DELETED

First Revision No. 1051-NFPA 13-2022 [Global Input]

Remove the word “spray” where it appears throughout Chapter 12 in all areas (titles, sections, tables and figures). The changes are to occur in the following sections:

12.1.8.7

12.1.10

12.1.10.2.1.3

12.1.10.1.2 (twice in this section)

12.1.10.1.2.2

12.1.11

12.1.11.1.4 (twice in this section)

Submitter Information Verification

Committee: AUT-SSI
Submittal Date: Tue Jul 26 14:06:56 EDT 2022

Committee Statement

Committee Statement: Residential sprinklers are not referred to as "spray" sprinklers.
Response Message: FR-1051-NFPA 13-2022

Public Input No. 227-NFPA 13-2022 [Chapter 12]

First Revision No. 1341-NFPA 13-2022 [Global Input]

Annex F (the current F – Informational References would change to Annex G)

~~Limited Area Design and Installation for Existing Residential Buildings for the Purpose of Life Safety.~~

~~F.1 Introduction. This annex is provided as an aid for building owners and the Authority Having Jurisdiction (AHJ) for the design and installation of automatic sprinkler system(s) into existing buildings for the purpose to enhance life safety within the means of egress. It is not the intent of this annex to provide complete information regarding all aspects of the sprinkler system design and installation. If a limited area or partial sprinkler system is voluntarily installed or required by the local AHJ, other sections of NFPA 13 still apply regarding the design and installation.~~

~~F.1.1 Occupants who live in existing multi family residential occupancies that do not have fire sprinklers are at a higher risk of dying in a fire than those with fire sprinklers. In January of 2022 a fire in a Philadelphia apartment building killed 12 people. Another 17 people were killed in an apartment building located in the Bronx, New York City that same month. In 2017, 13 people died in an apartment building also located in the Bronx, New York City. A common factor in each of these fires was that the means of egress became unsafe due to fire conditions.~~

~~F.1.2 Scope Annex F is only intended to apply to fire sprinklers being installed in areas that have been identified as a critical element for life safety of the occupants within the building. These areas would commonly be associated with the means of egress shared among the occupants.~~

~~F.1.3 Purpose Annex F provides guidance for a partial fire sprinkler system installed into existing multi-family residential occupancies. Users of Annex F should refer to the text within NFPA 13 for specific requirement for the planning, design, installation and testing of fire sprinkler systems.~~

~~F.1.4 and beyond~~

- ~~Do we want to be specific about the types of buildings this applies to?~~
    - ~~Minimum number of stories?~~
- ~~Address the water supply:~~
    - ~~Water taken from the Domestic system (Requirements from NFPA 101)~~
    - ~~Water taken from existing standpipe system~~
    - ~~New water supply? Dedicated?~~
- ~~Design approach – in accordance with Chapter 19, 19.2.3.3.7 – room design for corridor?~~
- ~~Hydraulic calculations in accordance with Chapter 28~~
- ~~Coverage – exits corridors, exits and stairways on every floor. (Could be more generic and reference area that are considered part of the means of egress that are common to occupants)~~
    - ~~One sprinkler inside each dwelling unit over the exit doors from that dwelling unit?~~
- ~~Components – sprinklers, spacing, piping, hangers, valves, drains (all in accordance with the~~

~~body of NFPA 13)~~

-see attahed file for new annex.

Supplemental Information

File Name	Description	Approved
13_SSI_Global_FR-1341_Annex_F-new_for_ballot.pdf	for ballot	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Thu Sep 15 14:07:09 EDT 2022

Committee Statement

Committee Statement: This idea for a limited area or partial system is not a new concept. NFPA 101, Chapter 31 (31.1.1.1, Option 3) allows partial systems for existing apartment buildings. The International Fire Code, Section 903.3.8 also allows “limited area sprinkler systems” in light or ordinary hazard areas. Likewise, the City of Los Angeles enacted the Dorothy Mae Ordinance (No. 158,963) in 1984 for specific residential buildings after a fire that occurred in an apartment building resulting in 18 fatalities. The purpose of this annex is not to require but to provide guidance for building owners, building authorities and AHJ’s if they choose to provide a partial system for any type of multi-family residential occupancy. The limited or partial system is specific to area(s) within the means of egress.

As this was submitted by a task group they will continue to refine this annex for the second draft.

Response Message: FR-1341-NFPA 13-2022

Public Input No. 511-NFPA 13-2022 [Global Input]

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Annex F Limited Area Design and Installation for Existing Residential Buildings for the Purpose of Life Safety.

F.1 Introduction.

This annex is provided as an aid for building owners and the authority having jurisdiction (AHJ) for the design and installation of automatic sprinkler system(s) into existing buildings for the purpose to enhance life safety within the means of egress. It is not the intent of this annex to provide complete information regarding all aspects of the sprinkler system design and installation. If a limited area or partial sprinkler system is voluntarily installed or required by the local AHJ, other sections of NFPA 13 still apply regarding the design and installation.

F.1.1

Occupants who live in existing multifamily residential occupancies that do not have fire sprinklers are at a higher risk of dying in a fire than those with fire sprinklers. In January of 2022 a fire in a Philadelphia apartment building killed 12 people. Another 17 people were killed in an apartment building located in the Bronx, New York City that same month. In 2017, 13 people died in an apartment building also located in the Bronx, New York City. A common factor in each of these fires was that the means of egress became unsafe due to fire conditions.

F.1.2 Scope.

Annex F is only intended to apply to fire sprinklers being installed in areas that have been identified as a critical element for life safety of the occupants within the building. These areas would commonly be associated with the means of egress shared among the occupants.

F.1.3 Purpose.

Annex F provides guidance for a partial fire sprinkler system installed into existing multifamily residential occupancies. Users of Annex F should refer to the text within NFPA 13 for specific requirements for the planning, design, installation, and testing of fire sprinkler systems.

First Revision No. 1073-NFPA 13-2022 [Detail]

15.1 Open Sprinklers and Open Nozzles.

15.1.1

Open sprinklers and open nozzles shall be permitted to be used in deluge systems to protect special hazards or exposures or in other special locations.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 18:28:55 EDT 2022

Committee Statement

Committee Statement: Clarifies that open sprinklers or open nozzles may be used in deluge systems.

Response Message: FR-1073-NFPA 13-2022

First Revision No. 1085-NFPA 13-2022 [Detail]

[Change title name to what is written below]

16.10.5.3 Auxiliary Drains for Dry Pipe Systems and Preaction Systems in Areas Subject to Freezing.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 08:45:27 EDT 2022

Committee Statement

Committee Statement: The title of this section should be changed to match the title of section 16.10.5.2 for clarification and to differentiate between freezing and non-freezing requirements.

Response Message: FR-1085-NFPA 13-2022

First Revision No. 1314-NFPA 13-2022 [Detail]

[Replace the Heading "Stairways with "Stair Shafts"]

9.3.4 ~~Stairways~~Stair Shafts.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Aug 16 16:20:57 EDT 2022

Committee Statement

Committee Statement: Stair shafts more appropriately describes the building condition that the following requirements apply to. The annex was not accepted, open stairs are not always creating an obstruction, normal obstruction rules would apply.

Response Message: FR-1314-NFPA 13-2022

Public Input No. 371-NFPA 13-2022 [Section No. 9.3.4]

Public Input No. 25-NFPA 13-2021 [Section No. 9.3.4]

First Revision No. 1343-NFPA 13-2022 [Detail]

30.5.2 Revamping of Hydraulic Design Systems. [original 30.6]

30.5.2.1

When hydraulically designed systems are revamped, any existing bushing shall be removed and a nipple not exceeding 4 in. (100 mm) in length shall be permitted to be installed in the branch line fitting.

30.5.2.2*

Calculations shall be provided to verify that the system design flow rate will be achieved.

A.30.5.2.2

It is not the intent of this section to require a full hydraulic analysis of the existing piping system in addition to the new sprinkler layout.

30.5.2.3

When it is necessary to pipe two new ceiling sprinklers from an existing outlet in an overhead system, any bushings shall be removed and the use of a nipple not exceeding 4 in. (100 mm) in length and of the same pipe thread size as the existing outlet shall be permitted, provided that a hydraulic calculation verifies that the design flow rate will be achieved.

30.5.2.4

Where an armover is attached to connect to a sprinkler, the use of pipe nipples less than 1 in. (25 mm) in diameter shall not be permitted where seismic design is required on the system.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Thu Sep 15 15:34:19 EDT 2022

Committee Statement

Committee Statement: Renumbering of section and add annex that was inadvertently removed during the 2019 reorg.

Response Message: FR-1343-NFPA 13-2022

Public Input No. 357-NFPA 13-2022 [New Section after 30.6.2]

First Revision No. 1344-NFPA 13-2022 [Detail]

Add annex to new 8.2.9.1:

A.8.2.9.1

The connection from an air compressor to the dry pipe valve should be of a type recommended by the manufacturer, including flexible hose, and approved by the authority having jurisdiction, taking into consideration the pressures, temperatures, and vibrations that the connection and adjacent equipment will endure.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Fri Sep 23 14:24:48 EDT 2022

Committee Statement

Committee Statement: Flexible hose should be used in accordance with the manufacturer's recommendations. The technical basis for the temperature requirement is not substantiated and is dangerous for technicians or people intimate with the equipment.

Response Message: FR-1344-NFPA 13-2022

Public Input No. 389-NFPA 13-2022 [Section No. A.8.2.6.4.1]

First Revision No. 1001-NFPA 13-2022 [Section No. 1.2.2]

1.2.2

Sprinkler systems and private fire service mains are specialized fire protection systems and shall require design and installation by ~~knowledgeable and experienced~~ qualified personnel.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 09:07:56 EDT 2022

Committee Statement

Committee Statement: The definition of qualified personnel describes an individual who is knowledgeable and experienced. This also aligns with other standards that use the same terminology.

Response Message: FR-1001-NFPA 13-2022

Public Input No. 597-NFPA 13-2022 [Section No. 1.2.2]

First Revision No. 1002-NFPA 13-2022 [Section No. 1.5 [Excluding any Sub-Sections]]

Nothing in this standard ~~is intended to prevent~~ shall prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety over those prescribed by this standard.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 09:11:38 EDT 2022

Committee Statement

Committee Statement: This makes the language enforceable and more closely follows the manual of style.

Response Message: FR-1002-NFPA 13-2022

Public Input No. 121-NFPA 13-2022 [Section No. 1.5 [Excluding any Sub-Sections]]

First Revision No. 1003-NFPA 13-2022 [Section No. 1.6.1]

1.6.1 Units.

1.6.1.1*

Metric units of measurement in this standard shall be in accordance with the modernized metric system known as the International System of Units (SI).

A.1.6.1.1

Two units (liter and bar), outside of but recognized by SI, are commonly used in international fire protection.

~~**1.6.1.2**~~

~~Two units (liter and bar), outside of but recognized by SI, are commonly used in international fire protection.~~

1.6.1.2

These units with conversion factors shall be used as listed in Table 1.6.1.2.

Table 1.6.1.2 Conversion Factors

-	Name of Unit	Unit Symbol	Conversion Factor
Length	Millimeter	mm	1 in. = 25 mm
	Meter	m	1 ft = 0.3048 m
Area	Square millimeters	mm^2	1 $in.^2$ = 645.2 mm^2
	Square meter	m^2	1 ft^2 = 0.0929 m^2
Volume	Cubic millimeter	mm^3	1 $in.^3$ = 16,387 mm^3
	Cubic meter	m^3	1 ft^3 = 0.02832 m^3
Fluid capacity	Liter	L	1 fl oz = 0.02957 L
	Liter	L	1 gal = 3.785 L
Flow	Liter per minute	L/min	1 gpm = 3.7848 L/min
Pressure	Bar	bar	1 psi = 0.0689 bar
Discharge density	Millimeter/minute	mm/min	1 gpm/ft^2 = 40.746 mm/min
	Liter/minute/m2	$(L/min)/m^2$	1 gpm/ft^2 = 40.746 $(L/min)/m^2$
k-factor	k-factor	$L/min/(bar)^2$	1 $gpm/(psi)^2$ = 14.285 $L/min/(bar)^2$
Weight	Kilogram	kg	1 lb = 0.4536 kg
Density	Kilogram/cubic meter	kg/m^3	1 lb/ft^3 = 16.02 kg/m^3
Temperature	Fahrenheit	°F	F° = ⅘ × C° + 32
	Celsius	°C	C° = ⅝ (F° − 32)
Velocity	Kilometers per hour	km/h	1 mph = 1.609 km/h
Pound force	Newtons	N	1 lb force = 4.44822 N
Gauge (sheet steel)	Millimeter	mm	12 gauge = 2.8 mm
			14 gauge = 1.98 mm
			16 gauge = 1.57 mm
			22 gauge = 0.78 mm
			24 gauge = 0.63 mm

Note: For additional conversions and information, see ASTM SI 10, *IEEE/ASTM SI 10 American National Standard for Metric Practice*.

1.6.1.3*

If a value for measurement as given in this standard is followed by an equivalent value in other units, the first stated shall be regarded as the requirement.

Supplemental Information

File Name	Description	Approved
13_1003_1.6.1.docx	For staff use	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 09:29:17 EDT 2022

Committee Statement

Committee Statement: This information is better suited for the annex.

Response Message: FR-1003-NFPA 13-2022

Public Input No. 120-NFPA 13-2022 [Section No. 1.6.1]

First Revision No. 1178-NFPA 13-2022 [Chapter 2]

Chapter 2 Referenced Publications

2.1 General.

The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

2.2 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 11, *Standard for Low-, Medium-, and High-Expansion Foam,* ~~2021~~ 2024 edition.

NFPA 14, *Standard for the Installation of Standpipe and Hose Systems,* ~~2019~~ 2023 edition.

NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection,* ~~2022~~ 2025 edition.

NFPA 22, *Standard for Water Tanks for Private Fire Protection,* ~~2018~~ 2023 edition.

NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems,* ~~2020~~ 2023 edition.

NFPA 30, *Flammable and Combustible Liquids Code,* ~~2021~~ 2024 edition.

NFPA 30B, *Code for the Manufacture and Storage of Aerosol Products,* ~~2019~~ 2023 edition.

NFPA 32, *Standard for Drycleaning Facilities,* 2021 edition.

NFPA 33, *Standard for Spray Application Using Flammable or Combustible Materials,* ~~2021~~ 2024 edition.

NFPA 34, *Standard for Dipping, Coating, and Printing Processes Using Flammable or Combustible Liquids,* ~~2021~~ 2024 edition.

NFPA 36, *Standard for Solvent Extraction Plants,* 2021 edition.

NFPA 37, *Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines,* ~~2021~~ 2024 edition.

NFPA 40, *Standard for the Storage and Handling of Cellulose Nitrate Film,* ~~2019~~ 2025 edition.

NFPA 45, *Standard on Fire Protection for Laboratories Using Chemicals,* ~~2019~~ 2023 edition.

NFPA 51, *Standard for the Design and Installation of Oxygen–Fuel Gas Systems for Welding, Cutting, and Allied Processes,* ~~2018~~ 2023 edition.

NFPA 51B, *Standard for Fire Prevention During Welding, Cutting, and Other Hot Work,* ~~2019~~ 2024 edition.

NFPA 55, *Compressed Gases and Cryogenic Fluids Code,* ~~2020~~ 2023 edition.

NFPA 59, *Utility LP-Gas Plant Code,* ~~2021~~ 2024 edition.

NFPA 59A, *Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG),* ~~2019~~ 2023 edition.

NFPA 70®, National Electrical Code®, ~~2020~~ 2023 edition.

NFPA 72®, National Fire Alarm and Signaling Code®, ~~2022~~ 2025 edition.

NFPA 75, *Standard for the Fire Protection of Information Technology Equipment,* ~~2020~~ 2024 edition.

NFPA 76, *Standard for the Fire Protection of Telecommunications Facilities,* ~~2020~~ 2024 edition.

NFPA 82, *Standard on Incinerators and Waste and Linen Handling Systems and Equipment,* ~~2019~~ 2024 edition.

NFPA 86, *Standard for Ovens and Furnaces,* ~~2019~~ 2023 edition.

NFPA 91, *Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Particulate Solids,* 2020 edition.

NFPA 96, *Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations,* ~~2021~~ 2024 edition.

NFPA 99, *Health Care Facilities Code,* ~~2021~~ 2024 edition.

NFPA 101®, Life Safety Code®, ~~2021~~ 2024 edition.

NFPA 120, *Standard for Fire Prevention and Control in Coal Mines,* ~~2020~~ 2023 edition.

NFPA 122, *Standard for Fire Prevention and Control in Metal/Nonmetal Mining and Metal Mineral Processing Facilities,* ~~2020~~ 2023 edition.

NFPA 130, *Standard for Fixed Guideway Transit and Passenger Rail Systems,* ~~2020~~ 2023 edition.

NFPA 140, *Standard on Motion Picture and Television Production Studio Soundstages, Approved Production Facilities, and Production Locations,* ~~2018~~ 2023 edition.

NFPA 150, *Fire and Life Safety in Animal Housing Facilities Code,* ~~2022~~ 2025 edition.

NFPA 170, *Standard for Fire Safety and Emergency Symbols,* ~~2021~~ 2024 edition.

NFPA 214, *Standard on Water-Cooling Towers,* 2021 edition.

NFPA 259, *Standard Test Method for Potential Heat of Building Materials,* ~~2018~~ 2023 edition.

NFPA 307, *Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves,* 2021 edition.

NFPA 318, *Standard for the Protection of Semiconductor Fabrication Facilities,* ~~2021~~ 2025 edition.

NFPA 400, *Hazardous Materials Code,* ~~2022~~ 2025 edition.

NFPA 409, *Standard on Aircraft Hangars,* ~~2016~~ 2022 edition.

NFPA 415, *Standard on Airport Terminal Buildings, Fueling Ramp Drainage, and Loading Walkways,* ~~2016~~ 2022 edition.

NFPA 423, *Standard for Construction and Protection of Aircraft Engine Test Facilities,* ~~2016~~ 2022 edition.

NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films,* ~~2019~~ 2023 edition.

NFPA 703, *Standard for Fire-Retardant-Treated Wood and Fire-Retardant Coatings for Building Materials,* ~~2021~~ 2024 edition.

NFPA 750, *Standard on Water Mist Fire Protection Systems,* ~~2019~~ 2023 edition.

NFPA 780, *Standard for the Installation of Lightning Protection Systems,* ~~2020~~ 2023 edition.

NFPA 804, *Standard for Fire Protection for Advanced Light Water Reactor Electric Generating Plants,* 2020 edition.

NFPA 805, *Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants,* 2020 edition.

