6.3]

26.21.1.7.4 Duration

A water supply adequate for at least a 2-hour duration shall be provided for the combination of the water supply specified in 5.6.1 or 5.6.2 of NFPA 214, plus the hose stream demand specified in 26.21.1.7.3. [214:5.6.4]

26.21.2 Installation Requirements

26.21.2.1\* Counterflow Towers

[214:5.2.4.1]

26.21.2.1.1

The discharge outlets shall be located under the fan deck and fan opening. [214:5.2.4.1.1]

26.21.2.1.2

Except under the fan opening, all discharge outlets shall have deflector distances installed in accordance with Section 9.5 of this standard. [214:5.2.4.1.2]

26.21.2.1.3

Closed-head discharge outlets for dry-pipe and preaction systems shall be installed in the upright position only. [214:5.2.4.1.3]

26.21.2.2\* Crossflow Towers

[214:5.2.4.2]

26.21.2.2.1

The discharge outlets protecting the plenum area shall be located under the fan deck and in the fan opening. [214:5.2.4.2.1]

26.21.2.2.2

Discharge outlets protecting the fill shall be located under the distribution basin on either the louver or drift eliminator side, discharging horizontally through the joist channels. [214:5.2.4.2.2]

26.21.2.2.3

Towers with an air travel dimension longer than the maximum allowable for the discharge device being used shall have discharge devices placed on both sides of the fill area in each joist channel. [214:5.2.4.2.3.1]

26.21.2.2.4

The pressure at each discharge device shall be adequate to provide protection for half of the length of the fill measured along the air travel. [214:5.2.4.2.3.2]

26.21.2.2.5

Where joist channels are wider than 2 ft (0.6 m), more than one discharge device shall be required per joist channel. [214:5.2.4.2.4.1]

26.21.2.2.6

If the discharge device being used is listed for the width of the joist channel being protected, one discharge device per joist channel shall be permitted to be used. [214:5.2.4.2.4.2]

26.21.2.3\* Extended Fan Decks

On towers having extended fan decks that completely enclose the distribution basin, the discharge outlets protecting the fill area shall be located over the basin, under the extension of the fan deck. [214:5.2.4.3]

26.21.2.4\* Water Basin Covers

On film-filled towers that have solid, hot-water basin covers over the complete basin, the discharge outlets protecting the fill area shall be permitted to be located under the basin covers. [214:5.2.4.5]

26.21.2.5 Valves

[214:5.2.6]

26.21.2.5.1

Shutoff valves and automatically operated water control valves, if provided, shall be located as follows:

Outside the fire-exposed area

As close to the cooling tower as possible to minimize the amount of pipe to the discharge device

Where they will be accessible during a fire emergency

[214:5.2.6.1.2]

26.21.2.5.2 Manual Release Valve

[214:5.2.6.2]

26.21.2.5.2.1

Remote manual release valves, where required, shall be conspicuously located and accessible during a fire emergency. [214:5.2.6.2.1]

26.21.2.5.2.2

Where remote manual release valves are not required, an inspector's test valve shall be provided for each pilot-head-operated system. [214:5.2.6.2.2]

26.21.2.6 Strainers

Strainers shall be required for systems utilizing discharge devices with waterways of less than 3/8 in. (9.5 mm) diameter. [214:5.2.7]

26.21.2.7 Heat Detectors

Where deluge or preaction systems are used, heat detectors shall be installed and shall be selected from either of the types in 5.2.8.1 or 5.2.8.2 of NFPA 214. [214:5.2.8]

26.21.2.7.1

In mechanical-draft towers, pilot line detectors shall be located under the fan deck at the circumference of the fan opening and under the fan opening where necessary to comply with the spacing requirements in 26.21.2.7.1.1. (For extended fan decks, see 5.2.8.2.3 in NFPA 214.) [214:5.2.8.1.2.1(A)]

26.21.2.7.1.1

Pilot line detectors shall be spaced not more than 8 ft (2.4 m) apart in any direction including the fan opening. Temperature ratings shall be selected in accordance with operating conditions, but shall be no less than intermediate. [214:5.2.8.1.2.1(B)]

26.21.2.7.2

On towers having extended fan decks that completely enclose the distribution basin, electrical heat detectors shall be located under the fan deck extension in accordance with standard, indoor-spacing rules for the type detectors used in accordance with NFPA 72. [214:5.2.8.2.3]

26.21.2.7.2.1

Where the fan deck extension is 16 ft (4.9 m) or less and this dimension is the length of the joist channel, then only one row of detectors centered on and at right angles to the joist channels shall be required. Spacing between detectors shall be in accordance with NFPA 72. [214:5.2.8.2.3.1]

26.21.2.7.2.2

On towers having extended fan decks that do not completely enclose the hot-water basin, electrical heat detectors shall not be required under the fan deck extension. [214:5.2.8.2.3.2]

26.21.2.7.3

Where electrical heat detectors are inaccessible during tower operation, an accessible test detector shall be provided for each detection zone. [214:5.2.8.3]

26.21.2.7.4

Electrical heat detector components exposed to corrosive vapors or liquids shall be protected by materials of construction or by protective coatings applied by the equipment manufacturer. [214:5.2.8.4]

26.21.2.8 Protection for Fan Drive Motor

[214:5.2.9]

26.21.2.8.1

A sprinkler or spray nozzle shall be provided over each fan drive motor where the motor is located so that it is not within the protected area of the tower. [214:5.2.9.1]

26.21.2.8.2

Where a preaction or deluge system is used, the detection system shall be extended to cover the motor. [214:5.2.9.2]

26.21.2.8.3

Provision shall be made to interlock the fan motors with the fire protection system so that the cooling tower fan motors are stopped in the cell(s) for which the system is actuated. [214:5.2.9.3]

26.21.2.8.4

Where the continued operation of the fans is vital to the process, a manual override switch shall be permitted to be provided to reactivate the fan when it is determined that there is no fire. [214:5.2.9.4]

26.21.2.9 Corrosion Protection

[214:5.3]

26.21.2.9.1

Piping, fittings, hangers, braces, and attachment hardware including fasteners shall be hot-dipped galvanized steel in accordance with ASTM A153A/153M, Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware, or other materials having a superior corrosion resistance. [214:5.3.1]

26.21.2.9.1.1

Exposed pipe threads and bolts on fittings shall be protected against corrosion. [214:5.3.1.1]

26.21.2.9.1.2

All other components shall be corrosion resistant or protected against corrosion by a coating. [214:5.3.1.2]

26.21.2.9.2\*

Wax-type coatings shall not be used on devices without fusible elements. [214:5.3.2]

26.21.2.9.3\*

Special care shall be taken in the handling and installation of wax-coated or similar sprinklers to avoid damaging the coating. [214:5.3.3]

26.21.2.9.3.1

Corrosion-resistant coatings shall not be applied to the sprinklers by anyone other than the manufacturer of the sprinklers. [214:5.3.3.1]

26.21.2.9.3.2

In all cases, any damage to the protective coating occurring at the time of installation shall be repaired at once using only the coating of the manufacturer of the sprinkler in an approved manner, so that no part of the sprinkler will be exposed after the installation has been completed. [214:5.3.3.2]

26.22 Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves

26.22.1 Design Requirements

26.22.1.1\*

Unless the requirements of 26.22.1.2 apply, automatic sprinkler systems shall be designed based upon the design criteria for the protection of Group A plastics. [307:5.4.2.1]

26.22.1.2

With the approval of the authority having jurisdiction, the requirements of 26.22.1.1 shall not apply to buildings used exclusively for the handling or storage of specific cargoes and commodities that are defined as commodity classes less than Group A plastics by this standard. [307:5.4.2.2]

26.22.1.3

Buildings consistent with 26.22.1.2 shall be protected in accordance with the design criteria for the applicable commodity as required by this standard. [307:5.4.2.3]

26.22.1.4

Buildings used for the storage of hazardous materials shall be protected in accordance with this standard and the applicable codes and standards for the type of hazardous material being stored. [307:5.4.2.4]

26.22.2 Installation Requirements

26.22.2.1 Piers and Wharves With Combustible Substructure

26.22.2.1.1

Where there is danger of damage to sprinkler equipment by floating objects, physical barriers shall be provided to exclude such objects. [307:4.3.3.1.2.2]

26.22.2.1.2\* Upward Projecting Sprinklers

Where narrow horizontal channels or spaces are caused by caps, stringers, ties, and other structural members and where the standard upright sprinkler does not project sufficient water upward to extinguish or control fires on the underside of the pier or wharf deck, a sprinkler that projects water upward to wet the overhead shall be used. [307:4.3.3.1.3.1]

(A)

Location, spacing, and deflector position shall be governed by the discharge pattern of the sprinkler and the structure being protected. [307:4.3.3.1.3.1(A)]

(B)

The following design and installation guides shall apply where pendent sprinklers in the upright position or old-style sprinklers are to be utilized:

The maximum coverage per sprinkler head shall be limited to 80 ft2 (7.4 m2).

Where spacing or arrangement of stringers constitutes typical open-joist construction directly supporting the deck, sprinkler branch lines shall be installed between the bents at right angles to the stringers and shall meet the following requirements:

Spacing between branch lines shall not exceed 10 ft (3 m).

Sprinklers on branch lines shall be staggered and spaced not to exceed 8 ft (2.4 m) on center.

\*Where crisscross construction is involved, closer spacing of sprinklers shall be permitted as necessary to provide wetting of the entire structure.

The deflectors of sprinklers on lines under stringers shall be located not less than 4 in. (100 mm) nor more than 10 in. (250 mm) below the bottom plane of the stringer, and not more than 18 in. (450 mm) below the underside of the pier or wharf deck.

\*The sprinkler system shall be hydraulically designed in accordance with the requirements of this standard and shall meet the following requirements:

Sprinkler orifice shall be 1/2 in. (13 mm) and shall discharge at a minimum pressure of 12.5 psi (85 kPa).

Design area shall be based upon the largest area between firestops plus an additional area embracing at least two branch lines on opposite sides of the firestop.

Minimum design area shall be not less than 5000 ft2 (465 m2).

The temperature rating of the sprinkler shall not exceed 165°F (74°C).

The maximum area to be protected by any one system shall be limited to 25,000 ft2 (2320 m2).

[307:4.3.3.1.3.1(B)]

26.23 Semiconductor Fabrication Facilities

26.23.1 Design Requirements

26.23.1.1\*

Automatic sprinklers for cleanrooms or clean zones shall be installed in accordance with this standard and shall be hydraulically designed for a density of 0.20 gpm/ft2 (8.2 mm/min) over a design area of 3000 ft2 (280 m2). [318:11.1.4.2]

26.23.1.2

Automatic sprinkler protection shall be designed and installed in the plenum and interstitial space above cleanrooms in accordance with this standard, for a density of 0.20 gpm/ft2 (8.2 mm/min) over a design area of 3000 ft2 (280 m2). [318:11.1.4.3]

26.23.1.3

Sprinklers installed in duct systems shall be hydraulically designed to provide 0.5 gpm (1.9 L/min) over an area derived by multiplying the distance between the sprinklers in a horizontal duct by the width of the duct. [318:11.2.1.2]

26.23.1.3.1\*

Minimum discharge shall be 20 gpm (75 L/min) per sprinkler from the five hydraulically most remote sprinklers. [318:11.2.1.2.1]

26.23.2 Installation Requirements

26.23.2.1\*

Wet pipe automatic sprinkler protection shall be provided throughout facilities containing cleanrooms and clean zones. [318:11.1.4.1]

26.23.2.2\*

Approved quick-response sprinklers shall be utilized for sprinkler installations within down-flow airstreams in cleanrooms and clean zones. [318:11.1.4.4]

26.23.2.3\*

Sprinklers shall be spaced a maximum of 20 ft (6.1 m) apart horizontally and 12 ft (3.7 m) apart vertically. [318:11.2.1.2.2]

26.23.2.4

A separate indicating control valve shall be provided for sprinklers installed in ductwork. [318:11.2.1.3]

26.23.2.5

The sprinklers shall be accessible for periodic inspection and maintenance. [318:11.2.1.6]

26.24 Aircraft Hangars

26.24.1 Design Requirements

Sprinkler systems installed in aircraft hangars shall comply with NFPA 409.