NFPA 909, *Code for the Protection of Cultural Resource Properties — Museums, Libraries, and Places of Worship,* ~~2017~~ 2021 edition.

NFPA 1963, *Standard for Fire Hose Connections,* 2019 edition.

2.3 Other Publications.

2.3.1 ACI Publications.

American Concrete Institute, 38800 Country Club Drive, Farmington Hills, MI 48331-3439.

ACI 318, *Building Code Requirements for Structural Concrete and Commentary*, ~~2014, errata 1, 2017, errata 2, 2018~~ 2019 .

ACI 355.2, *Qualification of Post-Installed Mechanical Anchors in Concrete and Commentary*, 2019.

2.3.2 ASCE Publications.

American Society of Civil Engineers, 1801 Alexander Bell Drive, Reston, VA 20191-4400.

ASCE/SEI 7, *Minimum Design Loads and Associated Criteria for Buildings and Other Structures,*~~2016~~ 2022 .

2.3.3 ASME Publications.

~~ASME International~~ American Society for Mechanical Engineers , Two Park Avenue, New York, NY 10016-5990.

Boiler and Pressure Vessel Code, Section IX, "Welding, Brazing, and Fusing Qualifications," ~~2019~~ 2021 .

ASME A17.1/CSA B44 , *Safety Code for Elevators and Escalators*, 2019/~~CSA B44-16~~ .

ASME B1.20.1, *Pipe Threads, General Purpose ~~(, Inch)~~* , 2013 (R2018) .

ASME B16.1, *Gray Iron Pipe Flanges and Flanged Fittings~~,~~ : Classes 25, 125, and 250*, ~~2015~~ 2020 .

ASME B16.3, *Malleable Iron Threaded Fittings~~,~~ : Classes 150 and 300*, ~~2016~~ 2021 .

ASME B16.4, *Gray Iron Threaded Fittings~~,~~ : Classes 125 and 250*, ~~2016~~ 2021 .

ASME B16.5, *Pipe Flanges and Flanged Fittings~~,~~ : NPS ½ through NPS 24 Metric/Inch Standard*, ~~2017~~ 2020 .

ASME B16.9, *Factory-Made Wrought Buttwelding Fittings*, 2018.

ASME B16.11, *Forged Fittings, Socket-Welding and Threaded*, 2016, errata, 2017.

ASME B16.15, *Cast Copper Alloy Threaded Fittings~~,~~ : Classes 125 and 250*, 2018.

ASME B16.18, *Cast Copper Alloy Solder Joint Pressure Fittings*, ~~2018~~ 2021 .

ASME B16.22, *Wrought Copper and Copper Alloy Solder — Joint Pressure Fittings*, ~~2018~~ 2021 .

ASME B16.25, *Buttwelding Ends*, 2017.

ASME B36.10M, *Welded and Seamless Wrought Steel Pipe*, 2018.

2.3.4 ASTM Publications.

ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM A53/A53M, *Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless*, ~~2018~~ 2021 .

ASTM A106/A106M, *Standard Specification for Seamless Carbon Steel Pipe for High Temperature Service*, 2019.

ASTM A135/A135M, *Standard Specification for Electric-Resistance-Welded Steel Pipe*, ~~2009, reapproved 2014~~ 2021 .

ASTM A234/A234M, *Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service*, 2019.

ASTM A312/A312M, *Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes*, ~~2019~~ 2021 .

ASTM A403/A403M, *Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings*, ~~2020~~ 2022 .

ASTM A795/A795M, *Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use*, ~~2020~~ 2021 .

ASTM B32, *Standard Specification for Solder Metal*, ~~2008, reapproved 2014~~ 2020 .

ASTM B43, *Standard Specification for Seamless Red Brass Pipe, Standard Sizes*, 2020.

ASTM B75/B75M, *Standard Specification for Seamless Copper Tube*, 2020.

ASTM B88, *Standard Specification for Seamless Copper Water Tube*, 2020.

ASTM B251/B251M, *Standard Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube*, 2017.

ASTM B446, *Standard Specification for Nickel-Chromium-Molybdenum-Columbium Alloy (UNS N06625), Nickel-Chromium-Molybdenum-Silicon Alloy (UNS N06219), and Nickel-Chromium-Molybdenum-Tungsten Alloy (UNS N06625) Rod and Bar*, 2019.

ASTM B813, *Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube*, 2016.

ASTM B828, *Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings*, 2016.

ASTM C635/C635M, *Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings*, 2017.

ASTM C636/C636M, *Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels*, 2019.

ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, ~~2020~~ 2021 .

ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, 2020.

ASTM E136, *Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C*, ~~2019a~~ 2020 .

ASTM E2652, *Standard Test Method for Assessing Combustibility of Materials Using a Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750°C*, 2018.

ASTM E2768, *Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test)*, reapproved 2018.

ASTM E2965, *Standard Test Method for Determination of Low Levels of Heat Release Rate for Materials and Products Using an Oxygen ~~Combustion~~ Consumption Calorimeter*, 2017.

ASTM F437, *Standard Specification for Threaded Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80*, ~~2015~~ 2021 .

ASTM F438, *Standard Specification for Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC)*

Plastic Pipe Fittings, Schedule 40, 2017.

ASTM F439, *Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80*, 2019.

ASTM F442/F442M, *Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR)*, ~~2019~~ 2020 .

ASTM F1121, *Standard Specification for International Shore Connections for Marine Fire Applications*, 1987, 2019.

ASTM SI 10, *IEEE/ASTM SI 10 American National Standard for Metric Practice*, ~~2016~~ 2017 .

2.3.5 AWS Publications.

American Welding Society, 8669 NW 36 Street, ~~Doral~~ #130, Miami , FL 33166~~–6672~~ .

AWS A5.8M/A5.8, *Specification for Filler Metals for Brazing and Braze Welding*, 2019.

AWS B2.1/B2.1M, *Specification for Welding Procedure and Performance Qualification*, ~~2014~~ 2021 .

2.3.6 AWWA Publications.

American Water Works Association, 6666 West Quincy Avenue, Denver, CO 80235.

AWWA C104/A21.4, *Cement-Mortar Lining for Ductile-Iron Pipe and Fittings,* 2016.

AWWA C105/A21.5, *Polyethylene Encasement for Ductile-Iron Pipe Systems,* 2018.

AWWA C110/A21.10, *Ductile-Iron and Gray-Iron Fittings*, ~~2012~~ 2021 .

AWWA C111/A21.11, *Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings,* 2017.

AWWA C115/A21.15, *Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges,*~~2011~~ 2020 .

AWWA C150/A21.50, *Thickness Design of Ductile-Iron Pipe,*~~2014~~ 2021 .

AWWA C151/A21.51, *Ductile-Iron Pipe, Centrifugally Cast,* 2017, errata, 2018.

AWWA C153/A21.53, *Ductile-Iron Compact Fittings*, 2019.

AWWA C300, *Reinforced Concrete Pressure Pipe, Steel-Cylinder Type,* 2016.

AWWA C301, *Prestressed Concrete Pressure Pipe, Steel-Cylinder Type*, 2014, Reaffirmed without Revision 2019.

AWWA C302, *Reinforced Concrete Pressure Pipe, Non-Cylinder Type*, 2016.

AWWA C303, *Reinforced Concrete Pressure Pipe, Bar-Wrapped, Steel-Cylinder Type~~, Pretensioned~~* , 2017.

AWWA C600, *Installation of Ductile-Iron ~~Water~~ Mains and Their Appurtenances,* 2017.

AWWA C602, *Cement-Mortar Lining of Water ~~Pipe Lines~~ Pipelines in Place, 4 in. (100 mm) and Larger*, 2017.

AWWA C900, *Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 in. Through 60 in. (100 mm Through 1,500 mm)*, 2016.

AWWA C906, *Polyethylene (PE) Pressure Pipe and Fittings, 4 in. (100 mm) Through ~~63~~ 65 in. (1,650 mm), for Waterworks*, ~~2015~~ 2021 .

AWWA C909, *Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe, 4 in. Through 24 in. ~~(100 mm) and Larger,~~ (100 mm Through 600 mm), for Water, Wastewater, and Reclaimed Water Service* , 2016.

AWWA M9, *Concrete Pressure Pipe*, 2008, errata, ~~2013~~ 2014 .

AWWA M23, *PVC Pipe — Design and Installation*, ~~2002~~ 2020 .

AWWA M55, *PE Pipe — Design and Installation*, ~~2006~~ 2020 .

2.3.7 ICC-ES Publications.

ICC Evaluation Service, 900 Montclair Road, Suite A, Birmingham, AL 35213.

ICC-ES AC446, *Acceptance Criteria for Headed Cast-in Specialty Inserts in Concrete*, 2018.

2.3.8 IEEE Publications.

IEEE, ~~Three Park Avenue, 17th Floor, New York, NY 10016-5997~~ Operations Center, 445 Hoes Lane, Piscataway, NJ 08854-4141 .

IEEE 45, *Recommended Practice for Electric Installations on Shipboard*, 2002.

2.3.9 UL Publications.

Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

UL 263, ~~*Standard for*~~ *Fire Tests of Building Construction and Materials*, 2011, revised ~~2018~~ 2022 .

UL 723, ~~*Standard for*~~ *Test for Surface Burning Characteristics of Building Materials*, 2018.

UL 2556, *Wire and Cable Test Methods*, 2015, revised 2021 .

2.3.10 U.S. Government Publications.

U.S. Government Publishing Office, 732 North Capitol Street, NW, Washington, DC 20401-0001.

Title 46, CFR, Parts 54.15-10 Safety and Relief Valves, 56.20 Valves, 56.20-5(a) Markings, 56.50-95 Overboard Discharges and Shore Connections, 56.60 Materials, and 58.01-40 Machinery, Angles of Inclination.

Title 46, CFR, Subchapter F, “Marine Engineering.”

Title 46, CFR, Subchapter J, “Electrical Engineering.”

2.3.11 Other Publications.

Merriam-Webster’s Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, ~~2003~~ 2020 .

2.4 References for Extracts in Mandatory Sections.

NFPA 1, *Fire Code,* ~~2021~~ 2024 edition.

NFPA 14, *Standard for the Installation of Standpipe and Hose Systems* , . 2023 edition.

NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection,* ~~2022~~ 2025 edition.

NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances,* ~~2022~~ 2025 edition.

NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems,* ~~2020~~ 2023 edition.

NFPA 5000®, Building Construction and Safety Code®, ~~2021~~ 2024 edition.

Supplemental Information

File Name	Description	Approved
13-2022_Chapter_2.docx	For staff use	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Thu Jul 28 13:07:42 EDT 2022

Committee Statement

Committee Statement: Reference information updated.

Response Message: FR-1178-NFPA 13-2022

Public Input No. 578-NFPA 13-2022 [Section No. 2.3.9]

Public Input No. 404-NFPA 13-2022 [Section No. 2.3.4]

First Revision No. 1120-NFPA 13-2022 [New Section after 3.3.4]

3.3.5* Alcove.

An area in a compartment or corridor that is set back from the rest of the wall it is located along. (AUT-SSI)

A.3.3.5 Alcove.

While most alcoves requiring sprinkler protection are enclosed on three sides, some alcoves are designed as an architectural feature with curved walls or other configurations. The area is incidental to the space it is adjacent to, is typically enclosed on three sides, and might contain a lower ceiling and/or an elevated floor. (AUT-SSI)

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 14:36:00 EDT 2022

Committee Statement

Committee Statement: The term has been added to the standard and the definition clarifies the application of the term.

Response Message: FR-1120-NFPA 13-2022

First Revision No. 1157-NFPA 13-2022 [New Section after 3.3.6]

3.3.8 Area of Discharge.

The floor area covered by a sprinkler that takes into account any walls or obstructions whose summation determines the remote area. *(See Figure A.28.3.4.2.1 .)* (AUT-SSI)

Submitter Information Verification

Committee: AUT-SSI
Submittal Date: Wed Jul 27 19:18:26 EDT 2022

Committee Statement

Committee Statement: A new definition was added to define this term as it is used in this standard.
Response Message: FR-1157-NFPA 13-2022

Public Input No. 8-NFPA 13-2021 [New Section after 3.3]

First Revision No. 1308-NFPA 13-2022 [New Section after 3.3.43.2]

3.3.237 Panel Construction.

Ceiling panels formed by members capable of trapping heat to aid the operation of sprinklers and limited to a maximum of 300 ft^2 (28 m^2) in area. See A.3.3.46.1(4). (AUT-SSI)

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Fri Aug 12 14:00:49 EDT 2022

Committee Statement

Committee Statement: The new definition is added to aid in enforceability.

Response Message: FR-1308-NFPA 13-2022

Public Input No. 152-NFPA 13-2022 [Section No. 3.3.43]

First Revision No. 1006-NFPA 13-2022 [Section No. 3.3.65]

3.3.69* Dwelling Unit (for sprinkler system installations).

One or more rooms arranged for the use of one or more individuals living together, as in a single housekeeping unit normally having cooking, living, sanitary, and sleeping facilities that include, but are not limited to, hotel rooms, dormitory rooms, apartments, condominiums, sleeping rooms in nursing homes, and similar living units. (AUT-SSI)

A.3.3.69 Dwelling Unit (for sprinkler system installations).

Common spaces such as a lounges, group cooking facilities, and group bathrooms that are for use by the occupants of the building should be considered a part of the dwelling unit. (AUT-SSI)

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 09:39:25 EDT 2022

Committee Statement

Committee Statement: Residential fire sprinklers are appropriate for these areas. The hazards presented in these areas are similar to dwelling units in which residential sprinklers can be used to provide protection.

Response Message: FR-1006-NFPA 13-2022

Public Input No. 17-NFPA 13-2021 [Section No. 3.3.65]

First Revision No. 1169-NFPA 13-2022 [New Section after 3.3.106]

3.3.111 Hose Station.

A combination of a hose rack or reel, hose nozzle, hose, and hose connection. [**14**, 2023] (AUT-SSI)

Submitter Information Verification

Committee: AUT-SSI
Submittal Date: Thu Jul 28 09:24:35 EDT 2022

Committee Statement

Committee Statement: A new definition was added to define this term as it is used in this standard.
Response Message: FR-1169-NFPA 13-2022

Public Input No. 10-NFPA 13-2021 [New Section after 3.3]

First Revision No. 1008-NFPA 13-2022 [New Section after 3.3.175]

3.3.180 Qualified Personnel.

Competent and capable individual(s) having met the requirements and training for a given field acceptable to the AHJ. [**25**, 2023] (AUT-SSI)

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 09:53:43 EDT 2022

Committee Statement

Committee Statement: The term is used in the body of the standard and needs to be defined. This aligns with other standards.

Response Message: FR-1008-NFPA 13-2022

Public Input No. 599-NFPA 13-2022 [New Section after 3.3.175]

First Revision No. 1121-NFPA 13-2022 [New Section after 3.3.215.3.6]

3.3.220.3.6 Supplemental Sprinkler.

A sprinkler that is installed below an obstruction. (AUT-SSI)

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 14:43:22 EDT 2022

Committee Statement

Committee Statement: This term has been added to the standard and the definition clarifies the application of the term.

Response Message: FR-1121-NFPA 13-2022

Public Input No. 413-NFPA 13-2022 [New Section after 3.3.215.3.6]

First Revision No. 1014-NFPA 13-2022 [Section No. 3.3.216 [Excluding any Sub-Sections]]

A system, commonly activated by heat from a fire and discharges water over the fire area, that consists of an integrated network of piping designed in accordance with fire protection engineering standards that includes a water supply source, a control valve, a waterflow alarm (where required) , and a drain. The portion of the sprinkler system above ground is a network of specifically sized or hydraulically designed piping installed in a building, structure, or area, generally overhead, and to which sprinklers are attached in a systematic pattern. (AUT-SSI)

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 11:14:48 EDT 2022

Committee Statement

Committee Statement: Not all systems require a water flow alarm. This clarifies the definition.

Response Message: FR-1014-NFPA 13-2022

Public Input No. 223-NFPA 13-2022 [Section No. 3.3.216 [Excluding any Sub-Sections]]

First Revision No. 1168-NFPA 13-2022 [Section No. 3.3.216.4]

3.3.221.4 Dry Pipe Sprinkler System.

A sprinkler system employing automatic sprinklers that are attached to a piping system containing air ~~or nitrogen~~ , nitrogen, or other approved gas under pressure, the release of which (as from the opening of a sprinkler) permits the water pressure to open a valve known as a dry pipe valve, and the water then flows into the piping system and out the opened sprinklers. (AUT-SSI)

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Thu Jul 28 08:59:56 EDT 2022

Committee Statement

Committee Statement: Revision provides consistency with updated languages.

Response Message: FR-1168-NFPA 13-2022

Public Input No. 14-NFPA 13-2021 [Section No. 3.3.216.4]

First Revision No. 1004-NFPA 13-2022 [New Section after 3.3.235.1]

3.3.241.2* Automatic Breach Control Valve.

A hydraulic sensing device that detects abnormal water flow conditions and automatically isolates portions of a piping system when a catastrophic downstream breach or line break occurs. (AUT-SSI)

A.3.3.241.2 Automatic Breach Control Valve.

Also known as a *breach valve* and an *automatic breach containment valve* . (AUT-SSI)

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 09:35:28 EDT 2022

Committee Statement

Committee Statement: This term is used in the body of the standard and needs to be defined.

Response Message: FR-1004-NFPA 13-2022

Public Input No. 481-NFPA 13-2022 [New Section after 3.3.235.1]

Public Input No. 577-NFPA 13-2022 [New Section after 3.3.9]

First Revision No. 1159-NFPA 13-2022 [Sections 3.3.235.4.1, 3.3.235.4.2]

3.3.241.5.1 Differential Dry Pipe Valve.

A water control valve that is held in the closed position by the system ~~gas~~ pneumatic pressure exposed to the surface area on the ~~air/nitrogen~~ system side of the clapper where such surface area is larger than the surface area on the water supply side, with an intermediate chamber between the two surface areas that is open to atmosphere. (AUT-SSI)

3.3.241.5.2 Mechanical Dry Pipe Valve.

A water control valve that uses a series of mechanical devices such as levers, springs, diaphragms, and latches to hold the valve in the closed position with ~~air/nitrogen~~ pneumatic pressure and without using the clapper surface areas to provide a differential between ~~air/nitrogen~~ system pneumatic and water pressures. (AUT-SSI)

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 19:22:52 EDT 2022

Committee Statement

Committee Statement: Using the term “pneumatic” is more appropriate and covers all current and future approved gases.