26.24.2 Installation Requirements

Sprinkler systems installed in aircraft hangars shall comply with NFPA 409.

26.25 Airport Terminal Buildings, Fueling Ramp Drainage, and Loading Walkways

26.25.1 Design Requirements

26.25.1.1

Passenger-handling areas shall be classified as Ordinary Hazard Group 1 Occupancy, as defined in this standard, for the purpose of sprinkler system design. [415:4.5.1.3]

26.25.1.2\*

Baggage, package, and mail-handling areas shall be classified as Ordinary Hazard Group 2 Occupancy, as defined in this standard, for the purpose of sprinkler system design. [415:4.5.1.4]

26.25.1.3

Other areas of the airport terminal building shall be classified in accordance with Chapter 4 of this standard based on the occupancy of the area. [415:4.5.1.5]

26.25.1.4 Water Supply

Water supply from public and private sources shall be adequate to supply maximum calculated sprinkler demand plus a minimum of 500 gpm (1900 lpm) for hose streams. The supply shall be available at the rate specified for a period of at least 1 hour. [415:4.5.5]

26.25.1.4.1

Main sizes shall be hydraulically calculated based on the total domestic and fire protection requirements. Mains shall be not less than 8 in. (200 mm) in diameter except that laterals shall be permitted to be 6 in. (150 mm) in diameter if not over 200 ft (61 m) long. [415:4.5.5.1]

26.25.2 Installation Requirements. (Reserved)

26.26 Aircraft Engine Test Facilities

26.26.1 Design Requirements

26.26.1.1\*

In engine test cells, the minimum design discharge density shall be 0.50 gpm/ft2 (20.4 mm/min) of protected area. [423:7.6.3]

26.26.1.2

In engine test cells, water supplies shall be capable of meeting the largest demand at the design rate plus hose stream demand for a period of 30 minutes. [423:7.6.4]

26.26.1.2.1

Hose stream demand shall be a minimum of 250 gpm (950 lpm). [423:7.6.4.1]

26.26.1.2.2

The hydraulic calculation and the water supply shall be based on the assumption that all sprinklers in the test cell are operating simultaneously. [423:7.6.4.2]

26.26.2 Installation Requirements. (Reserved)

26.27 Advanced Light Water Reactor Electric Generating Plants

26.27.1 Design Requirements

26.27.1.1\* Sprinkler System Water Supply

The fire water supply shall be calculated on the basis of the largest expected flow rate for a period of 2 hours but shall not be less than 300,000 gal (1,135,500 L), and the following criteria also shall apply:

The flow rate shall be based on 500 gpm (1900 lpm) for manual hose streams plus the largest design demand of any sprinkler or fixed water spray system as determined in accordance with this standard, with NFPA 15, or with NFPA 804.

The fire water supply shall be capable of delivering the design demand specified in 26.27.1.1(1) with the hydraulically least demanding portion of fire main loop out of service.

[804:9.2.1]

26.27.1.2 Yard Mains

The underground yard fire main loop shall be installed to furnish anticipated water requirements, and the following criteria also shall be met:

The type of pipe and water treatment shall be design considerations, with tuberculation as one of the parameters.

Means for inspecting and flushing the systems shall be provided.

[804:9.4.1]

26.27.1.3 Cable Spreading Room

The cable spreading room shall have an automatic fixed water-based suppression system, and the following criteria also shall be met:

The location of sprinklers or spray nozzles shall protect cable tray arrangements to ensure water coverage for areas that could present exposure fire hazards to the cable raceways.

Automatic sprinkler systems shall be designed for a density of 0.30 gpm/ft2 (12.2 mm/min) over the most remote 2500 ft2 (230 m2).

[804:10.4.1.1]

26.27.1.4 Cable Tunnels

[804:10.4.2]

26.27.1.4.1

Automatic sprinkler systems shall be designed for a density of 0.30 gpm/ft2 (12.2 mm/min) for the most remote 100 linear ft (30 m) of cable tunnel up to the most remote 2500 ft2 (230 m2). [804:10.4.2.2.2]

26.27.1.4.2

Deluge sprinkler systems or deluge spray systems shall meet the following criteria:

They shall be zoned to limit the area of protection to that which the drainage system can handle with any two adjacent systems actuated.

They shall be hydraulically designed with each zone calculated with the largest adjacent zone flowing.

[804:10.4.2.2.4]

26.27.1.5\* Beneath Turbine Generator Operating Floor

All areas beneath the turbine generator operating floor shall be protected by an automatic sprinkler or foam-water sprinkler system meeting the following criteria:

The sprinkler system beneath the turbine generator shall be designed around obstructions from structural members and piping.

The sprinkler system shall be designed to a minimum density of 0.30 gpm/ft2 (12.2 mm/min) over a minimum application of 5000 ft2 (465 m2).

[804:10.8.2.1]

26.27.1.6\* Turbine Generator Bearings

[804:10.8.3]

26.27.1.6.1

Lubricating oil lines above the turbine operating floor shall be protected with an automatic sprinkler system to a minimum density of 0.30 gpm/ft2 (12.2 mm/min) that covers those areas subject to oil accumulation, including the area within the turbine lagging (skirt). [804:10.8.4]

26.27.1.6.2

Where shaft-driven ventilation systems are used, an automatic preaction sprinkler system providing a density of 0.30 gpm/ft2 (12.2 mm/min) over the entire area shall be provided. [804:10.8.7(2)]

26.27.1.7 Standby Emergency Diesel Generators and Combustion Turbines

The sprinkler and water spray protection systems shall be designed for a 0.25 gpm/ft2 (10.2 mm/min) density over the entire area. [804:10.9.3(2)]

26.27.1.8 Fire Pump Room/House

If sprinkler and water spray systems are provided for fire pump houses, they shall be designed for a minimum density of 0.25 gpm/ft2 (10.2 mm/min) over the entire fire area. [804:10.22.2]

26.27.1.9 Auxiliary Boilers

Sprinkler and water spray systems shall be designed for a minimum density of 0.25 gpm/ft2 (10.2 mm/min) over the entire area. [804:10.24.3]

26.27.2 Installation Requirements

26.27.2.1 Yard Mains, Hydrants, and Building Standpipes

[804:9.4]

26.27.2.1.1

Approved visually indicating sectional control valves such as postindicator valves shall be provided to isolate portions of the main for maintenance or repair without simultaneously shutting off the supply to both primary and backup fire suppression systems. [804:9.4.2]

26.27.2.1.2\*

Sectional control valves shall allow maintaining independence of the individual loop around each unit, and the following also shall apply:

For such installations, common water supplies shall also be permitted to be utilized.

For multiple-reactor sites with widely separated plants [approaching 1 mi (1.6 km) or more], separate yard fire main loops shall be used.

[804:9.4.4]

26.27.2.1.3

Sprinkler systems and manual hose station standpipes shall have connections to the plant underground water main so that a single active failure or a crack in a moderate-energy line can be isolated so as not to impair both the primary and the backup fire suppression systems unless otherwise permitted by the following:

Alternatively, headers fed from each end shall be permitted inside buildings to supply both sprinkler and standpipe systems, provided steel piping and fittings meeting the requirements of ASME B31.1, Code for Power Piping, are used for the headers (up to and including the first valve) supplying the sprinkler systems where such headers are part of the seismically analyzed hose standpipe system.

Where provided, such headers shall be considered an extension of the yard main system.

Each sprinkler and standpipe system shall be equipped with an outside screw and yoke (OS&Y) gate valve or other approved shutoff valve.

[804:9.4.7]

26.27.2.2 Cable Tunnels

The location of sprinklers or spray nozzles shall protect cable tray arrangements and possible transient combustibles to ensure water coverage for areas that could present exposure fire hazards to the cable raceways. [804:10.4.2.2.3]

26.27.2.3 Deluge

Deluge sprinkler systems or deluge spray systems shall meet the following criteria:

They shall be zoned to limit the area of protection to that which the drainage system can handle with any two adjacent systems actuated.

They shall be hydraulically designed with each zone calculated with the largest adjacent zone flowing.

[804:10.4.2.2.4]

26.27.2.4

Cable tunnels over 50 ft (15 m) long shall be provided with hose stations and portable fire extinguishers installed outside the tunnel. [804:10.4.2.4(3)]

26.28 Light Water Nuclear Power Plants

26.28.1 Design Requirements

A fire protection water supply of reliability, quantity, and duration shall be provided by one of the two following methods:

A fire protection water supply of not less than two separate 300,000 gal (1,135,500 L) supplies shall be provided.

The 2-hour fire flow rate for 2 hours shall be calculated, and the following criteria shall be met:

The flow rate shall be based on 500 gpm (1900 lpm) for manual hose streams plus the largest design demand of any sprinkler or fixed water spray system(s) in the power block as determined in accordance with NFPA 13 or NFPA 15.

The fire water supply shall be capable of delivering this design demand with the hydraulically least demanding portion of fire main loop out of service.

[805:5.5.1]

26.28.2 Installation Requirements

26.28.2.1

Sprinkler systems and manual hose station standpipes shall be connected to the plant fire protection water main so that a single active failure or a crack to the water supply piping to these systems can be isolated so as not to impair both the primary and backup fire suppression systems. [805:5.5.12]

26.28.2.2

Each sprinkler and standpipe system shall be equipped with an outside screw and yoke (OS&Y) gate valve or other approved shutoff valve. [805:5.5.17]

26.29 Code for the Protection of Cultural Resource Properties — Museums, Libraries, and Places of Worship. [NFPA 909]

26.29.1 Design Requirements

26.29.1.1\*

Standard-response sprinklers shall be permitted for use in light-hazard areas. [909:9.12.13.2]

26.29.1.2\*

Preaction and dry pipe systems shall be designed to minimize the risk of corrosion in accordance with the requirements 9.12.13.3.1 through 9.12.13.3.6.5 of NFPA 909. [909:9.12.13.3]

26.29.1.3 System Design for Museums, Libraries, and Their Collections in Compact Storage

26.29.1.3.1\*

The design shall recognize the nature of the potential threat of a fire that originates in a compact mobile storage unit, where fuel loads are invariably large and fire growth is significantly different from that in other kinds of storage. [909:9.12.24.4.1.3]

26.29.1.3.2\*

The automatic fire suppression system, the compact storage system, and the storage compartmentalization features shall be designed to limit fire damage in accordance with the facility's fire safety objectives. [909:9.12.24.4.1.4(A)]

26.29.1.3.3

Design calculations shall include the number and size of the storage modules, the separation provided between the modules end-to-end and back-to-back, and the type of material being stored. [909:9.12.24.4.1.4(B)]

26.29.1.3.4

Where the automatic fire suppression is provided by automatic fire sprinkler systems, the systems shall be wet pipe, single interlock preaction, or single non-interlock preaction systems. [909:9.12.24.4.1.4(C)]

26.29.1.3.5

Dry pipe or double-interlock preaction systems shall not be installed in compact storage areas. [909:9.12.24.4.1.4(D)]

26.29.1.3.6

Where compact storage is installed in an existing storage area, the existing automatic fire detection and fire suppression systems shall be modified as required to accommodate the increased fire loading. [909:9.12.24.4.1.4(E)]