Response Message: FR-1159-NFPA 13-2022

Public Input No. 15-NFPA 13-2021 [Sections 3.3.235.4.1, 3.3.235.4.2]

First Revision No. 1146-NFPA 13-2022 [New Section after 3.3.235.4.2]

3.3.241.5.3 Deluge Valve.

A water control valve, used for deluge and preaction systems, that is held in the closed position by hydraulic pressure operating on a series of mechanical devices such as levers, pistons, springs, diaphragms, and latches, wherein the loss of hydraulic pressure due to automatic or manual operation of a releasing device or devices results in operation of the deluge valve. (AUT-SSI)

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 18:22:10 EDT 2022

Committee Statement

Committee Statement: A new definition was added to define this term as it is used in this standard.

Response Message: FR-1146-NFPA 13-2022

Public Input No. 203-NFPA 13-2022 [New Section after 3.3.235.4.2]

First Revision No. 1010-NFPA 13-2022 [Section No. 7.2.6.2]

7.2.6.2*

Escutcheons used with recessed~~,~~ or flush-type~~, or concealed~~ sprinklers shall be part of a listed sprinkler assembly.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 10:25:08 EDT 2022

Committee Statement

Committee Statement: Concealed sprinklers are covered under 7.2.6.3 and are required to be listed as part of the assembly.

Response Message: FR-1010-NFPA 13-2022

Public Input No. 251-NFPA 13-2022 [Section No. 7.2.6.2]

First Revision No. 1011-NFPA 13-2022 [New Section after 7.6.2]

7.6.3* Automatic Breach Control Valves.

Automatic breach control valves shall not be installed on any sprinkler system.

A.7.6.3

Automatic breach control valves will automatically cut off the water supply in a sprinkler system once the flow reaches a preset gpm. It is assumed that a catastrophic failure has occurred in the piping system, and the valve closes to conserve water. In a sprinkler system, flow rates can exceed those included in the hydraulic calculations when the fire department charges the fire department connection and provides supplemental flow and pressure during a fire scenario. The automatic breach control valve could shut down with the increased flow and cut off the entire water supply. These valves are also known as *breach valves and automatic breach containment valves* .

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 10:33:32 EDT 2022

Committee Statement

Committee Statement: Closed valves have been and continue to be the single largest reason for fire sprinkler systems to fail. Introducing a valve that will close based on a preset flow is inconsistent with the goal of fire control or suppression.

Response Message: FR-1011-NFPA 13-2022

Public Input No. 546-NFPA 13-2022 [New Section after 7.6.2]

Public Input No. 576-NFPA 13-2022 [New Section after A.7.5.4.5]

Public Input No. 478-NFPA 13-2022 [New Section after 7.6.2.2]

First Revision No. 1012-NFPA 13-2022 [New Section after 7.8.2]

7.8.3*

Additives to the air supply for control of corrosion shall be listed for use within fire sprinkler systems.

A.7.8.3

Requiring additives to be listed is not intended to preclude increasing the level of nitrogen in sprinkler systems to reduce corrosion potential.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 11:00:32 EDT 2022

Committee Statement

Committee Statement: Where listed, Vapor phase corrosion inhibitors can be added to the air supply for dry pipe and preaction sprinkler systems as a method to reduce corrosion. This is not intended to preclude increasing the level of nitrogen in sprinkler systems to reduce corrosion potential.

Response Message: FR-1012-NFPA 13-2022

Public Input No. 348-NFPA 13-2022 [Section No. 7.8]

First Revision No. 1013-NFPA 13-2022 [Section No. 8.1.2.1]

8.1.2.1*

Unless the requirements of 8.1.2.2 are met, a wet pipe system shall be provided with a listed relief valve not less than ½ in. (15 mm) in size and set to operate at 175 psi (12 bar) or 10 psi (0.7 bar) in excess of the maximum system pressure, whichever is greater.

A.8.1.2.1

It is important to note that the pressure rating of the relief valve indicates an operating range of pressure for both opening and closing of the valve. Standard relief valves are required to open in a range of pressure between 90 percent and 105 percent of their rating. The valves are required to close at a pressure above 80 percent of that rating.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 11:04:30 EDT 2022

Committee Statement

Committee Statement: The annex was added to reduce confusion in the industry on this issue and the users would benefit with this additional clarification in the Annex.

Response Message: FR-1013-NFPA 13-2022

Public Input No. 20-NFPA 13-2021 [Section No. 8.1.2.1]

First Revision No. 1129-NFPA 13-2022 [Section No. 8.2]

~~**8.2***~~ ~~Dry Pipe Systems.~~

~~**A.8.2**~~

~~A dry pipe system should be installed only where heat is not adequate to prevent freezing of water in all parts of, or in sections of, the system. Dry pipe systems should be converted to wet pipe systems when they become unnecessary because adequate heat is provided. Sprinklers should not be shut off in cold weather.~~

~~Where two or more dry pipe valves are used, systems preferably should be divided horizontally to prevent simultaneous operation of more than one system and the resultant increased time delay in filling systems and discharging water and to prevent receipt of more than one waterflow alarm signal.~~

~~Where adequate heat is present in sections of the dry pipe system, consideration should be given to dividing the system into a separate wet pipe system and dry pipe system. Minimized use of dry pipe systems is desirable where speed of operation is of particular concern.~~

~~**8.2.1** Pressure Gauges.~~

~~Approved pressure gauges in accordance with Section 16.13 shall be connected as follows:~~

- ~~On the water side and air side of the dry pipe valve~~
- ~~At the air pump supplying the air receiver where one is provided~~
- ~~At the air receiver where one is provided~~
- ~~In each independent pipe from air supply to dry pipe system~~
- ~~At quick-opening devices~~

~~**8.2.2** Sprinklers.~~

~~**8.2.2.1**~~

~~Residential sprinklers installed on dry pipe systems shall be listed for dry pipe applications.~~

8.2.2.2

The following sprinkler orientations and arrangements shall be permitted for dry pipe systems:

Upright sprinklers

* Listed dry sprinklers

A.8.2.2.2(2) –

Installation limitations of listed dry pendent sprinklers can vary with different products. Limitations should be included in product installation instructions to warn the user of the potential accumulation of water, scale, and sediment from collecting at the sprinkler.

Pendent sprinklers and sidewall sprinklers installed on return bends, where the sprinklers, return bend, and branch line piping are in an area maintained at or above 40°F (4°C)

Horizontal sidewall sprinklers installed so that water is not trapped

Pendent sprinklers and sidewall sprinklers, where the sprinklers and branch line piping are in an area maintained at or above 40°F (4°C), the water supply is potable, and the piping for the dry pipe system is copper or CPVC specifically listed for dry pipe applications

8.2.3* Size of Systems.

A.8.2.3

The capacities of the various sizes of pipe given in Table A.8.2.3 are for convenience in calculating the capacity of a system.

Table A.8.2.3 Capacity of 1 ft of Pipe (Based on Actual Internal Pipe Diameter)

Nominal Pipe Diameter		Pipe		Nominal Pipe Diameter		Pipe	
		Schedule 40	Schedule 10			Schedule 40	Schedule 10
in.	mm	[gal (L)]	[gal (L)]	in.	mm	[gal (L)]	[gal (L)]
3/4	20	0.028 (0.11)	-	3	80	0.383 (1.45)	0.433 (1.64)
1	25	0.045 (0.17)	0.049 (0.19)	3 1/2	90	0.513 (1.94)	0.576 (2.18)
1 1/4	32	0.078 (0.30)	0.085 (0.32)	4	100	0.660 (2.50)	0.740 (2.80)
1 1/2	40	0.106 (0.40)	0.115 (0.43)	5	125	1.040 (3.94)	1.144 (4.33)
2	50	0.174 (0.66)	0.190 (0.72)	6	150	1.501 (5.68)	1.649 [b] (6.24)
2 1/2	65	0.248 (0.94)	0.283 (1.07)	8	200	2.66 [a] (10.1)	2.776 [c] (10.5)

[a] Schedule 30.

[b] 0.134 wall pipe.

[c] 0.188 wall pipe.

8.2.3.1*

The system capacity (volume) controlled by a dry pipe valve shall be determined by 8.2.3.2 , 8.2.3.3 , 8.2.3.4 , 8.2.3.5 , or 8.2.3.7 .

A.8.2.3.1

The 60-second limit does not apply to dry systems with capacities of 500 gal (1900 L) or less, nor to dry systems with capacities of 750 gal (2850 L) or less if equipped with a quick-opening device.

8.2.3.1.1

For dry pipe systems protecting dwelling unit portions of any occupancy, system size shall be such that initial water is discharged from the system test connection in not more than 15 seconds, starting at the normal air pressure on the system and at the time of fully opened inspection test connection.

8.2.3.1.1.1

Dry pipe systems protecting dwelling unit portions of any occupancy shall not be permitted to use the options outlined in 8.2.3.2 , 8.2.3.3 , or 8.2.3.4 .

8.2.3.2

System size shall be such that initial water is discharged from the system test connection in not more than 60 seconds, starting at the normal air pressure on the system and at the time of fully opened inspection test connection.

8.2.3.3

A system size of not more than 500 gal (1900 L) shall be permitted without a quick-opening device and shall not be required to meet any specific water delivery requirement to the inspection test connection.

8.2.3.4

A system size of not more than 750 gal (2850 L) shall be permitted with a quick-opening device and shall not be required to meet any specific water delivery requirement to the inspection test connection.

8.2.3.5

System size shall be based on dry pipe systems being calculated for water delivery in accordance with 8.2.3.6 .

8.2.3.6 Dry Pipe System Water Delivery.

8.2.3.6.1

Calculations for dry pipe system water delivery shall be based on the hazard shown in Table 8.2.3.6.1 .

Table 8.2.3.6.1 Dry Pipe System Water Delivery

Hazard	Number of Most Remote Sprinklers Initially Open	Maximum Time of Water Delivery (seconds)
Dwelling unit	1	15
Light	1	60
Ordinary I	2	50
Ordinary II	2	50
Extra I	4	45
Extra II	4	45
High piled	4	40

8.2.3.6.2

The calculation program and method shall be listed by a nationally recognized testing laboratory.

8.2.3.6.3

Calculations of water delivery time shall be based on the time interval between the following:

Calculated point in time when the selected most remote sprinkler(s) open

Calculated point in time when pressure at the most remote sprinkler reaches or surpasses and maintains the design pressure

8.2.3.6.4

For dry pipe systems protecting dwelling unit portions of any occupancy, the sprinklers in the dwelling unit shall have a maximum water delivery time of 15 seconds to the single most remote sprinkler.

8.2.3.7* Manifold Test Connection.

A.8.2.3.7

See Figure A.8.2.3.7 .

Figure A.8.2.3.7 Example Manifold Arrangement (Four Sprinklers).

8.2.3.7.1

System size shall be such that initial water discharge from the system trip test connection or manifold outlets is not more than the maximum time of water delivery specified in Table 8.2.3.6.1 , starting at normal air pressure on the system and at the time of fully opened test connection.

8.2.3.7.2

When flow is from four sprinklers, the test manifold shall be arranged to simulate two sprinklers on the most remote sprinkler branch line and two sprinklers on the next adjacent branch line.

8.2.3.7.3

When flow is from three sprinklers, the test manifold shall be arranged to simulate two sprinklers on the most remote branch line and one sprinkler on the next adjacent branch line.

8.2.3.7.4

When flow is from two sprinklers, the test manifold shall be arranged to simulate two sprinklers on the most remote branch line.

8.2.3.7.5

When flow is from one sprinkler, the test manifold shall be installed as per the requirements for a trip test connection in accordance with 16.14.2 .

8.2.3.7.6

A system meeting the requirements of this section shall not be required to also meet the requirements of 8.2.3.2 or 8.2.3.5 .

8.2.3.8

Dry pipe systems with water delivery times other than 8.2.3.2 , 8.2.3.5 , and 8.2.3.7 shall be acceptable where listed by a nationally recognized testing laboratory.

8.2.3.9 Dry Pipe System Subdivision.

Unless installed in a heated enclosure, check valves shall not be used to subdivide the dry pipe systems.

8.2.3.9.1

When check valves are used to subdivide dry pipe systems in accordance with 8.2.3.9 , a hole 1⁄8 in. (3 mm) in diameter shall be drilled in the clapper of each check valve to permit equalization of air pressure among the various parts of the system.

8.2.3.9.2

Where auxiliary drains are not provided for each subdivided section, an approved indicating drain valve supervised in the closed position in accordance with 16.9.3.3 , connected to a bypass around each check valve, shall be provided as a means for draining the system.

8.2.3.10

Gridded dry pipe systems shall not be installed.

8.2.4 Quick-Opening Devices.

8.2.4.1

A listed quick-opening device shall be permitted to help meet the requirements of 8.2.3.2 , 8.2.3.5 , 8.2.3.7 , or 8.2.3.8 .

8.2.4.2

The quick-opening device shall be located as close as practical to the dry pipe valve.

8.2.4.3

To protect the restriction orifice and other operating parts of the quick-opening device against submergence, the connection to the riser shall be above the point at which water (priming water and back drainage) is expected when the dry pipe valve and quick-opening device are set, except where design features of the particular quick-opening device make these requirements unnecessary.

8.2.4.4

Where a valve is installed in the connection between a dry pipe sprinkler riser and a quick-opening device, it shall be an indicating-type valve that is sealed, locked, or electrically supervised in the open position.

8.2.4.5

A check valve shall be installed between the quick-opening device and the intermediate chamber of the dry pipe valve, where the quick-opening device requires protection against submergence after system operation.

8.2.4.6

If the quick-opening device requires pressure feedback from the intermediate chamber, a valve type that will clearly indicate whether it is opened or closed shall be permitted in place of that check valve.

8.2.4.7

Where a valve is utilized in accordance with 8.2.4.6 , the valve shall be constructed so that it can be locked or sealed in the open position.

8.2.4.8 Antiflooding Device.

8.2.4.8.1

Unless the requirements of 8.2.4.8.2 are met, a listed antiflooding device shall be installed in the connection between the dry pipe sprinkler riser and the quick-opening device.

8.2.4.8.2

A listed antiflooding device shall not be required where the quick-opening device has built-in antiflooding design features or the quick-opening device is listed or approved without the use of an antiflooding device.

8.2.5* Location and Protection of Dry Pipe Valve.

A.8.2.5

The dry pipe valve should be located in an accessible place near the sprinkler system it controls. Where exposed to cold, the dry pipe valve should be located in a valve room or enclosure of adequate size to properly service equipment.

8.2.5.1* General.

The dry pipe valve and supply pipe shall be protected against freezing and mechanical injury.

A.8.2.5.1

The dry pipe valve and supply piping should be in an area maintained at or above 40°F (4°C). It is the intent of the committee to protect the valves from freezing. The occasional exposure of valves to short exposures of air temperatures below 40°F (4°C) that would not cause the valves to freeze does not justify the construction of a valve room.

8.2.5.2 Valve Rooms.

8.2.5.2.1

Valve rooms shall be lighted and heated.

8.2.5.2.2

The source of heat shall be of a permanently installed type.

8.2.5.2.3

Heat tape shall not be used in lieu of heated valve enclosures to protect the dry pipe valve and supply pipe against freezing.

8.2.5.3 Supply.

The supply for the sprinkler in the dry pipe valve enclosure shall be either from the dry side of the system or from a wet pipe sprinkler system that protects the area where the dry pipe valve is located.

8.2.5.4 High Water Level Protection.

8.2.5.4.1

Where it is possible to reseat the dry valve after actuation without first draining the system, a high water level device in accordance with 8.2.5.4.3 shall be provided.

8.2.5.4.2 Differential Dry Pipe Valve.

Protection against accumulation of water above the clapper shall be provided for differential dry pipe valves in accordance with 8.2.5.4.3 .

8.2.5.4.3 High Water Level Device.

An automatic high water level signaling device or an automatic drain shall be permitted.

8.2.6 Air Pressure and Supply.

8.2.6.1

Where the term *air* is used throughout this standard, it shall also include the use of nitrogen or other approved gas.

8.2.6.2 Maintenance of Air Pressure.

Air or nitrogen or other approved gas pressure shall be maintained on dry pipe systems throughout the year.

8.2.6.3* Air Supply.

A.8.2.6.3

The compressor should draw its air supply from within the operating criteria allowed by the manufacturer of the compressor. Air piping should not be attached to the intake of the compressor unless acceptable to the compressor manufacturer and installed in accordance with 8.8.2.7 . Damage, air reduction, or reduced life expectancy can result if guidelines are not followed.

8.2.6.3.1

The compressed air supply shall be from a source available at all times.

8.2.6.3.2*

The air supply shall have a capacity capable of restoring normal air pressure in the system within 30 minutes.

A.8.2.6.3.2

When a single compressor serves multiple dry pipe systems, the 30-minute fill time is based on the single largest system.

8.2.6.3.3

The requirements of 8.2.6.3.2 shall not apply in refrigerated spaces maintained below 5°F (–15°C), where normal system air pressure shall be permitted to be restored within 60 minutes.

8.2.6.4 Air Supply Connections.

8.2.6.4.1*

The connection from the air supply to the dry pipe valve shall not be less than ½ in. (15 mm) in diameter and shall enter the system above the priming water level of the dry pipe valve.

A.8.2.6.4.1

The connection from an air compressor to the dry pipe valve should be of a type recommended by the manufacturer and approved by the authority having jurisdiction, taking into consideration the pressures, temperatures, and vibrations that the connection and adjacent equipment will endure. Flexible hose should be considered suitable when capable of withstanding expected vibration, a maximum pressure of 175 psi (12 bar) or greater, and a maximum temperature of 150°F (66°C) or greater.

8.2.6.4.2

A check valve shall be installed in the air filling connection.

8.2.6.4.2.1

A listed or approved shutoff valve of either the renewable disc or ball valve type shall be installed on the supply side of this check valve.

8.2.6.5 Relief Valve.

An approved relief valve shall be provided between the air supply and the shutoff valve and shall be set to relieve pressure no less than 10 psi (0.7 bar) in excess of system air pressure provided in 8.2.6.7.1 and shall not exceed the manufacturer's limitations.

8.2.6.6 Automatic Air Maintenance.

8.2.6.6.1*

Unless the requirements of 8.2.6.6.2 are met, where the air supply to a dry pipe system is maintained automatically, the air supply shall be from a dependable plant system or an air compressor with an air receiver, and shall utilize an air maintenance device specifically listed for such service and capable of controlling the required air pressure on, and maximum airflow to, the dry pipe system.

A.8.2.6.6.1

Air maintenance devices are unique components within the air supply and need to be listed for use. Compressors are not air maintenance devices and this section does not require air compressors to be listed.

8.2.6.6.2

Where the air compressor supplying a single dry pipe system has a capacity less than 5.5 ft^3 /min (160 L/min), an air receiver or air maintenance device shall not be required.

8.2.6.6.3

The automatic air supply to more than one dry pipe system shall be connected to enable individual maintenance of air pressure in each system.

8.2.6.6.3.1

Each dry pipe system shall have a dedicated air maintenance device.

8.2.6.6.4

A check valve or other positive backflow prevention device shall be installed in the air supply to each system to prevent airflow or waterflow from one system to another.

8.2.6.6.5

Where an air compressor is the dedicated air supply, it shall be installed in accordance with *NFPA 70* , Article 430.

8.2.6.6.5.1

The disconnecting means for an automatic air compressor shall not be a general-use light switch or a cord-and-plug connected motor.

8.2.6.7 System Air Pressure.

8.2.6.7.1

The system air pressure shall be maintained in accordance with the instruction sheet furnished with the dry pipe valve, or shall be 20 psi (1.4 bar) in excess of the calculated trip pressure of the dry pipe valve, based on the highest normal water pressure of the system supply.

8.2.6.7.2

Each dry pipe valve shall have a low/high supervisory pressure switch that provides a supervisory signal when the air pressure within the system is out of the ranges specified in 8.2.6.7.2.1 and 8.2.6.7.2.2 .

8.2.6.7.2.1

The low pressure signal shall be set at a minimum of 5 psi (0.3 bar) above the calculated trip pressure of the dry pipe valve.

8.2.6.7.2.2

The high pressure signal shall be set at 5 psi (0.3 bar) above the system air pressure specified in 8.2.6.7.1 .

8.2.6.7.2.3

When a low or high air pressure condition is detected, notification shall be by either of the following:

An audible signal at a location that will be heard by building maintenance staff

Through the fire alarm control unit as a supervisory condition

8.2.6.7.3

The permitted rate of air leakage shall be as specified in 29.2.2 .

8.2.6.8 Nitrogen or Other Approved Gas.

8.2.6.8.1*

Where nitrogen or other approved gas is used, the supply shall be from a reliable source.

A.8.2.6.8.1

The nitrogen or other approved gas can be either generated on site or from storage containers, sized to provide a reliable supply for at least 6 months of expected maintenance use.

8.2.6.8.2

Where stored nitrogen or other approved gas is used, the gas shall be introduced through a pressure regulator and shall be in accordance with 8.2.6.6 .

8.2.6.8.3

A low pressure alarm shall be provided on gas storage containers to notify the need for refilling.

8.2.6.8.4*

When nitrogen or other approved gas is the only source of gas for pressurizing a system, it shall have a capacity capable of restoring normal gas pressure in the system within 30 minutes.

A.8.2.6.8.4

When a single nitrogen or other approved gas source serves multiple dry pipe systems, the 30-minute fill time is based on the single largest system.

8.2.6.8.5

The requirements of 8.2.6.8.4 shall not apply in refrigerated spaces maintained below 5°F (−15°C), where normal system air pressure shall be permitted to be restored within 60 minutes.

8.2.6.9* Nitrogen Supply for Increased C Value.

A.8.2.6.9

Nitrogen systems are equipped with an air compressor capable of restoring system air pressure within 30 or 60 minutes. It is not the intent of this section to require a 98 percent concentration of nitrogen within the 30 or 60 minutes as required in 8.2.6.8 .

8.2.6.9.1

Where nitrogen is used to allow for increased C value in accordance with Table 28.3.4.8.1 , the nitrogen supply shall be in accordance with 8.2.6.9.2 through 8.2.6.9.6 .

~~**8.2.6.9.2**~~

~~Nitrogen shall be from a listed nitrogen generator permanently installed.~~

~~**8.2.6.9.3**~~

~~The generator shall be capable of supplying and maintaining at least 98 percent nitrogen concentration throughout the system at a minimum leakage rate of 1.5 psi (0.1 bar) per hour.~~

~~**8.2.6.9.4**~~

~~A means of verifying nitrogen concentration shall be provided for each system where increased C value is used.~~

~~**8.2.6.9.5**~~

~~The nitrogen generator shall be installed per the manufacturer's instruction.~~

~~**8.2.6.9.6**~~

~~The nitrogen generator shall be maintained in accordance with Chapter 32 .~~

8.2* Dry Systems.

A.8.2

A dry pipe system should be installed only where heat is not adequate to prevent freezing of water in all parts of, or in sections of, the system. Dry pipe systems should be converted to wet pipe systems when they become unnecessary because adequate heat is provided. Sprinklers should not be shut off in cold weather.

Where two or more dry pipe valves are used, systems preferably should be divided horizontally to prevent simultaneous operation of more than one system and the resultant increased time delay in filling systems and discharging water and to prevent receipt of more than one waterflow alarm signal.

Where adequate heat is present in sections of the dry pipe system, consideration should be given to dividing the system into a separate wet pipe system and dry pipe system. Minimized use of dry pipe systems is desirable where speed of operation is of particular concern.

8.2.1 Gridded Dry Pipe Systems.

Gridded dry pipe systems shall not be installed.

8.2.2 Components.

8.2.2.1 Sprinklers.

8.2.2.1.1

The following orientations and arrangements shall be permitted for dry pipe systems:

(1) Upright sprinklers

(2)* Listed dry sprinklers

A.8.2.2.1.1(2)

Installation limitations of listed dry pendent sprinklers can vary with different products. Limitations should be included in product installation instructions to warn the user of the potential accumulation of water, scale, and sediment from collecting at the sprinkler.

(3) Pendent sprinklers and sidewall sprinklers installed on return bends, where the sprinklers, return bend, and branch line piping are in an area maintained at or above 40°F (4°C)

(4) Horizontal sidewall sprinklers installed so that water is not trapped

(5) Pendent sprinklers and sidewall sprinklers where the sprinklers and branch line piping are in an area maintained at or above 40°F (4°C), the water supply is potable, and the piping for the dry system is copper or CPVC specifically listed for dry pipe applications

8.2.2.1.2

Residential sprinklers installed on dry pipe systems shall be listed for dry pipe applications.

8.2.2.2 Pressure Gauges.

Approved pressure gauges in accordance with Section 16.13 shall be provided as follows:

(1) On the water side and pneumatic side of the dry pipe valve

(2) At the air compressor supplying the system, where one is provided

(3) At the air, nitrogen, or other approved gas receiver, where one is provided

(4) In each independent pipe from the pneumatic source to the dry pipe system

(5) At mechanical quick opening devices

8.2.3* Location and Protection of Dry Pipe Valve.

A.8.2.3

The dry pipe valve should be located in an accessible place near the sprinkler system it controls. Where exposed to cold, the dry pipe valve should be located in a valve room or enclosure of adequate size to properly service equipment.

8.2.3.1* General.

The dry pipe valve and supply pipe shall be protected against freezing and mechanical injury.

A.8.2.3.1

The dry pipe valve and supply piping should be in an area maintained at or above 40°F (4°C). It is the intent of the committee to protect the valves from freezing. The occasional exposure of valves to short exposures of air temperatures below 40°F (4°C) that would not cause the valves to freeze does not justify the construction of a valve room.

8.2.3.2 Valve Rooms.

8.2.3.2.1

Valve rooms shall be lighted and heated.

8.2.3.2.2

The source of heat shall be of a permanently installed type.

8.2.3.2.3

Heat tape shall not be used in lieu of heated valve enclosures to protect the dry pipe valve and supply pipe against freezing.

8.2.3.3 Enclosure Protection.

The valve enclosure shall be protected with a sprinkler or sprinklers supplied from the dry system or from a wet pipe system that protects the area where the enclosure is located.

8.2.3.4 High Water Level Prevention.

Protection against accumulation of water above the clapper shall be provided for dry pipe valves in accordance with 8.2.3.4.1 .

8.2.3.4.1

An automatic high water level signaling device, an automatic drain, or a means to manually drain shall be permitted.

8.2.4* Dry Pipe System Water Delivery.

A.8.2.4

The capacities of the various sizes of pipe given in Table A.8.2.4 are for convenience in calculating the capacity of a system.

Table A.8.2.4 Capacity of 1 ft (300 mm) of Pipe (Based on Actual Internal Pipe Diameter)

Nominal Pipe Diameter		Pipe				Nominal Pipe Diameter		Pipe			
		Schedule 40		Schedule 10				Schedule 40		Schedule 10	
in.	mm	gal	L	gal	L	in.	mm	gal	L	gal	L
¾	20	0.028	0.11			3	80	0.383	1.45	0.433	1.64
1	25	0.045	0.17	0.049	0.19	3½	90	0.513	1.94	0.576	2.18
1¼	32	0.078	0.30	0.085	0.32	4	100	0.660	2.50	0.740	2.80
1½	40	0.106	0.40	0.115	0.43	5	125	1.040	3.94	1.144	4.33
2	50	0.174	0.66	0.190	0.72	6	150	1.501	5.68	1.649 [b]	6.24
2½	65	0.248	0.94	0.283	1.07	8	200	2.66 [a]	10.1	2.776 [c]	10.5

[a] Schedule 30.

[b] 0.134 wall pipe.

[c] 0.188 wall pipe.

8.2.4.1

For dry pipe systems protecting dwelling unit portions of any occupancy, initial water shall be discharged from the system test connection in not more than 15 seconds, starting at the normal air pressure on the system at the time of fully opened inspection test connection.

8.2.4.2

For dry pipe systems protecting areas other than dwelling unit portions of any occupancy, initial water shall be discharged from the system test connection in accordance with 8.2.4.3 , 8.2.4.4 , 8.2.4.5 , 8.2.4.6 , or 8.2.4.7 .

8.2.4.3

System size shall be such that initial water is discharged from the system test connection in not more than 60 seconds, starting at the normal air pressure on the system at the time of fully opened inspection test connection.

8.2.4.4*

A system size of not more than 500 gal (1900 L) shall be permitted without a quick-opening device and shall not be required to meet any specific water delivery requirement to the inspection test connection.

A.8.2.4.4

The 60-second limit does not apply to dry systems with capacities of 500 gal (1900 L) or less, nor to dry systems with capacities of 750 gal (2850 L) or less if equipped with a quick-opening device.

8.2.4.5

A system size of not more than 750 gal (2850 L) shall be permitted with a quick-opening device and shall not be required to meet any specific water delivery requirement to the inspection test connection.

8.2.4.6 Water Delivery Calculations.

8.2.4.6.1

Initial water shall be discharged from the system test connection based on calculations using a program listed by a nationally recognized testing laboratory.

8.2.4.6.2

Water delivery calculation for each dry pipe system shall be based on the hazard shown in Table 8.2.4.6.2 .

Table 8.2.4.6.2 Dry Pipe System Water Delivery

Hazard	Number of Most Remote Sprinklers Initially Open	Maximum Time of Water Delivery (seconds)
Light	1	60
Ordinary I	2	50
Ordinary II	2	50
Extra I	4	45
Extra II	4	45
High-piled	4	40

8.2.4.6.3

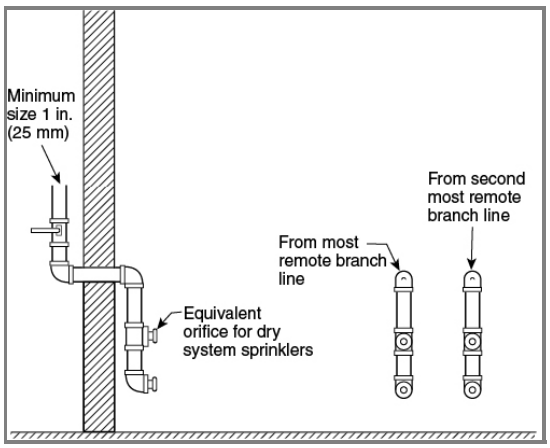
Water delivery calculation shall be based on the time interval between the calculated point in time when the selected most remote sprinkler(s) open and the calculated point in time when the minimum design pressure at the most remote sprinkler is reached or surpassed and maintained.

8.2.4.7*

A.8.2.4.7

See Figure A.8.2.4.7 .

Figure A.8.2.4.7 Example Manifold Arrangement (Four Sprinklers).



8.2.4.7.1

System size shall be such that initial water discharge from the system manifold test connection is not more than the maximum time of water delivery specified in Table 8.2.4.6.2 , starting at the normal air pressure on the system at the time of fully opened inspection test connection.

8.2.4.7.2

When flow is from four sprinklers, the test manifold shall be arranged to simulate two sprinklers on the most remote sprinkler branch line and two sprinklers on the next adjacent branch line.

8.2.4.7.3

When flow is from two sprinklers, the test manifold shall be arranged to simulate two sprinklers on the most remote sprinkler branch line.

8.2.4.7.4

A system meeting the requirements of this section shall not be required to also meet the requirements of 8.2.4.3 , 8.2.4.4 , 8.2.4.5 , or 8.2.4.6 .

8.2.4.8 Dry Pipe System Subdivision.

8.2.4.8.1

Subdivision of dry pipe systems using check valves to facilitate water delivery shall be permitted when all the conditions in 8.2.4.8.2 through 8.2.4.8.5 are met.

8.2.4.8.2

Check valves shall be located in a heated enclosure.

8.2.4.8.3

A 1⁄8 in. (3 mm) diameter hole shall be drilled in the clapper of each check valve to permit equalization of air or nitrogen pressure among various parts of the system.

8.2.4.8.4

Auxiliary drains shall be provided for each subdivided section of the system.

8.2.4.8.5

Where auxiliary drains are not provided for each subdivided section, a bypass around each check valve incorporating an approved and supervised normally closed indicating control valve shall be provided as a means to drain the subdivided section.

8.2.4.9

Dry pipe systems with water delivery times other than 8.2.4 shall be acceptable where listed by a nationally recognized testing laboratory.

8.2.5 Quick-Opening Devices.

8.2.5.1

A listed quick-opening device shall be permitted to help meet the requirements of 8.2.4 .

8.2.5.2

The quick-opening device shall be located as close as practical to the dry pipe valve.

8.2.5.3

Where a valve is installed in the connection between a dry pipe valve and the inlet of a quick-opening device, it shall be a supervised normally open indicating type valve.

8.2.5.4

To protect the quick-opening device against submergence, the connection to the riser shall be above the point at which water is expected when the device is set, unless the design features of the quick-opening device or dry pipe valve make this requirement unnecessary.

8.2.5.5

To protect the quick opening device against submergence upon operation, a check valve shall be installed between the quick-opening device and the intermediate chamber of the dry pipe valve, unless the design features of the quick-opening device make this requirement unnecessary.

8.2.5.6

If the quick-opening device requires pressure feedback from the intermediate chamber, a supervised normally open indicating type valve shall be permitted in place of the check valve in 8.2.5.5 .

8.2.5.7

Unless the quick-opening device has a built-in antiflooding device or is listed or approved for use without an antiflooding device, a listed anti-flooding device shall be installed in the connection between the dry pipe valve and the quick-opening device.

8.2.6 System Pneumatic Pressure.

8.2.6.1

System pneumatic pressure shall be maintained in accordance with the instruction sheet furnished with the dry pipe valve, or in the absence of manufactures data system pneumatic pressure shall be 20 psi (1.4 bar) in excess of the calculated trip pressure of the dry pipe valve, based on the highest normal water pressure of the system supply.

8.2.6.2

The permitted rate of pressure leakage shall be as specified in 29.2.2 .

8.2.6.3

Each dry pipe valve shall have a low/high supervisory pressure switch that provides a supervisory signal when the pneumatic pressure within the system is out of the ranges specified in 8.2.6.4 and 8.2.6.5 .

8.2.6.4

The low pressure signal shall be set at a minimum of 5 psi (0.3 bar) above the trip pressure of the dry pipe valve or per the manufacturer's instructions.

8.2.6.5

The high pressure signal shall be set at a minimum of 5 psi (0.3 bar) above the system pneumatic pressure specified in 8.2.6.1 or per the manufacturer's instructions.

8.2.6.6

When a low or high pneumatic pressure condition is detected, notification shall be by either of the following:

(1) An audible signal at a location that will be heard by building maintenance staff

(2) Through the fire alarm control unit as a supervisory condition

8.2.7* Air, Nitrogen, or Other Approved Gas Supply.

A.8.2.7

The compressor should draw its air supply from within the operating criteria allowed by the manufacturer of the compressor. Air piping should not be attached to the intake of the compressor unless acceptable to the compressor manufacturer and installed in accordance with 8.8.2.7 . Damage, air reduction, or reduced life expectancy can result if guidelines are not followed.

8.2.7.1

Air, nitrogen, or other approved gas under pressure shall be maintained on dry pipe systems throughout the year.

8.2.7.2*

The air, nitrogen, or other approved gas shall be supplied from a permanent source available at all times.

A.8.2.7.2

The nitrogen or other approved gas can be either generated on site or from storage containers, sized to provide a reliable supply for at least 6 months of expected maintenance use.

8.2.7.3*

The air, nitrogen, or other approved gas supply shall be capable of restoring normal pressure in the system within 30 minutes.

A.8.2.7.3

When a single compressor serves multiple dry pipe systems, the 30-minute fill time is based on the single largest system.

When a single nitrogen or other approved gas source serves multiple dry pipe systems, the 30-minute fill time is based on the single largest system.

8.2.7.4

The requirement of 8.2.7.3 shall not apply in refrigerated spaces maintained below 5°F (-15°C), where the air, nitrogen, or other approved gas supply is capable of restoring normal pressure in the system within 30 minutes.

8.2.7.5 Compressed Air.

8.2.7.5.1

Air supply shall be from a dependable plant compressed air system or an air compressor with an air receiver.

8.2.7.5.2

Where the air compressor supplying a single dry pipe system has a capacity of less than 5.5 ft^3/min (160 L/min) at 10 psi, the air receiver shall not be required.

8.2.7.5.3

Where an air compressor is the dedicated air supply, it shall be installed in accordance with *NFPA 70*, Article 430.

8.2.7.5.4

The disconnecting means for an automatic air compressor shall not be a general use switch or a cord-and-plug connection.

8.2.7.6 Compressed Nitrogen.

8.2.7.6.1

Nitrogen supply shall be from a dependable nitrogen generator or from one or more industrial cylinders or containers.

8.2.7.6.2

A minimum leak rate of 1.5 psi (0.1 bar) per hour shall be used to determine the size of the compressed nitrogen supply.

8.2.7.6.3

Where a nitrogen generator is the dedicated nitrogen supply, it shall be installed in accordance with *NFPA 70* , Article 430.

8.2.7.6.4

The disconnecting means for a nitrogen generator shall not be a general use switch or a cord-and-plug connection.

8.2.7.6.5

Where nitrogen or other approved gas stored in high-pressure industrial cylinders is used, the gas shall be introduced through an approved regulator on the supply side of the pressure maintenance device(s).

8.2.7.6.6

A low pressure alarm shall be provided between the regulator in 8.2.7.6.4 and the air maintenance device(s) to notify the need for refilling cylinder(s).