26.29.2 Installation Requirements

26.29.2.1\*

Branch lines shall be pitched at least 1/2 in. per 10 ft (4 mm/m), and mains shall be pitched at least 1/4 in. per 10 ft (2 mm/m). [909:9.12.13.3.1]

26.29.2.2\*

Auxiliary drains shall be provided at all preaction system low points in accordance with the requirements of this standard for dry pipe systems whether the preaction system piping subject to freezing or not. [909:9.12.13.3.2.1]

26.29.2.3\*

Where steel pipe is used in dry pipe and preaction systems, it shall be assumed that the water supplies and environmental conditions contribute to unusual corrosive properties. [909:9.12.13.3.3]

26.30 National Electrical Code

26.30.1 Design Requirements. (Reserved)

26.30.2 Installation Requirements

26.30.2.1 Dedicated Electrical Space

The space equal to the width and depth of the equipment and extending from the floor to a height of 6 ft (1.8 m) above the equipment or to the structural ceiling, whichever is lower, shall be dedicated to the electrical installation. No piping, ducts, leak protection apparatus, or other equipment foreign to the electrical installation shall be located in this zone.

Exception: Suspended ceilings with removable panels shall be permitted within the 1.8-m (6-ft) zone.

26.30.2.2

The area above the dedicated space required by 26.30.2.1 shall be permitted to contain foreign systems, provided protection is installed to avoid damage to the electrical equipment from condensation, leaks, or breaks in such foreign systems. [70:110.26(E) (1) (b)]

26.30.2.3

Sprinkler protection shall be permitted for the dedicated space where the piping complies with this section. [70:110.26(E) (1) (c)]

26.31 Fire Protection of Telecommunication Facilities

26.31.1 Design Requirements. (Reserved)

26.31.2 Installation Requirements

26.31.2.1

All piping for dry pipe and preaction sprinkler systems shall be installed with a pitch in accordance with this standard whether or not the piping is subjected to freezing conditions. [76:8.6.2.2.2]

26.32 Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids

26.32.1 Design Requirements

26.32.1.1

Any portion of an exhaust system utilizing combustible components or having the potential for combustible residue buildup on the inside, where the duct cross-sectional area is greater than or equal to 75 in.2 (480 cm2), shall be provided with an automatic extinguishing system within the duct and at the duct intake, hood, enclosure, or canopy. [91:9.1]

26.32.1.2

When a sprinkler system is installed, means shall be provided to prevent water accumulation in the duct or flow of water back to a process subject that could be damaged by water. [91:9.2]

26.32.2 Installation Requirements. (Reserved)

26.33 Hypobaric Facilities

26.33.1 Design Requirements

26.33.1.1

A fire suppression system consisting of independently supplied and operating handline and fixed deluge-type water spray systems shall be installed. [99B:4.5.1.5]

26.33.1.2

Design of the fire suppression system shall be such that failure of components in either the handline or deluge system will not render the other system inoperative. [99B: 4.5.1.6]

26.33.1.3

System design shall be such that activation of either the handline or the deluge system shall automatically cause the following:

Visual and audio alarm indicators shall be activated at the chamber operator's console.

All ungrounded electrical leads for power and lighting circuits contained inside the chamber shall be disconnected.

Emergency lighting and communication, where used, shall be activated.

[99B:4.5.1.7]

26.33.1.4

Intrinsically safe circuits, including sound-powered communications, shall be permitted to remain connected when either the handline or deluge system is activated. [99B:4.5.1.8]

26.33.1.5

Control circuitry and other electrical equipment involved in the fire detection and suppression system shall be powered from the critical branch of the emergency electrical system and connected to the uninterruptible power supply (UPS). [99B:4.5.1.11]

26.33.1.6

In chambers that consist of more than one compartment, the deluge system shall operate independently or simultaneously even if the compartments are at different pressures (altitudes). [998:4.5.2.2]

26.33.1.7

Fixed deluge systems shall not be required in chamber compartments that are used strictly as personnel transfer compartments and for no other purpose. [99B:4.5.2.3]

26.33.1.8

Manual activation and deactivation deluge controls shall be located at the operator's console and in each chamber compartment containing a deluge system. [99B:4.5.2.4]

26.33.1.9

Controls shall be designed to prevent unintended activation. [998:4.5.2.4.1]

26.33.1.10

Water shall be delivered from the fixed discharge nozzles of the deluge system within 3 seconds of activation of any affiliated deluge control. [99B:4.5.2.5]

26.33.1.11\*

Total water demand shall be determined by multiplying the total chamber floor area by 7.5 gpm/ft2 (306 mm/min). [99B:4.5.2.5.1]

26.33.1.12

The minimum operating pressure at the nozzle shall be 30 psi (2.1 bar). [99B:4.5.2.5.2]

26.33.1.13

The water supply shall be constantly and fully charged. [99B:4.5.2.6]

26.33.1.14

The water supply pressure shall be constantly monitored and an interlock shall prevent chamber operation if water supply pressure has fallen 10 percent below normal operating charge pressure. [99B:4.5.2.7]

26.33.1.15

There shall be water in the deluge system to maintain the flow specified in 26.33.1.11 simultaneously in each chamber containing the deluge system for 1 minute. [99B: 4.5.2.8]

26.33.1.16

The limit on maximum extinguishment duration shall be governed by the chamber capacity (bilge capacity also, if so equipped) and/or its drainage system. [99B:4.5.2.9]

26.33.1.17

The deluge system shall have stored pressure to operate for at least 15 seconds without electrical branch power. [99B:4.5.2.10]

26.33.2 Installation Requirements. (Reserved)

26.34 Coal Mines

26.34.1 Design Requirements

26.34.1.1 Underground Mining Operations

26.34.1.1.1\*

Fire sprinkler systems for underground mining operations shall be designed and installed in accordance with NFPA 120.