8.2.7.7

Combinations of approved sources of air, nitrogen, or other gas supplies shall be permitted.

8.2.8 Automatic Pressure Maintenance.

8.2.8.1

The air, nitrogen, or other approved gas supply to more than one dry pipe system shall be connected to enable individual maintenance of pressure in each system.

8.2.8.2*

Unless the requirements of 8.2.10.4 are met, each dry pipe system shall have a dedicated pressure maintenance device capable of controlling the required pressure on the system and the maximum flow of air, nitrogen, or other approved gas into the system.

8.2.8.3

Where the air compressor supplying a single dry pipe system has a capacity of less than 5.5 ft^3 /min (160 L/min), an air maintenance device shall not be required.

8.2.9 Connections.

Detail FR-1344

8.2.9.1*

The connection from the air, nitrogen, or other approved gas source shall not be less than 1½ in. (15 mm) in diameter and shall enter the system above the priming water level of the dry pipe valve, or as otherwise specified by the manufacturer.

A.8.2.9.1

The connection from an air compressor to the dry pipe valve should be of a type recommended by the manufacturer, including flexible hose, and approved by the authority having jurisdiction, taking into consideration the pressures, temperatures, and vibrations that the connection and adjacent equipment will endure.

8.2.9.2

A check valve shall be installed in the pneumatic supply connection.

8.2.9.3

A listed or approved shutoff valve of either the renewable disc or ball valve type shall be installed on the supply side of the check valve in 8.2.9.2 .

8.2.9.4

An approved relief valve shall be provided between the pneumatic supply and shutoff valve required in 8.2.9.3 and shall be set to relieve pressure no less than 10 psi (0.7 bar) in excess of the system pneumatic air pressure provided in 8.8.2.6.1 .

8.2.10* Nitrogen Supply for Increased *C* Value.

Where nitrogen is used to allow for increased *C* value in hydraulic calculations in accordance with Table 28.3.4.8.1 , the nitrogen supply shall be in accordance with 8.2.10.1 through 8.2.10.5 .

A.8.2.10

Nitrogen systems are equipped with an air compressor capable of restoring system air pressure within 30 or 60 minutes. It is not the intent of this section to require a 98 percent concentration of nitrogen within the 30 or 60 minutes as required in 8.2.7 .

8.2.10.1

Nitrogen shall be from a listed nitrogen generator permanently installed.

8.2.10.2

The generator shall be capable of supplying and maintaining at least 98 percent nitrogen concentration throughout the system at a minimum leakage rate of 1.5 psi (0.1 bar) per hour.

8.2.10.3

A means of verifying nitrogen concentration shall be provided for each system where increased *C* value is used.

8.2.10.4

The nitrogen generator shall be installed per the manufacturer's instructions.

8.2.10.5

The nitrogen generator shall be maintained in accordance with Chapter 32 .

Supplemental Information

File Name	Description	Approved
Chapter_8_8_2_PI_562.docx	For Staff Use	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 16:33:39 EDT 2022

Committee Statement

Committee Statement: Section 8.2 was reorganized to align with other codes and standards.

Response Message: FR-1129-NFPA 13-2022

Public Input No. 22-NFPA 13-2021 [Section No. 8.2.6.6.2]

Public Input No. 129-NFPA 13-2022 [Section No. 8.2.3]

Public Input No. 562-NFPA 13-2022 [Section No. 8.2]

Public Input No. 116-NFPA 13-2022 [Section No. 8.2.3.6.2]

First Revision No. 1015-NFPA 13-2022 [Section No. 8.3.1]

8.3.1* General.

8.3.1.1* Components.

All components of pneumatic, hydraulic, or electrical systems shall be compatible.

8.3.1.2 Detection.

~~The automatic water control valve shall be provided with hydraulic, pneumatic, or mechanical manual means for operation that is independent of detection devices and of the sprinklers.~~ Automatic systems shall be controlled by the operation of fire detection devices in accordance with Section 8.10 .

8.3.1.3 Actuator Supervision.

~~Effective January 1, 2021, removal~~ Removal or disabling of an electric actuator from the preaction or deluge valve that it controls shall result in an audible and visual indication of system impairment at the system releasing control panel.

8.3.1.4 Automatic Water Control Valve.

The automatic water control valve shall be provided with hydraulic, pneumatic, or mechanical manual means for operation that is independent of detection devices and of the sprinklers.

8.3.1.5 Pressure Gauges.

8.3.1.5.1

Approved pressure gauges conforming with Section 16.13 shall be installed as follows:

(1) Above and below ~~preaction valve and below deluge valve~~ water control valve on preaction systems

(2) Below water control valve on deluge systems

(3) On air supply to preaction ~~and deluge valves~~ systems

8.3.1.5.2

For deluge systems only, a pressure gauge connection shall be installed near the most remote open sprinkler or nozzle.

~~**8.3.1.4**~~

~~A supply of spare fusible elements for heat-responsive devices, not less than two of each temperature rating, shall be maintained on the premises for replacement purposes.~~

~~**8.3.1.5**~~

~~Hydraulic release systems shall be designed and installed in accordance with manufacturer's requirements and listing for height limitations above deluge valves or deluge valve actuators to prevent water column.~~

~~**8.3.1.6** Location and Spacing of Releasing Devices.~~

~~**8.3.1.6.1**~~

~~Spacing of releasing devices, including automatic sprinklers used as releasing devices, shall be in accordance with their listing and manufacturer' specifications.~~

~~**8.3.1.6.2**~~

~~The release system shall serve all areas that the preaction system protects.~~

~~**8.3.1.6.3**~~

~~Where thermal activation is utilized, the activation temperature of the release system shall be lower than the activation temperature of the sprinkler.~~

~~**8.3.1.7** Devices for Test Purposes and Testing Apparatus.~~

~~**8.3.1.7.1**~~

~~Where detection devices installed in circuits are located where not accessible for testing, an additional detection device shall be provided on each circuit for test purposes at an accessible location and shall be connected to the circuit at a point that will ensure a proper test of the circuit.~~

~~**8.3.1.7.2**~~

~~Testing apparatus capable of producing the heat or impulse necessary to operate any normal detection device shall be furnished to the owner of the property with each installation.~~

~~**8.3.1.7.3**~~

~~Where explosive vapors or materials are present, hot water, steam, or other methods of testing not involving an ignition source shall be used.~~

8.3.1.6* Additional Indicating Control Valve.

A separate additional indicating control valve, supervised in accordance with 16.9.3.3, shall be permitted to be installed in the riser assembly above ~~a~~ the water control valve on preaction ~~or~~ and deluge ~~valve~~ systems to permit full function trip testing as required by NFPA 25, without flooding the system.

8.3.1.7 Location and Protection of System Water Control Valves.

8.3.1.7.1

System water control valves and supply pipes shall be protected against freezing and mechanical injury.

8.3.1.7.2 Valve Rooms.

8.3.1.7.2.1

Valve rooms shall be lighted and heated.

8.3.1.7.2.2

The source of heat shall be of a permanently installed type.

8.3.1.7.2.3

Heat tracing shall not be used in lieu of heated valve enclosure rooms to protect preaction and deluge valves and supply pipe against freezing.

Supplemental Information

File Name	Description	Approved
13-2022_8_3_1.docx	Revision Clarification	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 11:54:44 EDT 2022

Committee Statement

Committee Revisions clarify the intent of the Standard. The criteria for detection was relocated

Statement:	to 8.10. This also clarifies that electrical detection should be in accordance with NFPA 72 or applicable alarm code.
Response Message:	FR-1015-NFPA 13-2022

Public Input No. 583-NFPA 13-2022 [Sections 8.3.1.2, 8.3.1.3, 8.3.1.4, 8.3.1.5, 8.3.1.6, 8.3.1...]

Public Input No. 465-NFPA 13-2022 [New Section after 8.3.1.6.3]

Public Input No. 82-NFPA 13-2021 [Section No. 8.3.1.2.1]

Public Input No. 103-NFPA 13-2021 [Section No. 8.3.1.3]

Public Input No. 463-NFPA 13-2022 [Section No. 8.3.1.6]

First Revision No. 1016-NFPA 13-2022 [Section No. 8.3.2.7]

8.3.2.7 System Configuration.

~~Preaction systems of the type described in 8.3.2.1(3) and all preaction systems protecting storage occupancies, excluding miscellaneous storage, shall not be gridded.~~

8.3.2.7.1

Double interlock preaction systems shall not be gridded.

8.3.2.7.2

~~Preaction systems of the type described in~~ 8.3.2.1(3) Single and ~~all~~ non-interlock preaction systems protecting high-piled storage occupancies~~, excluding miscellaneous storage,~~ shall not be gridded.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 12:02:22 EDT 2022

Committee Statement

Committee Statement: Revised language clarifies the intent of the standard that double interlock preaction systems cannot be gridded.

Response Message: FR-1016-NFPA 13-2022

Public Input No. 23-NFPA 13-2021 [Section No. 8.3.2.7]

First Revision No. 1017-NFPA 13-2022 [New Section after 8.3.3.2]

8.3.3.3*

A sign to identify its function shall be provided at the deluge system manual releasing mechanism.

A.8.3.3.3

Particular care should be taken where the manual release mechanism for more than one system or the manual fire alarm box of a fire alarm system are in close proximity and could be confused or the wrong system actuated. The manual releasing mechanism in this instance should be clearly identified as to which zone or extinguishing area it affects.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 13:32:01 EDT 2022

Committee Statement

Committee Statement: Labeling is important to minimize the probability of inadvertent operation and to identify the purpose of the mechanism.

Response Message: FR-1017-NFPA 13-2022

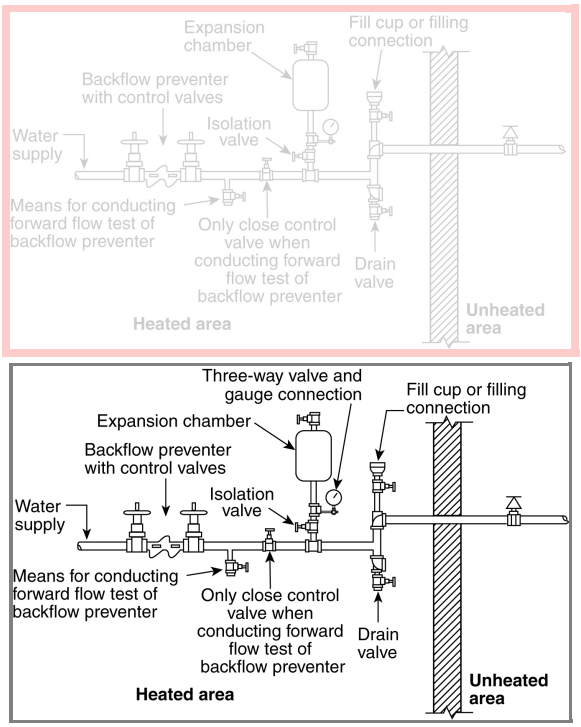
Public Input No. 84-NFPA 13-2021 [New Section after A.8.3.3]

Public Input No. 83-NFPA 13-2021 [New Section after 8.3.3.2]

First Revision No. 1258-NFPA 13-2022 [Section No. 8.6.3.3 [Excluding any Sub-Sections]]

Where the connection between the antifreeze system and supply pipe incorporates a backflow prevention device, and the conditions of 8.6.3.5 are not met, a listed expansion chamber shall be provided to compensate for thermal expansion of the antifreeze solution as illustrated in Figure 8.6.3.3.

Figure 8.6.3.3 Arrangement of Supply Piping with Backflow Device.



Supplemental Information

File Name	Description	Approved
3_Way_Valve.pdf	Revised Figure	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Fri Jul 29 15:27:23 EDT 2022

Committee Statement

Committee Statement: Add "call-out" of 3 way valve as it was added last cycle and not called out on detail.

Response Message: FR-1258-NFPA 13-2022

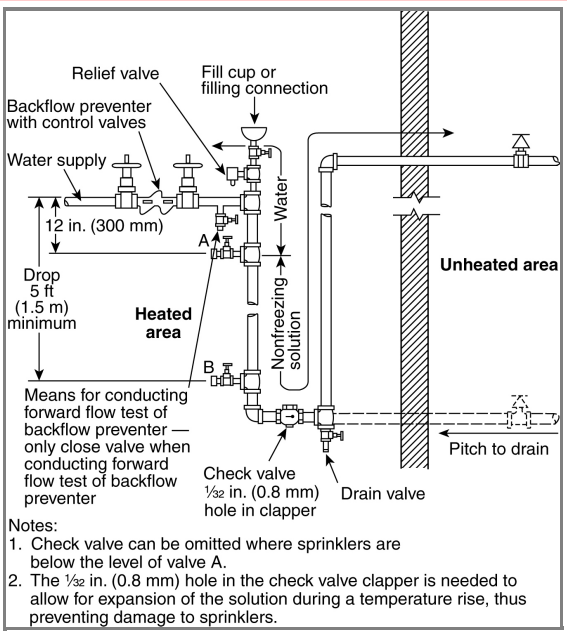
Public Input No. 200-NFPA 13-2022 [Section No. 8.6.3.3 [Excluding any Sub-Sections]]

First Revision No. 1018-NFPA 13-2022 [Section No. 8.6.3.4]

8.6.3.4

A listed ½ in. (15 mm) relief valve shall be permitted in lieu of the expansion chamber required in 8.6.3.3, and as illustrated in Figure 8.6.3.4, provided the antifreeze system volume does not exceed 40 gal (150 L).

Figure 8.6.3.4 Arrangement of Supply Piping with Relief Valve and Backflow Device.



Supplemental Information

File Name	Description	Approved

13_FIG_8.6.3.4.docx Revised Figure

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 13:45:10 EDT 2022

Committee Statement

Committee Statement: Figure 8.6.3.3 shows the needed connections to perform a forward flow test of a backflow preventer when a backflow preventer is installed. However, Figure 8.6.3.4 lacks this test connection. This figure needed to be modified to show and describe this connection.

Response Message: FR-1018-NFPA 13-2022

Public Input No. 541-NFPA 13-2022 [Section No. 8.6.3.4]

First Revision No. 1312-NFPA 13-2022 [Section No. 8.8.2.8]

8.8.2.8 Fire Detection for Preaction Release.

Systems shall be automatically controlled by the operation of fire detection devices in accordance with 8.10.5 .

~~**8.8.2.8.1** Detectors for Preaction Systems.~~

~~**8.8.2.8.1.1***~~

~~The release system shall be designed to operate prior to sprinkler operation, unless detectors meet the requirements of 8.8.2.8.1.2 .~~

~~**(A)**~~

~~Detectors shall be electric or pneumatic fixed temperature type with temperature ratings less than that of the sprinklers.~~

~~**(B)**~~

~~Detection devices shall not be rate-of-rise type.~~

~~**8.8.2.8.1.2**~~

~~Where the system is a double interlock preaction system or single interlock preaction antifreeze system, detection devices shall be permitted to be any type specifically approved for use in a refrigerated area if installed in accordance with their listing requirements and *NFPA 72* or other approved fire alarm code.~~

~~**8.8.2.8.2** Detector Location at Ceiling.~~

~~**8.8.2.8.2.1**~~

~~Under smooth ceilings, detectors shall be spaced not exceeding their listed spacing.~~

~~**8.8.2.8.2.2**~~

~~For other than smooth ceilings, detectors shall not exceed one-half of the listed linear detector spacing or full allowable sprinkler spacing, whichever is greater.~~

~~**8.8.2.8.3** Detector Location in Racks.~~

~~**8.8.2.8.3.1**~~

~~Unless conditions in 8.8.2.8.4 are met, one level of detectors shall be installed for each level of sprinklers.~~

~~**8.8.2.8.3.2**~~

~~Detectors shall be installed vertically within one storage level of the rack sprinklers and as follows:~~

~~Detectors shall be located in the transverse flue in single-row racks and in the longitudinal flue in double-row racks.~~

~~For multiple-row racks, detectors shall be located in either longitudinal or transverse flue space and shall be within 5 ft (1.5 m) horizontally of each sprinkler.~~

~~Separate detection systems shall be installed for ceiling sprinkler systems and in-rack sprinkler systems.~~

~~Where system is double interlock preaction type, ceiling detection system shall operate solenoid valves on both ceiling and in-rack preaction systems.~~

~~**8.8.2.8.4** Single Detection System for Ceiling and In-Rack Sprinklers.~~

~~Ceiling detection only shall be permitted where all of the following conditions are met:~~

~~Maximum storage height is 35 ft (11 m).~~

~~Maximum ceiling height is 40 ft (12.0 m).~~

~~Maximum hazard of storage is Class III.~~

~~No solid shelves are present.~~

~~One preaction valve is used for both ceiling and in-rack sprinklers protecting the same area, with separate indicating control valves and check valves provided downstream as shown in Figure 8.8.2.8.4 .~~

~~Detectors at the ceiling are spaced at a maximum of one-half the listed detector spacing but not less than the sprinkler spacing.~~

~~**Figure 8.8.2.8.4 Valve Arrangement.**~~

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Aug 16 12:39:16 EDT 2022

Committee Statement

Committee Statement: The requirements for detection methods have been consolidated to a new section 8.10.5 for ease of use.

Response Message: FR-1312-NFPA 13-2022

Public Input No. 584-NFPA 13-2022 [Section No. 8.8.2.8]

First Revision No. 1260-NFPA 13-2022 [Section No. 8.10]

8.10 Pilot Line Detectors.

8.10.1

Pilot line detectors and related components including pipe and fittings shall be corrosion resistant when installed in areas exposed to weather or corrosive conditions.

8.10.2

Where subject to mechanical or physical damage, pilot line detectors and related detection system components shall be protected.

8.10.3

Where spray sprinklers are used as pilot line detectors, they shall be installed in accordance with Section 8.10 and the spacing and location rules of Section 10.2 , except that the obstruction to water distribution rules for automatic sprinklers shall not be required to be followed.

8.10.3.1

Where located under a ceiling, pilot sprinklers shall be positioned in accordance with the requirements of Section 10.2 .

8.10.4

The temperature rating of spray sprinklers utilized as pilot line detectors shall be selected in accordance with 9.4.2 .

8.10.5

Maximum horizontal spacing for indoor locations shall not exceed 12 ft (3.7 m).

8.10.6

Pilot line detectors shall be permitted to be spaced more than 22 in. (550 mm) below a ceiling or deck where the maximum spacing between pilot line detectors is 10 ft (3.0 m) or less.

8.10.6.1

Other maximum horizontal spacing differing from those required in 8.10.5 shall be permitted where installed in accordance with their listing.

8.10.7

Pilot line detectors located outdoors, such as in open process structures, shall be spaced such that the elevation of a single level of pilot line detectors and between additional levels of pilot line detectors shall not exceed 17 ft (5.2 m).

8.10.8

The maximum distance between pilot line detectors installed outdoors shall not exceed 8 ft (2.4 m).

8.10.8.1

The horizontal distance between pilot line detectors installed outdoors on a given level shall be permitted to be increased to 10 ft (3.0 m) when all of the following conditions are met:

The elevation of the first level does not exceed 15 ft (4.6 m).

The distance between additional levels does not exceed 12 ft (3.7 m).

The pilot line actuators are staggered vertically.

~~**8.10.8.2**~~

~~Alternate vertical spacing of pilot line detectors differing from those required in 8.10.8.1 shall be permitted where installed in accordance with their listing.~~

~~**8.10.9**~~

~~Pilot line detectors located in open-sided buildings shall follow the indoor spacing rules.~~

~~**8.10.9.1**~~

~~A row of pilot line detectors spaced in accordance with the outdoor pilot line detector spacing rules shall be located along the open sides of open-sided buildings.~~

~~**8.10.9.2**~~

~~Pilot line detectors located under open gratings shall be spaced in accordance with the outdoor rules.~~

~~**8.10.9.3**~~

~~Where two or more adjacent water spray systems in one fire area are controlled by separate pilot line detector systems, the detectors on each system shall be spaced independently as if the dividing line between the systems were a wall or draft curtain.~~

~~**8.10.9.4**~~

~~Where pilot line detectors are installed in water cooling tower applications, they shall be in accordance with Section 27.26 .~~

~~**8.10.10**~~

~~Pipe supplying pilot line detectors shall be permitted to be supported from the same points of hanger attachment as the piping system it serves.~~

~~**8.10.10.1**~~

~~Pipe supplying pilot line detectors shall not be required to meet the requirements of Section 18.5 .~~

8.10 Detection and Release System for Preaction and Deluge Systems.

8.10.1 General.

8.10.1.1

The type of detection shall be appropriate for the hazard protected and shall be approved by the authority having jurisdiction.

8.10.1.2

All components of pneumatic, hydraulic, or electrical systems shall be compatible.

8.10.1.3

The detection system shall serve all areas that the preaction or deluge system protects.

8.10.1.4*

The detection system for preaction systems shall be designed to activate prior to sprinkler operation.

A.8.10.1.4

While it is the intent to require the detection system to operate prior to sprinklers, it is possible that in some fire scenarios the sprinklers could operate prior to the detection system. In general, the detection system, at its installed location and spacing, should be more sensitive to fire than the sprinklers.

8.10.1.5

Where thermal activation is utilized for preaction systems, the activation temperature of the release system shall be lower than the activation temperature of the sprinklers.

8.10.1.6

The temperature rating of thermal detection devices shall be selected in accordance with 9.4.2 .

8.10.1.7

A supply of spare fusible elements for heat-responsive devices, not less than two of each temperature rating, shall be maintained on the premises for replacement purposes.

8.10.1.8

Where two or more adjacent water spray systems in one fire area are controlled by separate detection systems, the detectors on each system shall be spaced independently as if the dividing line between the systems was a wall or draft curtain.

8.10.2 Electrical Detection.

Electrical detection and release systems shall comply with the requirements of *NFPA 72* .

8.10.3 Pilot Line Detection.

8.10.3.1

Piping for wet and dry pilot line detection shall be permitted to be any type of approved pipe or tube.

8.10.3.2

Piping for wet and dry pilot line detection shall be considered branch lines for purposes of installation and shall be installed in accordance with the applicable requirements of this standard, except as modified by 8.10.3.2 and 8.10.3.3 .

8.10.3.3

Pipe supplying pilot line detectors shall be permitted to be supported from the same points of hanger attachment as the piping system it serves.

8.10.3.4

Pipe supplying pilot line detectors shall not be required to meet the requirements of Section 18.5 .

8.10.3.5

Pilot line detectors, spray sprinklers utilized as pilot line detectors, and related components including pipe and fittings shall be corrosion resistant when installed in areas exposed to weather or corrosive conditions.

8.10.3.6

Where subject to mechanical of physical damage, pilot line detection piping and related detection system components shall be protected.

8.10.3.7

Where spray sprinklers are used as pilot line detectors, they shall be installed in accordance with the spacing and location rules of Section 10.2 , except that the obstruction to water distribution rules shall not be required to be followed.

8.10.3.7.1

Pilot line detectors shall be permitted to be located more than 22 in. (550 mm) below a ceiling or deck where the maximum spacing between pilot line detectors is 10 ft (3.0 m) or less.

8.10.3.8

Wet pilot release systems shall be designed and installed in accordance with manufacturer's requirements and listing for height limitations above deluge valves or deluge valve actuators to prevent water column.

8.10.3.9

Pilot line detectors shall be installed in the upright position on dry pilot lines.

8.10.3.10

Dry pilot lines shall be pitched ½ in. per 10 ft (4 mm/m) for drainage.

8.10.3.11

The air supply for dry pilot lines shall be arranged to enable maintenance of dry pilot line pressure independent from that of the preaction system.

8.10.3.12

A row of pilot line detectors shall be located along the open sides of open-sided buildings.

8.10.3.13

Where pilot line detectors are installed in water cooling tower applications, they shall be in accordance with Section 27.26 .

8.10.4 Spacing of Detection Devices.

8.10.4.1

Spacing of detection devices shall be in accordance with their listing and manufacturer's specifications.

8.10.4.2

Where spray sprinklers are used as pilot line detectors, spacing of detectors shall not exceed that of the sprinkler spacing in the area it serves.

8.10.4.3

The maximum horizontal distance between pilot line detectors installed indoors shall not exceed 12 ft (3.7 m).

8.10.4.3.1

Pilot line detectors located in open-sided buildings shall in accordance with 8.10.4.3 .

8.10.4.4

The maximum horizontal distance between pilot line detectors installed outdoors shall not exceed 8 ft (2.4 m).

8.10.4.4.1

Pilot line detectors required by 8.10.3.11 shall be spaced in accordance with 8.10.4.4 .

8.10.4.5

Where multiple levels of pilot line detectors are present, the horizontal distance between pilot line detectors installed outdoors on a given level shall be permitted to be increased to 10 ft (3.0 m) when all the following conditions are met:

(1) The elevation of the first level does not exceed 15 ft (4.6 m).

(2) The distance between additional levels does not exceed 12 ft (3.7 m).

(3) The pilot line detectors are staggered vertically.

8.10.4.6

Pilot line detectors located outdoors, such as in open process structures, shall be spaced such that the vertical distance between levels of pilot line detectors does not exceed 17 ft (5.2 m).

8.10.4.7

Horizontal spacing of pilot line detectors differing from those required in 8.10.4.3 and 8.10.4.4 shall be permitted where installed in accordance with their listing.

8.10.5 Detection for Refrigerated Spaces.

8.10.5.1

Detection devices shall be electric or pneumatic fixed temperature type with temperature ratings less than that of the sprinklers in the protected space.

8.10.5.2

Detection devices shall not be rate-of-rise type.

8.10.5.3

Where the system is a double interlock preaction system or single interlock antifreeze system, detection devices shall be permitted to be any type specifically approved for use in a refrigerated area if installed in accordance with their listing requirements and *NFPA 72* or other approved fire alarm code.

8.10.5.4 Detector Location at Ceiling.

8.10.5.4.1

Under smooth ceilings, detectors shall be spaced not exceeding their listed spacing.

8.10.5.4.2

For other than smooth ceilings, detector spacing shall not exceed one-half of their listed spacing or full allowable sprinkler spacing in the protected area, whichever is greater.

8.10.5.5 Detector Location in Racks.

8.10.5.5.1

Unless the conditions in 8.10.5.6 are met, one level of detectors shall be installed for each level of sprinklers.

8.10.5.5.2

Detectors shall be installed vertically no further than one storage level away from the rack sprinklers and as follows:

(1) Detectors shall be located in the transverse flue in single-row racks and in the longitudinal flue in double-row racks.

(2) For multiple-row racks, detectors shall be located in either longitudinal or transverse flue space and shall be within 5 ft (1.5 m) horizontally of each sprinkler.

(3) Separate detection systems shall be installed for ceiling sprinkler systems and in-rack sprinkler systems.

(4) Where the system is double interlock preaction type, the ceiling detection system shall operate both the ceiling and in-rack preaction systems.

8.10.5.6

Ceiling detection only shall be permitted where all the following conditions are met:

(1) Maximum storage height is 35 ft (11 m)

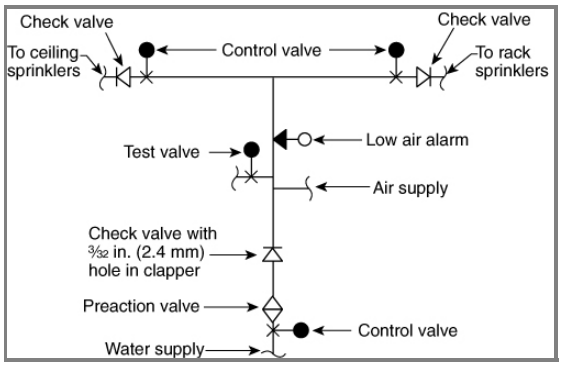
(2) Maximum ceiling height is 40 ft (12 m)

(3) Maximum hazard of storage class is Class III

(4) No solid shelves are present

(5) One preaction valve is used for both ceiling and in-rack sprinklers protecting the same area, with separate indicating control valves and check valves provided downstream, as shown in Figure 8.10.5.6

Figure 8.10.5.6 Valve Arrangement.



8.10.6 Devices for Test Purposes and Testing Apparatus.

8.10.6.1

Where detection devices are located where not accessible for testing, an additional detection device shall be provided on each detection zone for test purposes at an accessible location and shall be connected at a point that will ensure a proper test of each zone.

8.10.6.2

Any specialized testing apparatus needed to activate the detection devices shall be furnished to the owner of the property with each installation.

8.10.6.3

Where explosive vapors or material are present, hot water, steam, or other methods of testing not involving an ignition source shall be used.

Supplemental Information

File Name	Description	Approved
Revised_8.10.docx	Revised Section 8.10	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Fri Jul 29 15:49:08 EDT 2022

Committee Statement

Committee Statement: The requirements for detection methods have been consolidated to a new section for ease of use.

Response Message:	FR-1260-NFPA 13-2022

Public Input No. 586-NFPA 13-2022 [Section No. 8.10]

First Revision No. 1037-NFPA 13-2022 [New Section after 8.10.10.1]

8.11 Negative Pressure Systems. (Reserved)

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 09:06:01 EDT 2022

Committee Statement

Committee Statement: This issue is new technology and needs to have its own requirements. The submitter is encouraged to respond to the Committee with requirements for 8.11 as it relates to this subject. It would also be beneficial to understand the acceptance testing and inspection, testing and maintenance requirements associated with these systems. The inspection, testing and maintenance requirements should be submitted to NFPA 25.

Response Message: FR-1037-NFPA 13-2022

Public Input No. 296-NFPA 13-2022 [Section No. 3.3.216.4]

Public Input No. 307-NFPA 13-2022 [Section No. 8.2.6.5]

Public Input No. 462-NFPA 13-2022 [Section No. 8.8.2.4]

Public Input No. 461-NFPA 13-2022 [Section No. 8.3.2.5.2]

Public Input No. 306-NFPA 13-2022 [Section No. 8.2.6.3.1]

Public Input No. 294-NFPA 13-2022 [Section No. 3.3.216.2]

Public Input No. 298-NFPA 13-2022 [Section No. 3.3.216.9]

Public Input No. 305-NFPA 13-2022 [Section No. 8.2.6.2]

Public Input No. 460-NFPA 13-2022 [Section No. 8.2.6.6.1]

Public Input No. 304-NFPA 13-2022 [Section No. 8.2.6.1]

First Revision No. 1024-NFPA 13-2022 [Section No. 9.2.1.12]

9.2.1.12

Concealed spaces where rigid materials are used and the exposed surfaces, in the form in which they are installed, comply with one of the following shall not require sprinkler protection:

(1) The surface materials have a flame spread index of 25 or less, and the materials have ~~been demonstrated not to propagate fire more than 10.5 ft (3.2 m)~~ demonstrated that the flame front does not progress more than 10.5 ft (3.2 m) beyond the centerline of the burners at any time during the 30-minute test period, when tested in accordance with ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, or UL 723, ~~*Standard for*~~ *Test for Surface Burning Characteristics of Building Materials*, extended for an additional 20 minutes.

(2) The surface materials comply with the requirements of ASTM E2768, *Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test)*.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 15:01:56 EDT 2022

Committee Statement

Committee Statement: The revision aligns the text with the language in ASTM E2768.

Response Message: FR-1024-NFPA 13-2022

Public Input No. 406-NFPA 13-2022 [Section No. 9.2.1.12]

First Revision No. 1025-NFPA 13-2022 [Section No. 9.2.2]

9.2.2 Spaces Under Ground Floors, Exterior Docks, and Exterior Platforms.

Sprinklers shall be permitted to be omitted from spaces under ground floors, exterior docks, and exterior platforms where all of the following conditions exist:

(1) The space is not accessible for storage purposes and is protected against accumulation of wind-borne debris.

(2) The space contains no equipment such as conveyors or fuel-fired heating units.

(3) The floor over the space is ~~of tight construction~~ constructed in such a manner as to prevent the passage of debris into the space below .

(4) No combustible or flammable liquids or materials that under fire conditions would convert into combustible or flammable liquids are processed, handled, or stored on the floor above the space.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 15:05:31 EDT 2022

Committee Statement

Committee Statement: The proposed language adds clarity to the intent of this section as tight construction is not defined.

Response Message: FR-1025-NFPA 13-2022

Public Input No. 250-NFPA 13-2022 [Section No. 9.2.2]

First Revision No. 1026-NFPA 13-2022 [Section No. 9.2.5.1]

9.2.5.1

Sprinklers shall not be required in clothes closets, linen closets, and pantries with or without doors within dwelling units in hotels and motels where the area of the space does not exceed 24 ft^2 (2.2 m^2) and the walls and ceilings are surfaced with noncombustible or limited-combustible materials.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 15:18:35 EDT 2022

Committee Statement

Committee Statement: Helps clarify the intent of this section. A door on a closet is not the reason for the omission of a sprinkler. The allowable omission is the low hazard a closet presents to the overall life safety/property

Response Message: FR-1026-NFPA 13-2022

Public Input No. 224-NFPA 13-2022 [Section No. 9.2.5.1]

First Revision No. 1190-NFPA 13-2022 [Section No. 9.2.14]

9.2.14 Elevator Hoistways and Machine Rooms.

~~Sprinklers shall not be required in locations complying with 9.3.6.3 , 9.3.6.6 , or 9.3.6.7.2 .~~

9.2.14.1

Sprinklers shall not be required in locations complying with ~~9.3.6.3 , 9.3.6.6 , or 9.3.6.7.2~~ 9.3.6 .

9.2.14.2

Sprinklers shall not be required in elevator pits.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Thu Jul 28 15:44:43 EDT 2022

Committee Statement

Committee Statement: Information was provided that showed entry into the pit to service and maintain sprinkler and associated devices presents significant hazard to workers. There is not significant fire data to support the need for sprinklers in the pit or hoistway that outweighs the need for worker safety.

Response Message: FR-1190-NFPA 13-2022

First Revision No. 1186-NFPA 13-2022 [Section No. 9.3.2]

9.3.2 ~~Special Sprinklers for~~ Horizontal Combustible Concealed Spaces.

Unless the requirements of 9.2.1.19 are met, sprinklers used in horizontal combustible concealed spaces (with a slope not exceeding 2 in 12) with wood truss, wood joist construction, or bar joist construction having a combustible upper surface and where the depth of the space is less than 36 in. (900 mm) from deck to deck, from deck to ceiling, or with double wood joist construction with a maximum of 36 in. (900 mm) between the top of the bottom joist and the bottom of the upper joist shall be listed for such use.

9.3.2.1

Sprinklers specifically listed to provide protection of combustible concealed spaces described in 9.3.2 shall be permitted to be used in accordance with 9.4.1.2 where the space is less than 12 in. (300 mm) from deck to deck or deck to ceiling

9.3.2.2

Sprinklers specifically listed to provide protection of combustible concealed spaces described in 9.3.2 shall be permitted to be used in accordance with 9.4.1.2 throughout the area when a portion of the area exceeds a depth of 36 in. (900 mm).

9.3.2.3

Sprinklers specifically listed to provide protection of combustible concealed spaces described in 9.3.2 shall be permitted to be used in accordance with 9.4.1.2 to protect composite wood joist construction.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Thu Jul 28 15:24:08 EDT 2022

Committee Statement

Committee Statement: This is a special situation not to be confused with a special sprinkler. The revision of the title aligns it with the remainder of 9.3.

Response Message: FR-1186-NFPA 13-2022

Public Input No. 167-NFPA 13-2022 [Section No. 9.3.2]

First Revision No. 1315-NFPA 13-2022 [Section No. 9.3.6]

9.3.6 Elevator Machine Rooms, Machinery Spaces, Control Rooms, Control Spaces, and Hoistways.

~~**9.3.6.1***~~

~~Sidewall spray sprinklers shall be installed at the bottom of each elevator hoistway not more than 2 ft (600 mm) above the floor of the pit.~~

~~**A.9.3.6.1**~~

~~The sprinklers in the pit are intended to protect against fires caused by debris, which can accumulate over time. Ideally, the sprinklers should be located near the side of the pit below the elevator doors, where most debris accumulates. However, care should be taken that the sprinkler location does not interfere with the elevator toe guard, which extends below the face of the door opening.~~

~~**9.3.6.2**~~

~~The sprinkler required at the bottom of the elevator hoistway by~~ 9.3.6.1 ~~shall not be required for enclosed, noncombustible elevator shafts that do not contain combustible hydraulic fluid.~~

9.3.6.1

Automatic fire sprinklers shall not be required in elevator machine rooms, machinery spaces, control rooms, control spaces, or hoistways of traction elevators installed in accordance with the applicable provisions in NFPA *101*, or the applicable building code, where all of the following conditions are met:

(1) The elevator machine rooms , machinery spaces , control rooms , control spaces , or hoistways ~~of traction elevator is~~ are dedicated to elevator equipment only.

~~The elevator machine room, machinery space, control room, control space, or hoistway of traction elevators are protected by smoke detectors, or other automatic fire detection, installed in accordance with *NFPA 72* or other approved fire alarm code.~~

(2) The elevator machinery spaces , control rooms , control spaces , or hoistways ~~of traction elevators is~~ are separated from the remainder of the building by walls and floor/ceiling or roof/ceiling assemblies having a fire resistance rating of not less than that specified by the applicable building code.