26.34.1.2 Coal Preparation Plants and Crusher Buildings

26.34.1.2.1

When automatic sprinkler systems are to be supplied through the standpipe system, hydraulic calculations shall be used to ensure that the piping and the water supply meet the hose and automatic sprinkler demands simultaneously. [120:6.3.2.3.2]

26.34.1.3 Underground Conveyors

26.34.1.3.1

The water supply shall be free of excessive sediment and corrosives. An approved strainer with a flush-out connection and manual shutoff valve shall be provided. [120:9.4.6.3.1.1]

26.34.1.3.2

The water supply shall provide the required water flow for not less than 60 minutes. [120:9.4.6.3.1.2]

26.34.1.3.3

Sprinkler systems shall meet the following requirements:

The sprinklers shall be installed in accordance with this standard as far as practical, and shall have components that have been listed.

The sprinkler head activation temperature shall not be less than 150°F (65.6°C) or greater than 300°F (148.9°C).

Sprinklers shall be kept free of excessive rock dust, muck, conveyor string, or any other material that can block the discharge or insulate the fusible link.

The application rate shall not be less than 0.25 gpm/ft2 (10.2 mm/min) of the top surface of the top belt, bottom surface of the top belt, and the top surface of the lower belt.

With a water flow and pressure than is present under normal mine operating conditions, the residual pressure measured downstream of the opened sprinklers or the 8-head inspector's test connection of 10 psi (70 kPa) or greater for belt drive systems shall be maintained at all times.

Maximum distance between nozzles on a branch line shall not exceed 8 ft (2.4 m).

Piping for the deluge, foam, or closed-head sprinkler system shall be metal and listed for sprinkler applications.

\*Sprinkler piping shall be supported by UL-listed pipe hangers or other substantial metal supports such as angle iron, U bolts, or heavy chain.

The system shall be interlocked to shut down the conveyor and provide an audible and a visual alarm.

The components of the system shall be located so as to minimize the possibility of damage by roof fall or by the moving belt and its load.

[120:9.4.6.3.2]

26.34.2 Installation Requirements

26.34.2.1 Underground Conveyors

26.34.2.1.1

Deluge water spray systems, foam systems, closed-head sprinkler systems, or dry-chemical systems automatically actuated by rise in temperature shall be installed at main and secondary belt conveyor drives. [120:9.4.6.1]

26.34.2.1.2

Fire suppression systems shall extend to the drive areas of belt conveyors, including drive motor(s), reducer, head pulley, and belt storage unit (takeup), including any hydraulic power unit; its electrical controls; and the top and bottom of the first 50 ft (15 m) of belt from the drive on the downwind side. [120:9.4.6.2]

26.34.2.1.3

Deluge water spray systems shall meet the requirements of 26.34.2.1.3.1 through 26.34.2.1.3.5. [120:9.4.6.3.3]

26.34.2.1.3.1

The system shall be activated by heat detectors or no less effective means. [120:9.4.6.3.3.1]

26.34.2.1.3.2

Detectors shall be located at the belt drive, hydraulic takeup unit (unless fire-resistive fluid is used), discharge roller, and the roof above the conveyor. [120:9.4.6.3.3.1(A)]

26.34.2.1.3.3

Detectors at the roof line should be spaced 8 ft to 10 ft (2.4 m to 3.0 m) apart along the entire length of the protected area of the belt. [120:9.4.6.3.3.1(B)]

26.34.2.1.3.4

The water spray nozzles shall be full cone, corrosion resistant [if less than 3/8 in. (0.95 cm) inside diameter or K-factor 4.2 or lower], and provided with blow-off dust covers. [120:9.4.6.3.3.2]

26.34.2.1.3.5

A closed sprinkler head shall be used over the electrical controls. [120:9.4.6.3.3.4]

26.34.2.2 Mine Surface Buildings

26.34.2.2.1

In addition, If sprinklers are installed, water flow, valve tamper, and low building temperature alarms shall be provided. [120:8.6.1.2]

26.35 Metal/Nonmetal Mining and Metal Mineral Processing Facilities

26.35.1 Design Requirements

26.35.1.1 Water Supplies

26.35.1.1.1

When automatic sprinkler systems are supplied through the hand hose line standpipe system, hydraulic calculations shall be used to ensure that the piping and water supply will supply the hose and automatic sprinkler demands simultaneously. [122:6.2.3]

26.35.1.1.2

Where a fire water supply is required by the risk assessment, capacity and availability shall provide the water demand for fire-fighting purposes, including hose and sprinkler systems, for a minimum duration of 2 hours. [122:13.7.2]

26.35.1.2\*

Where provided, automatic sprinkler systems installed for the protection of flammable liquid or diesel fuel storage areas shall be of the foam-water type. [122:11.3.1]

26.35.1.3 New Solvent Extraction (SX) Facilities

26.35.1.3.1

Fixed fire suppression shall be provided for the following SX facility areas and equipment:

Buildings housing SX processes

Interior of all mixer-settler vessels/cells

Crud tanks that include treatment filters and centrifuges

Coalescers

Along launders and weirs outside of mixer-settler vessels

Inside pipe trenches carrying solvents

Inside organic solvent and diluent tanks

Inside dikes enclosing organic solvent storage tanks

Over organic solvent pumps

Over elevated pipe racks carrying organic solvents in plastic pipes

Other areas handling, processing, or exposed to flammable or combustible liquids

[122:13.19.1]

26.35.1.3.2\*

Fire suppression for applications in 26.35.1.3.1 shall be water, foam, dry chemical, or water mist. [122:13.19.1.1]

26.35.1.3.3\*

Design of fire suppression systems in 26.35.1.3.1 shall be based on criteria set forth in NFPA 11, NFPA 15, NFPA 16, and NFPA 17. [122:13.19.1.2]

26.35.1.3.4\*

Actuation of fire suppression systems in 26.35.1.3.1 shall be automatic. [122:13.19.1.3]