(3) No materials unrelated to elevator equipment are permitted to be stored in elevator machine rooms, machinery spaces, control rooms, control spaces, or hoistways ~~of traction elevators~~ .

~~The elevator machinery is not of the hydraulic type.~~

9.3.6.2*

~~The sprinklers required at the top of the elevator hoistway by~~ 9.3.6.5 Sprinklers shall not be required in the hoistway where the hoistway for passenger elevators is noncombustible or limited-combustible and the car enclosure materials meet the requirements of ASME A17.1/CSA B44 , *Safety Code for Elevators and Escalators*.

A.9.3.6.2

Passenger elevator cars that have been constructed in accordance with ASME A17.1/CSA B44 , *Safety Code for Elevators and Escalators,* Rule 204.2a (under A17.1a-1985 and later editions of the code) have limited combustibility. Materials exposed to the interior of the car and the hoistway, in their end-use composition, are limited to a flame spread index of 0 to 75 and a smoke-developed index of 0 to 450, when tested in accordance with ASTM E84, *Standard Test Method ~~of~~ for Surface Burning Characteristics of Building Materials*.

9.3.6.3 Hydraulic Fluid for Elevators.

9.3.6.3.1

Sprinklers shall be required in the elevator machine rooms, machinery spaces, control rooms, and control spaces where combustible hydraulic fluid is used.

9.3.6.3.2

Sprinklers shall not be required in elevator hoistways where hydraulic fluid is used.

9.3.6.4*

~~Automatic~~ Where provided, automatic sprinklers in elevator machine rooms, machinery spaces, control rooms, control spaces, or hoistways shall be standard response.

A.9.3.6.4

ASME A17.1/CSA B44 , *Safety Code for Elevators and Escalators*, requires the shutdown of power to the elevator upon or prior to the application of water in elevator machine rooms or hoistways. This shutdown can be accomplished by a detection system with sufficient sensitivity that operates prior to the activation of the sprinklers *(see also NFPA 72 or other approved fire alarm code)*. As an alternative, the system can be arranged using devices or sprinklers capable of effecting power shutdown immediately upon sprinkler activation, such as a waterflow switch without a time delay. This alternative arrangement is intended to interrupt power before significant sprinkler discharge.

9.3.6.5

~~Upright~~ Where required, upright , pendent, or sidewall spray sprinklers shall be installed at the top of elevator hoistways.

~~**9.3.6.6** Combustible Suspension in Elevators.~~

~~**9.3.6.6.1**~~

~~Sprinklers shall be installed at the top and bottom of elevator hoistways where elevators utilize combustible suspension means such as noncircular elastomeric-coated or polyurethane-coated steel belts.~~

~~**9.3.6.6.2**~~

~~The sprinklers in the elevator hoistway shall not be required when the suspension means provide not less than an FT-1 rating when tested to the vertical burn test requirements of UL 2556, *Wire and Cable Test Methods* , where the suspension means shall not continue to burn for more than 60 seconds, nor shall the indicator flag be burned more than 25 percent.~~

Supplemental Information

File Name	Description	Approved
13-2022_9_3_6.docx	Revisions to 9.3.6	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Aug 17 13:55:48 EDT 2022

Committee Statement

Committee Statement: Information was provided that showed entry into the pit to service and maintain sprinkler and associated devices presents significant hazard to workers. There is not significant fire data to support the need for sprinklers in the pit or hoistway that outweighs the need for worker safety.

Response Message: FR-1315-NFPA 13-2022

Public Input No. 534-NFPA 13-2022 [Section No. 9.3.6]

Public Input No. 233-NFPA 13-2022 [Section No. 9.3.6]

Public Input No. 263-NFPA 13-2022 [Section No. A.9.3.6.1]

Public Input No. 536-NFPA 13-2022 [Section No. A.9.3.6.1]

First Revision No. 1030-NFPA 13-2022 [Section No. 9.3.12]

9.3.12* Fur Storage Vaults.

Old-style/conventional sprinklers shall be installed in fur storage vaults.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 16:38:42 EDT 2022

Committee Statement

Committee Statement: Added title per Manual of Style. Added conventional sprinklers to align with the definition.

Response Message: FR-1030-NFPA 13-2022

Public Input No. 539-NFPA 13-2022 [Section No. 9.3.12]

First Revision No. 1128-NFPA 13-2022 [Sections 9.3.14.2, 9.3.14.3]

9.3.14.2

Where the space above a ~~drop~~ ceiling is sprinklered, the sprinkler system shall conform to the rules of 19.1.2 and Section 20.13.

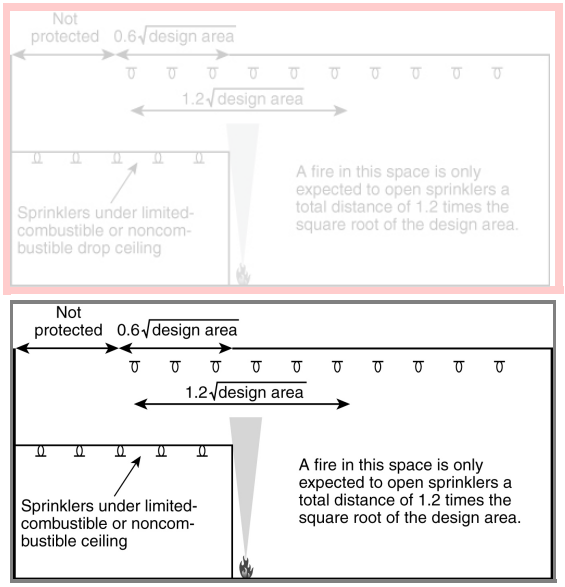
9.3.14.3*

Where there is a noncombustible space above a noncombustible or limited-combustible ~~drop~~ ceiling that is sprinklered because it is open to an adjacent sprinklered space and where there is no possibility for storage above the drop ceiling, the sprinkler system shall be permitted to extend only as far into the space as 0.6 times the square root of the design area of the sprinkler system in the adjacent space.

A.9.3.14.3

See Figure A.9.3.14.3.

Figure A.9.3.14.3 Extension of Sprinkler System Above ~~Drop~~ Ceiling.



9.3.14.3.1

The sprinkler system shall extend at least 24 ft (7.3 m) into the space above the ceiling.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 15:53:00 EDT 2022

Committee Statement

Committee Statement: Removing the word drop eliminates the need for a definition of drop ceiling.

Response Message: FR-1128-NFPA 13-2022

First Revision No. 1031-NFPA 13-2022 [Section No. 9.3.16]

9.3.16 Skylights.

9.3.16.1

Sprinklers shall be permitted to be omitted from skylights not exceeding 32 ft^2 (3.0 m^2) in area, regardless of hazard classification, that are separated by at least 10 ft (3.0 m) horizontally from any other unprotected skylight or unprotected ceiling pocket.

9.3.16.1.1

When a sprinkler is installed directly beneath a skylight that does not allow venting and does not exceed 32 ft^2 (3.0 m^2), the distance to the ceiling shall be measured to the plane of the ceiling as if the skylight was not present.

9.3.16.2*

Where skylights do not meet the requirements of 9.3.16.1 , the skylight shall be permitted to be protected as a ceiling pocket in accordance with the appropriate sprinkler installation requirements in Chapter 10 through Chapter 14 .

A.9.3.16.2

Plastic covers might not meet the noncombustible or limited-combustible requirement for ceiling pockets as required in Chapters 10 through Chapter 14 .

9.3.16.3

Skylights not exceeding 32 ft^2 (3.0 m^2) shall be permitted to have a plastic cover.

9.3.16.4

Skylights that allow venting, other than smoke and heat venting per 20.9.5, shall be provided with sprinkler protection installed in the skylight.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 17:29:25 EDT 2022

Committee Statement

Committee Statement: Annex added to the public input for clarification that the ceiling pocket must meet all of Section 10.2.9.

Response Message: FR-1031-NFPA 13-2022

Public Input No. 107-NFPA 13-2021 [Section No. 9.3.16]

First Revision No. 1032-NFPA 13-2022 [Section No. 9.4.2.1]

9.4.2.1*

Unless the requirements of 9.4.2.2, 9.4.2.3, 9.4.2.4, or 9.4.2.5 are met, ordinary or intermediate-temperature sprinklers shall be permitted to be used throughout buildings and compartments .

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 17:48:46 EDT 2022

Committee Statement

Committee Statement: Adding the word compartment does add needed clarification. The word buildings needs to remain so that a design can utilize intermediate- temperature sprinklers throughout a building and not just a defined compartment.

Response Message: FR-1032-NFPA 13-2022

Public Input No. 27-NFPA 13-2021 [Section No. 9.4.2.1]

First Revision No. 1033-NFPA 13-2022 [Section No. 9.4.2.2]

9.4.2.2

Where maximum ceiling temperatures exceed 100°F (38°C), sprinklers with temperature ratings in accordance with the maximum ceiling temperatures of Table 7.2.4.1(a) or Table 7.2.4.1(b) shall be used.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 17:54:10 EDT 2022

Committee Statement

Committee Statement: Updated the section that was missed last cycle.

Response Message: FR-1033-NFPA 13-2022

Public Input No. 199-NFPA 13-2022 [Section No. 9.4.2.2]

Public Input No. 190-NFPA 13-2022 [Section No. 9.4.2.2]

First Revision No. 1034-NFPA 13-2022 [Section No. 9.4.2.5]

9.4.2.5*

The following practices shall be observed to provide sprinklers of other than ordinary-temperature classification unless other temperatures are determined or unless high-temperature sprinklers are used throughout, and temperature selection shall be in accordance with Table 9.4.2.5(a), Table 9.4.2.5(b), and Figure 9.4.2.5:

(1)* Sprinklers in the high-temperature zone shall be of the high-temperature classification, and sprinklers in the intermediate-temperature zone shall be of the intermediate-temperature classification.

(2) Sprinklers located within 12 in. (300 mm) to one side or 30 in. (750 mm) above an uncovered steam main, heating coil, or radiator shall be of the intermediate-temperature classification.

(3) Sprinklers within 7 ft (2.1 m) of a low-pressure blowoff valve that discharges free in a large room shall be of the high-temperature classification.

(4) Sprinklers under glass or plastic skylights exposed to the direct rays of the sun shall be of the intermediate-temperature classification.

(5) Sprinklers in attics (peaked or flat) shall be of the intermediate-temperature classification.

(6) Sprinklers in enclosed show windows shall be of the intermediate-temperature classification.

(7) Sprinklers protecting commercial-type cooking equipment and ventilation systems shall be of the high- or extra-high-temperature classification as determined by use of a temperature-measuring device. *(See 8.9.6.)*

(8) Sprinklers protecting residential areas installed near specific heat sources identified in Table 9.4.2.5(b) shall be installed in accordance with Table 9.4.2.5(b).

(9) Ordinary-temperature sprinklers located adjacent to a heating duct that discharges air that is less than 100°F (38°C) are not required to be separated in accordance with Table 9.4.2.5(a) or Table 9.4.2.5(b).

(10) Sprinklers in walk-in type coolers and freezers with automatic defrosting shall be of the intermediate-temperature classification or higher.

(11) Sprinklers in closets containing ventless clothes dryers shall be of the intermediate-temperature classification or higher.

Table 9.4.2.5(a) Temperature Ratings of Sprinklers Based on Distance from Heat Sources

Type of Heat Condition	Ordinary-Temperature Rating	Intermediate-Temperature Rating	High-Temperature Rating
(1) Heating ducts			
(a) Above	More than 2 ft 6 in. (750 mm)	2 ft 6 in. or less (750 mm)	
(b) Side and below	More than 1 ft 0 in. (300 mm)	1 ft 0 in. or less (300 mm)	
(c) Diffuser	Any distance except as shown under Intermediate-Temperature Rating column	*Downward discharge:* Cylinder with 1 ft 0 in. (300 mm) radius from edge extending 1 ft 0 in. (300 mm) below and 2 ft 6 in. (750 mm) above *Horizontal discharge:* Semicylinder or cylinder with 2 ft 6 in. (750 mm) radius from edge in direction of flow extending 1 ft 0 in. (300 mm) below and 2 ft 6 in. (750 mm) above	

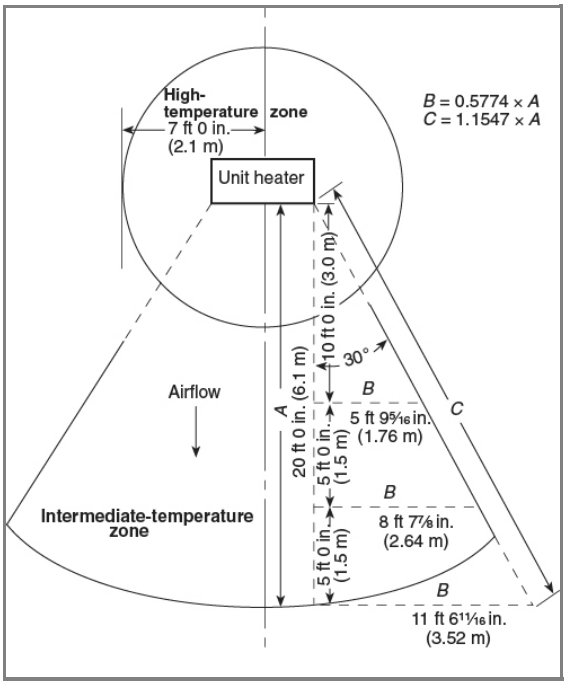
Type of Heat Condition	Ordinary-Temperature Rating	Intermediate-Temperature Rating	High-Temperature Rating
(2) Unit heater and radiant heater			
(a) Horizontal discharge		*Discharge side:* 7 ft 0 in. (2.1 m) to 20 ft 0 in. (6.1 m) radius pie-shaped cylinder *(see Figure 9.4.2.5)* extending 7 ft 0 in. (2.1 m) above and 2 ft 0 in. (600 mm) below heater; also 7 ft 0 in. (2.1 m) radius cylinder more than 7 ft 0 in. (2.1 m) above unit heater	7 ft 0 in. (2.1 m) radius cylinder extending 7 ft 0 in. (2.1 m) above and 2 ft 0 in. (600 mm) below unit heater
(b) Vertical downward discharge *(for sprinklers below unit heater, see Figure 9.4.2.5)*		7 ft 0 in. (2.1 m) radius cylinder extending upward from an elevation 7 ft 0 in. (2.1 m) above unit heater	7 ft 0 in. (2.1 m) radius cylinder extending from the top of the unit heater to an elevation 7 ft 0 in. (2.1 m) above unit heater
(3) Steam mains (uncovered)			
(a) Above	More than 2 ft 6 in. (750 mm)	2 ft 6 in. or less (750 mm)	
(b) Side and below	More than 1 ft 0 in. (300 mm)	1 ft 0 in. or less (300 mm)	
(c) Blowoff valve	More than 7 ft 0 in. (2.1 m)		7 ft 0 in. or less (2.1 m)

Table 9.4.2.5(b) Temperature Ratings of Sprinklers in Specified Residential Areas

	Minimum Distance from Edge of Source to Ordinary-Temperature Sprinkler		Minimum Distance from Edge of Source to Intermediate-Temperature Sprinkler	
Heat Source	in.	mm	in.	mm
Side of open or recessed fireplace	36	900	12	300
Front of recessed fireplace	60	1500	36	900
Coal- or wood-burning stove	42	1050	12	300
Kitchen range	18	450	9	225
Wall oven	18	450	9	225
Hot air flues	18	450	9	225
Uninsulated heat ducts	18	450	9	225
Uninsulated hot water pipes	12	300	6	150
Side of ceiling- or wall-mounted hot air diffusers	24	600	12	300
Front of wall-mounted hot air diffusers	36	900	18	450

Heat Source	Minimum Distance from Edge of Source to Ordinary-Temperature Sprinkler		Minimum Distance from Edge of Source to Intermediate-Temperature Sprinkler	
	in.	mm	in.	mm
Hot water heater or furnace	6	150	3	75
Light fixture (except LED) :				
0 W–250 W	6	150	3	75
250 W–499 W	12	300	6	150

Figure 9.4.2.5 High-Temperature and Intermediate-Temperature Zones at Unit Heaters and Radiant Heaters.



Supplemental Information

File Name	Description	Approved
Chapter_9_9_4_2_5_PI_161.docx	For staff	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 18:03:36 EDT 2022

Committee Statement

Committee Statement: Adding the words “from edge” provides clarity and matches figure 9.4.2.5. LED lights put off less heat and do not have enough heat to activate a sprinkler. Adding “except LED” also correlates with proposals accepted with NFPA 13R and NFPA 13D.

Response Message: FR-1034-NFPA 13-2022

Public Input No. 161-NFPA 13-2022 [Section No. 9.4.2.5]

Public Input No. 368-NFPA 13-2022 [Section No. 9.4.2.5]

First Revision No. 1035-NFPA 13-2022 [Section No. 9.4.3.1]

9.4.3.1

Sprinklers in light hazard occupancies shall be one of the following:

(1) Quick-response type as defined in 3.3.220.4.16

(2) Residential sprinklers in accordance with the requirements of Chapter 12

(3) Quick-response CMSA sprinklers

(4) ESFR sprinklers

~~Standard-response sprinklers used for modifications or additions to existing light hazard systems equipped with standard-response sprinklers~~

~~Standard-response sprinklers used where individual standard-response sprinklers are replaced in existing light hazard systems~~

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 18:30:16 EDT 2022

Committee Statement

Committee Statement: Section 9.4.3.1 is for new installation. The requirement for existing systems is already addressed in Chapter 30.

Response Message: FR-1035-NFPA 13-2022

Public Input No. 499-NFPA 13-2022 [Section No. 9.4.3.1]

First Revision No. 1036-NFPA 13-2022 [Section No. 9.4.3.6]

~~9.4.3.6~~

~~When existing light hazard systems are converted to use quick-response or residential sprinklers, all sprinklers in a compartment shall be changed.~~

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 18:32:46 EDT 2022

Committee Statement

Committee Statement: Section 9.4.3.6 is for new installation. The requirement for existing systems is already addressed in Chapter 30.

Response Message: FR-1036-NFPA 13-2022

Public Input No. 500-NFPA 13-2022 [Section No. 9.4.3.6]

First Revision No. 1213-NFPA 13-2022 [Section No. 9.5.4.2]

9.5.4.2 Deflector Orientation.

~~Deflectors~~ Except as required in 9.5.4.3 , deflectors of sprinklers shall be aligned parallel to ceilings, roofs, or the incline of stairs.