26.35.1.3.5

As exposure protection, automatic water-only deluge (open-head) sprinkler systems shall be provided between mixer-settler trains if spaced closer than 50 ft (15 m) from each other. [122:13.19.2]

26.35.1.3.6

As exposure protection, automatic water-only deluge sprinkler systems shall be provided around the exterior perimeter of organic solvent tanks if spaced closer than 50 ft (15 m) from each other. [122:13.19.3]

26.35.1.3.7

As exposure protection, automatic fire suppression shall be provided over other critical equipment (i.e., transformers) or outside along important building walls [i.e., motor control center (MCC) rooms] that are within 50 ft (15 m) of a solvent fire area. [122:13.19.4]

26.35.1.3.8

Hydraulic design of automatic fire suppression systems in 26.35.1.3.1 shall include the simultaneous operation of all fire protection systems associated with a single (multicell) train. [122:13.19.5]

26.35.1.3.9

The total flow rate of foam application and water associated with the discharge of automatic fire extinguishing systems, fixed monitors, and hydrants shall determine the total volume of fire water required. [122:13.19.6]

26.35.2 Installation Requirements. (Reserved)

26.36 Hazardous Materials Code

26.36.1 Design Requirements

Sprinkler system discharge criteria for the protection of hazardous materials shall comply with NFPA 400.

26.36.1.1 Requirements for Occupancies Storing Quantities of Hazardous Materials Exceeding the Maximum Allowable Quantities Per Control Area for High Hazard Contents

The design of the sprinkler system shall be not less than ordinary hazard Group 2 in accordance with this standard except as follows:

Where different requirements are specified in Chapters 11 through 21 of NFPA 400

Where the materials or storage arrangement requires a higher level of sprinkler system protection in accordance with nationally recognized standards

Where approved alternative automatic fire extinguishing systems are permitted

[400:6.2.1.1.1]

26.36.1.2 General Requirements for Storage of Organic Peroxide Formulations

26.36.1.2.1

Where required by other provisions of this code, automatic sprinklers and water spray systems shall be designed and installed according to the requirements of this standard and NFPA 15 and shall provide the following discharge densities:

Class I — 0.50 gpm/ft2 (20.4 mm/min)

Class II — 0.40 gpm/ft2 (16.3 mm/min)

Class III — 0.30 gpm/ft2 (12.2 mm/min)

Class IV — 0.25 gpm/ft2 (10.2 mm/min)

[400:14.2.5.1]

26.36.1.2.2

The system shall be designed as follows:

It shall provide the required density over a 3000 ft2 (280 m2) area for areas protected by a wet pipe sprinkler system or single-interlock preaction sprinkler system.

Buildings using a dry pipe sprinkler system shall be provided with a required density over the hydraulically most remote 3900 ft2 (360 m2) design area, and, if used, sprinklers shall be within 6 ft (1.8 m) of the top of any stored organic peroxide formulation.

The entire area of any building of less than 3000 ft2 (280 m2) shall be used as the area of application.

[400:14.2.5.2]

26.36.1.2.3

Where required for detached storage buildings containing Class I organic peroxide formulations in quantities exceeding 2000 lb (907 kg), automatic sprinkler protection shall be open-head deluge-type, designed and installed in accordance with this standard. [400:14.2.5.3]

26.36.1.3 Indoor Storage of Oxidizer Solids and Liquids

26.36.1.3.1

Sprinkler protection for Class 2 oxidizers shall be designed in accordance with Table 26.36.1.3.1. [400:15.3.2.3.4.1]

Table 26.36.1.3.1 Ceiling Sprinkler Protection for Class 2 Oxidizers in Palletized or Bulk and Rack Storage Areas

Type of Storage Ceiling Sprinklers Area of Application In-Rack Sprinklers

Storage Height Density

ft m gpm/ft2 mm/min ft2 m2

Palletized or bulk 8 2.4 0.20 8.2 3750 350 —

Palletized or bulk 12 3.7 0.35 14.3 3750 350 —

Rack 12 3.7 0.20 8.2 3750 350 One line above each level of storage, except the top level

Rack 16 4.9 0.30 12.2 2000 185 One line above each level of storage, except the top level

[400: Table 15.3.2.3.2.10(B)]

26.36.1.3.2

Ceiling sprinklers shall be high-temperature sprinklers. [400:15.3.2.3.4.2]

26.36.1.3.3 Storage Protection for Class 2 Oxidizers With In-Rack Sprinklers

(A)

In-rack sprinklers shall be quick-response sprinklers with an ordinary-temperature rating and have a K-factor of not less than K = 8.0. [400:15.3.2.3.4.3(A)]

(B)

In-rack sprinklers shall be designed to provide 25 psi (172 kPa) for the six most hydraulically remote sprinklers on each level. [400:15.3.2.3.4.3(B)]

(C)

The in-rack sprinklers shall be 8 ft to 10 ft (2.4 m to 3.0 m) spacings in the longitudinal flue space at the intersection of the transverse flue spaces. [400:15.3.2.3.4.3(C)]

26.36.1.3.4 Sprinkler Criteria for Class 3 Oxidizers

26.36.1.3.4.1 Class 3 Oxidizers Less Than 2700 LB (1225 kg)

(A)

Sprinkler design criteria for buildings that require sprinkler protection and contain total quantities of Class 3 oxidizers less than 2700 lb (1225 kg) shall be in accordance with the requirements of 26.36.1.3.4.1(B). [400:15.3.2.4.13.1(A)]

(B)

Facilities that require sprinkler protection and contain total quantities of Class 3 oxidizers greater than 200 lb (91 kg), but less than 2700 lb (1225 kg), shall follow the sprinkler design criteria in Table 26.36.1.3.4.1(B). [400:15.3.2.4.13.1(B)]

Table 26.36.1.3.4.1(B) Sprinkler Protection of Class 3 Oxidizers Stored in Total Quantities Greater than 200 lb (91 kg) but Less than 2700 lb (1225 kg)

Storage Parameters Shelf Bulk or Pile Bulk or Pile Rack

Maximum storage height 6 ft (1.8 m) 5 ft (1.5 m) 10 ft (3 m) 10 ft (3 m)

Maximum ceiling height 25 ft (7.6 m) 25 ft (7.6 m) 25 ft (7.6 m) NA

Aisles — pile separat-ion 4 ft (1.2 m) min. clear aisles 4 ft (1.2 m) min. clear aisles 8 ft (2.4 m) min. clear aisles 8 ft (2.4 m) min. clear aisles

Ceiling design criteria 18.3 mm/min/185 m2 14.3 mm/min/465 m2 or 24.5 mm/min/185 m2 26.5 mm/min/465 m2 0.35 gpm/ft2/or 5000 ft2 or 0.6 gpm/ft2/2000 ft2

In-rack sprinkl-ers NP NP NA See 26.36.1.3.4.2

Hose stream dem-and 500 gpm 500 gpm 500 gpm 500 gpm

Duration 120 minutes 120 minutes 120 minutes 120 minutes

For SI units, 1 gal = 3.79 L. NA: Not applicable. NP: Not permitted.

[400: Table 15.3.2.4.13.1(B)]

26.36.1.3.4.2 Storage Protection for Class 3 Oxidizers In-Rack Sprinkler Criteria

(A)

Where required by Table 26.36.1.3.4.1(B), in-rack sprinkler protection shall be as follows:

In-rack sprinklers shall be installed above every level of oxidizer storage.

In-rack sprinklers shall be spaced at maximum 4 ft (1.2 m) intervals to provide one sprinkler in each flue space.

In-rack sprinklers shall be quick-response sprinklers with an ordinary-temperature rating and have a K-factor of not less than K = 8.0.

In-rack sprinklers shall be designed to provide 25 psi (172 kPa) for the six most hydraulically remote sprinklers on each level.

[400:15.3.2.4.13.3(A)]

26.36.1.3.4.3 Class 3 Oxidizers Greater Than or Equal to 2700 LB (1225 kg)

The sprinkler protection required by 26.36.1.3.4.3 shall be in accordance with Table 26.36.1.3.4.3. [400:15.3.2.4.13.4(B)]

Table 26.36.1.3.4.3 Sprinkler Protection of Class 3 Oxidizers Stored in Total Quantities of Greater than or Equal to 2700 lb (1225 kg)

Storage Parameters Bulk or Pile Rack

Maximum storage height 5 ft (1.5 m) 10 ft (3 m)

Maximum ceiling height 25 ft (7.6 m) NP

Aisles — pile separat-ion 8 ft (2.4 m) min. clear aisles 8 ft (2.4 m) min. clear aisles

Ceiling design criteria 0.35 gpm/ft2/5000 ft2 (1.32 L/min/m2/464.5 m2) Predominant for other commodities but not less than ordinary hazard Group II

In-rack sprinklers NP See 26.36.1.3.4.4(B)

Hose stream demand 500 gpm (1900 lpm) 500 gpm (1900 lpm)

Duration 120 minutes 120 minutes

NP: Not permitted.

[400: Table 15.3.2.4.13.4(B)]

26.36.1.3.4.4 Special In-Rack Sprinkler Protection for Class 3 Oxidizers

(A)

Where required by Table 26.36.1.3.4.3, special in-rack sprinkler protection, which is required by 26.36.1.3.4.4(C), shall be as shown in Figure 26.36.1.3.4.4(A). [400:15.3.2.4.13.5(A)]

FIGURE 26.36.1.3.4.4(A) Arrangement of Barriers and In-Rack Sprinklers for Special Fire Protection Provisions. [400: Figure 15.3.2.4.13.5(A)]

(B)

In-rack automatic sprinklers shall be provided under each horizontal barrier and arranged in accordance with 26.36.1.3.4.4(C) through 26.36.1.3.4.4(J). [400:15.3.2.4.13:5(L)]

(C)

For double-row racks, two lines of in-rack sprinklers shall be provided between the face of the rack and the longitudinal vertical barrier located in the center of the rack. [400:15.3.2.4.13.5(M)]

(D)

For single-row racks, two lines of in-rack sprinklers shall be provided between each rack face. [400:15.3.2.4.13.5(N)]

(E)

Three in-rack sprinklers shall be provided on each in-rack sprinkler line as follows:

Two sprinklers on each line shall be spaced approximately 11/2 in. (40 mm) from each transverse vertical barrier.

One in-rack sprinkler on each in-rack sprinkler line shall be located approximately equidistant between the transverse vertical barriers.

[400:15.3.2.4.13.5(O)]

(F)

In-rack sprinklers shall be of the upright or pendent type, with the fusible element located no more than 6 in. (150 mm) from the horizontal barrier. [400:15.3.2.4.13.5(P)]

(G)

The stock shall be maintained at least 6 in. (152.4 mm) below the sprinkler deflector. [400:15.3.2.4.13.5(Q)]

(H)

In-rack sprinklers shall be K = 8.0, quick-response, ordinary-temperature-rated sprinklers. [400:15.3.2.4.13.5(R)]

(I)

The in-rack sprinkler system shall be designed to supply 6 sprinklers on each line, with a total of 12 sprinklers operating at gauge pressure of 25 psi (172 kPa). [400:15.3.2.4.13.5(S)]

(J)

The design of the in-rack sprinkler system shall be independent of, and shall not be required to be balanced with, ceiling sprinkler systems. [400:15.3.2.4.13.5(T)]

26.36.1.3.4.5 Sprinkler Criteria for Class 4 Oxidizers

(A)

Sprinkler protection for Class 4 oxidizers shall be installed on a deluge sprinkler system to provide water density of 0.35 gpm/ft2 (14.4 mm/min) over the entire storage area. [15.3.2.5.4.6(A)]

(B)

Sprinkler protection shall be installed in accordance with this standard. [400:15.3.2.5.4.6(B)]

26.36.2 Installation Requirements. (Reserved)