9.5.4.3*

Where sprinklers are installed under ceilings with a slope that exceeds 2 in 12 (16.7 percent) and protect storage in accordance with Chapters 20 through 26 , deflectors of sprinklers shall be aligned parallel to the floor of the storage area.

A.9.5.4.3

Computer simulations and full-scale fire tests as documented in the report entitled *Protection of Storage Under Sloped Ceilings Phase III: Large-Scale Testing Summary and Guidance* , written based on a project supported by the Fire Protection Research Foundation, have demonstrated the advantage of having sprinkler deflectors installed parallel to the floor when the slope of a ceiling over a storage occupancy exceeds 2 in 12. This orientation allows the water flux applied to a storage array to closely match the water flux obtained at the test labs, which were conducted under a horizontal flat ceiling. The previously referenced test program did not investigate the impact of sprinkler orientation parallel to the ceiling for nonstorage occupancies. While there are advantages to having sprinklers installed parallel to the floor when the slope of a ceiling exceeds 2 in 12, the sprinklers used to protect nonstorage occupancies have deflectors that create water flux distribution patterns that are significantly different than sprinklers used to protect storage. As nonstorage occupancies were not part of the scope of the Fire Protection Research Foundation project on sloped ceilings, coupled with the additional cost to install sprinklers with their deflectors parallel to the floor, the requirement to install sprinkler deflectors parallel to the floor under ceilings having a slope that exceeds 2 in 12 was limited to storage occupancies.

When this standard uses the term *parallel to the floor of the storage area* , it intends for this to be horizontal. In some cases, the floor of the building might have a slight slope to drain spilled fluids, but the intent of the standard is not to match this slope but have the deflectors be installed horizontally to comply with this requirement.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Fri Jul 29 09:24:24 EDT 2022

Committee Statement

Committee Statement: Based on recent fire testing on sloped ceilings in obstructed construction performed by the fire protection research foundation, sprinkler deflector orientation has been clarified. The report is “Protection of Storage Under Sloped Ceilings Phase III: Large Scale Testing Summary and Guidance” and can be found at www.nfpa.org.

Response Message: FR-1213-NFPA 13-2022

Public Input No. 473-NFPA 13-2022 [Section No. 9.5.4.2]

First Revision No. 1209-NFPA 13-2022 [Section No. 9.5.5]

9.5.5 Obstructions to Sprinkler Discharge.

9.5.5.1* ~~Performance Objective~~ General .

Sprinklers shall be ~~located so as~~ arranged in accordance with 9.5.5.2 and 9.5.5.3 to minimize obstructions to discharge ~~as defined in 9.5.5.2 and 9.5.5.3~~ , or ~~additional~~ supplemental sprinklers shall be provided to ensure adequate coverage of the hazard. ~~*(See Figure A.9.5.5.1 .)*~~

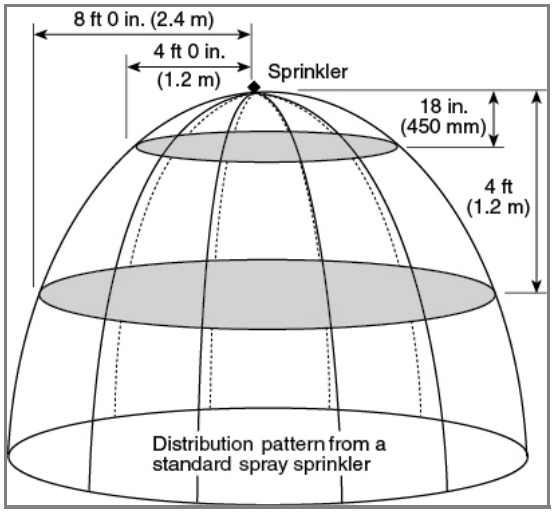
A.9.5.5.1

See Figure A.9.5.5.1 for a representation of a typical spray sprinkler pattern.

NFPA 13 strives to minimize the effect of obstructions through the use of specific criteria in 9.5.5, 10.2.7, 10.3.6, 11.2.5, 11.3.6, 12.1.10, 12.1.11, 13.2.8, and 14.2.11. The obstruction criteria for storage sprinklers in 13.2.8 and 14.2.11 is the most stringent. For other types of sprinklers, dry spaces caused ~~be~~ by obstructions such as columns and wall configurations will occur and can comply with the standard. The general rules known as the Three Times Rule and the Four Times Rule define *shadow areas* that are acceptable behind obstructions like columns and walls. Tests have shown that the larger the column, the larger the shadow area behind the column will be and the longer it will take for sprinklers on the other side of the column to react to the fire behind the column. In a very large compartment, the delay could become unacceptable. The delay in sprinkler response can be minimized with smaller columns, with smaller compartments, or by putting sprinklers on the other side of the column.

Where offset walls create ~~shadowed~~ shadow areas, the sprinkler does not appear to be significantly delayed in activation. Tests have shown that once the sprinkler activates, water will not cover all areas behind the obstructions.

Figure A.9.5.5.1 ~~Obstructions to~~ Sprinkler Discharge Pattern Development for Standard Upright or Pendent Spray Sprinklers.



9.5.5.2* Obstructions to Sprinkler Discharge Pattern Development.

9.5.5.2.1

~~Continuous~~ Obstructions, continuous or noncontinuous ~~obstructions~~ , individual or grouped, less than or equal to 18 in. (450 mm) below the sprinkler deflector that prevent the pattern from fully developing shall comply with 9.5.5.2.

9.5.5.2.2

Sprinklers shall be positioned in accordance with the minimum distances and special requirements of Section 10.2 through Section 14.2 so that they are located sufficiently away from obstructions such as truss webs and chords, pipes, columns, and fixtures.

9.5.5.3 Obstructions that Prevent Sprinkler Discharge from Reaching Hazard.

~~Continuous or noncontinuous obstructions that interrupt the water discharge in a horizontal plane more than 18 in. (450 mm) below the sprinkler deflector in a manner to limit the distribution from reaching the protected hazard shall comply with 9.5.5.3 .~~

9.5.5.3.1*

~~Continuous~~ Obstructions, continuous or noncontinuous ~~obstructions~~ , individual or grouped, that interrupt the water discharge in a horizontal plane more than 18 in. (450 mm) below the sprinkler deflector in a manner to limit the distribution from reaching the protected hazard shall comply with 9.5.5.3.

9.5.5.3.2 Obstructions Over 4 ft (1.2 m) in Width.

~~Sprinklers shall be installed below fixed obstructions over 4 ft (1.2 m) in width.~~

9.5.5.3.2.1*

~~Sprinklers~~ Supplemental sprinklers shall be installed below fixed obstructions, including open grate flooring, over 4 ft (1.2 m) in width.

A.9.5.5.3.2.1

When obstructions are located more than 18 in. (450 mm) below the sprinkler deflector, an adequate spray pattern develops and obstructions up to and including 4 ft (1.2 m) wide do not require additional protection underneath. Examples are ducts, decks, open grate flooring, catwalks, cutting tables, overhead doors, soffits, ceiling panels, and other similar obstructions.

Where multiple levels of ducts, pipes, or other similar horizontal obstructions ~~that are~~ over 4 ft (1.2 m) wide are stacked vertically, additional levels of automatic sprinkler protection between the vertical levels are not required. A single level of sprinklers beneath the lowest level of the obstruction is adequate, provided that the obstructions are noncombustible and ~~that~~ the combustible materials are not stored between the levels.

Sprinklers under open gratings should be provided with shields. Shields over automatic sprinklers should not be less, in least dimension, than four times the distance between the shield and fusible element, except special sprinklers incorporating a built-in shield need not comply with this recommendation if listed for the particular application.

9.5.5.3.2.2*

Supplemental sprinklers shall not be required below obstructions that are not fixed in place.

A.9.5.5.3.2.2

A conference table is an example of an obstruction that is not fixed in place.

9.5.5.3.2.3

Supplemental sprinklers shall not be required below noncombustible obstructions over 4 ft (1.2 m) wide where the bottom of the obstruction is 24 in. (600 mm) or less above the floor or deck.

~~**9.5.5.3.2.2**~~

~~Open grate flooring over 4 ft (1.2 m) in width shall require sprinkler protection below the grating.~~

~~**9.5.5.3.2.3***~~

~~Sprinklers located below obstructions shall comply with one of the following, regardless of the geometry of obstruction:~~

~~Installed below the obstruction~~

~~Installed adjacent to the obstruction not more than 3 in. (75 mm) from the outside edge of the obstruction~~

~~**A.9.5.5.3.1.2**~~

~~See Figure A.9.5.5.3.1.2(a) and Figure A.9.5.5.3.1.2(b) .~~

~~**Figure A.9.5.5.3.1.2(a) Sprinkler Location Below Obstruction.**~~

~~**Figure A.9.5.5.3.1.2(b) Sprinkler Location Below Circular Obstruction.**~~

~~**9.5.5.3.2.4**~~

~~Where sprinklers are located adjacent to the obstruction, they shall be of the intermediate level rack type.~~

~~**9.5.5.3.2.5**~~

~~The deflector of automatic sprinklers installed below fixed obstructions shall be positioned no more than 12 in. (300 mm) below the bottom of the obstruction.~~

~~**9.5.5.3.2.6**~~

~~Sprinklers shall not be required below noncombustible obstructions over 4 ft (1.2 m) wide where the bottom of the obstruction is 24 in. (600 mm) or less above the floor or deck.~~

~~**9.5.5.3.3**~~

~~Sprinklers shall not be required below obstructions that are not fixed in place.~~

~~**9.5.5.3.4**~~

~~Sprinklers installed below obstructions shall be of the same type (spray, CMSA, ESFR, residential) as installed at the ceiling except as permitted by 9.5.5.3.3.1 .~~

~~**9.5.5.3.4.1**~~

~~Spray sprinklers shall be permitted to be utilized under overhead doors.~~

~~**9.5.5.3.5**~~

~~Sprinklers installed under open gratings shall be of the intermediate level/rack storage type or otherwise shielded from the discharge of overhead sprinklers.~~

9.5.5.3.3 Supplemental Sprinklers.

9.5.5.3.3.1

Supplemental sprinklers shall be quick response having a nominal ordinary temperature rating unless otherwise required by 7.2.4 or 9.4.2.5 .

9.5.5.3.3.2

Unless the requirements of 9.5.5.3.3.3 are met, supplemental sprinklers shall have the same K-factor value, orientation, and coverage type characteristics as the ceiling sprinklers.

9.5.5.3.3.3

Supplemental sprinklers shall be permitted to have different K-factor value, orientation, and coverage-type characteristics than those of the ceiling sprinklers when the requirements of Section 19.5 are met.

9.5.5.3.3.4

Supplemental sprinklers shall be equipped with a water shield or otherwise shielded from the discharge of overhead sprinklers where they are installed for any of the following conditions:

(1) Under nonflat obstructions

(2) Under nonsolid obstructions

(3) Beyond the outer edges of the obstructions

(4) Under open grating

9.5.5.3.4 Position and Spacing of Supplemental Sprinklers.

9.5.5.3.4.1*

Supplemental sprinklers shall be positioned below obstructions in accordance with one of the following:

(1) Installed below the obstruction

(2) Installed adjacent to the obstruction not more than 3 in. (75 mm) from the outside edge of the obstruction

A.9.5.5.3.4.1

See Figure A.9.5.5.3.4.1(a) and Figure A.9.5.5.3.4.1(b) .

Figure A.9.5.5.3.4.1(a) Sprinkler Location Below Obstruction.

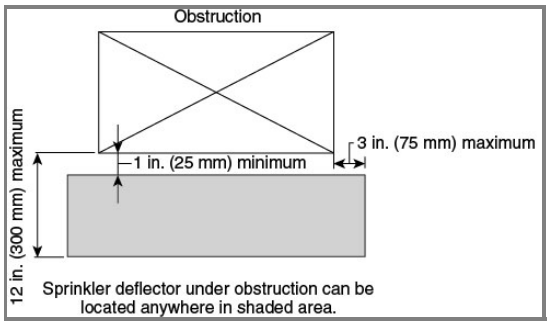
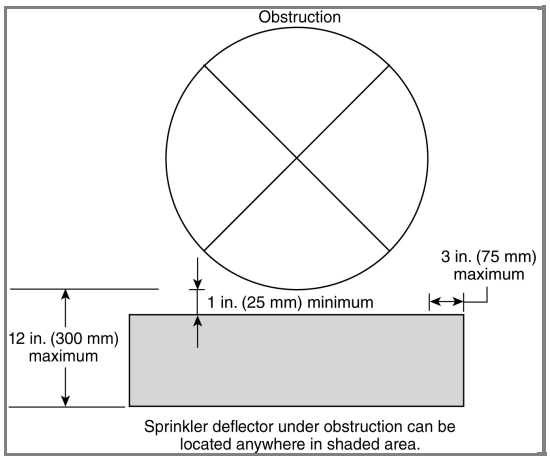


Figure A.9.5.5.3.4.1(b) Sprinkler Location Below Circular Obstruction.



9.5.5.3.4.2

The spacing of supplemental sprinklers under obstructions shall be in accordance with one of the following:

(1) Where supplemental sprinklers are required below flat, solid obstructions not exceeding 2 ft. (0.6 m) in width, the maximum allowable linear spacing for the sprinklers shall be 8 ft (2.4 m).

(2) Where supplemental sprinklers are required below nonflat or nonsolid obstructions, the maximum allowable linear and area spacing for the sprinklers shall be 4 ft (1.2 m) and 16 ft^2 (1.5 m^2).

(3) Where a flat, solid continuous horizontal barrier having the same footprint of the obstruction is installed below an obstruction not exceeding 2 ft (0.6 m) in width, the maximum allowable linear spacing for the sprinklers shall be 8 ft (2.4 m).

(4) Where supplemental sprinklers are required below flat, solid obstructions greater than 2 ft (0.6 m) but not exceeding 10 ft (0.3 m) in width, the maximum allowable linear spacing for the sprinklers shall be 10 ft (3.0 m).

(5) Where a flat, solid continuous horizontal barrier having the same footprint of the obstruction is installed below an obstruction greater than 2 ft (0.6 m) but not exceeding 10 ft (0.3 m) in width, the maximum allowable linear spacing for the sprinklers shall be 10 ft (3.0 m).

(6) Where supplemental sprinklers are required below flat, solid obstructions exceed 10 ft (3.0 m) in width, the sprinkler spacing for the supplemental sprinklers shall be in accordance with the requirements for the sprinklers installed under unobstructed construction.

(7) Where a flat, solid continuous horizontal barrier having the same footprint of the obstruction is installed below an obstruction exceeding 10 ft (0.3 m) in width, the sprinkler spacing for the supplemental sprinklers shall be installed under unobstructed construction.

9.5.5.4 Closets.

In all closets and compartments, including those closets housing mechanical equipment, that are not larger than 400 ft^3 (11.3 m^3) in size, a single sprinkler at the highest ceiling level shall be sufficient without regard to obstructions or minimum distance to the wall.

Supplemental Information

File Name	Description	Approved
Draft_Version_of_Section_9.5.5_for_2025_Edition_of_NFPA_13_FINAL_.docx	For staff use	
FIG_A.9.5.5.3.4.1.a_and_b.docx	For staff use	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Fri Jul 29 08:51:26 EDT 2022

Committee Statement

Committee Statement: Reorganized section 9.5.5 and revised the term additional sprinkler to supplemental sprinkler to better define sprinklers under obstructions.

Response Message: FR-1209-NFPA 13-2022

Public Input No. 283-NFPA 13-2022 [New Section after 9.5.5.3.1.5]

Public Input No. 433-NFPA 13-2022 [Section No. A.9.5.5.3.1.1]

Public Input No. 417-NFPA 13-2022 [Section No. 9.5.5.3.4]

Public Input No. 435-NFPA 13-2022 [Section No. A.9.5.5.3.2]

Public Input No. 432-NFPA 13-2022 [Section No. A.9.5.5.3.1]

Public Input No. 437-NFPA 13-2022 [New Section after A.9.5.5.3.2]

Public Input No. 436-NFPA 13-2022 [New Section after A.9.5.5.3.2]

Public Input No. 273-NFPA 13-2022 [Section No. A.9.5.5.3.1]

Public Input No. 434-NFPA 13-2022 [Section No. A.9.5.5.3.1.2]

Public Input No. 414-NFPA 13-2022 [Section No. 9.5.5.3.1]

Public Input No. 415-NFPA 13-2022 [Section No. 9.5.5.3.2]

Public Input No. 438-NFPA 13-2022 [Section No. A.9.5.5.3.4]

Public Input No. 416-NFPA 13-2022 [Section No. 9.5.5.3.3]

First Revision No. 1038-NFPA 13-2022 [New Section after 10.2.5.4.2]

10.2.5.4.3

Where sprinklers are installed in every channel formed by solid obstructed construction with the deflectors above the bottom of the structural members, the structural members shall be considered baffles in accordance with 10.2.5.4.2 .

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 09:28:00 EDT 2022

Committee Statement

Committee Statement: Solid structural members create a barrier between other sprinklers and work the same as baffles.

Response Message: FR-1038-NFPA 13-2022

Public Input No. 475-NFPA 13-2022 [New Section after 10.2.5.4.2]

First Revision No. 1217-NFPA 13-2022 [Section No. 10.2.6.1.2]

10.2.6.1.2 Obstructed Construction.

~~Under obstructed construction, the sprinkler deflector shall be located in accordance with one of the following arrangements:~~

~~Installed with the deflectors within the horizontal planes of 1 in. to 6 in. (25 mm to 150 mm) below the structural members and a maximum distance of 22 in. (550 mm) below the ceiling/roof deck~~

~~Installed with the deflectors at or above the bottom of the structural member to a maximum of 22 in. (550 mm) below the ceiling/roof deck where the sprinkler is installed in conformance with 10.2.7.2~~

~~Installed in each bay of obstructed construction, with the deflectors located a minimum of 1 in. (25 mm) and a maximum of 12 in. (300 mm) below the ceiling~~

~~Installed with the deflectors within the horizontal planes 1 in. to 6 in. (25 mm to 150 mm) below composite wood joists to a maximum distance of 22 in. (550 mm) below the ceiling/roof deck only where joist channels are fire-stopped to the full depth of the joists with material equivalent to the web construction so that individual channel areas do not exceed 300 ft^2 (28 m^2)~~

~~Installed with deflectors of sprinklers under concrete tee construction with stems spaced less than 7 ½ ft (2.3 m) on centers, regardless of the depth of the tee, located at or above a horizontal plane 1 in. (25 mm) below the bottom of the stems of the tees and complying with Table 10.2.7.2(a) or Table 10.2.7.2(b)~~

~~A.10.2.6.1.2(5)~~ –

~~For concrete joists spaced less than 3 ft (900 mm) on center, the rules for obstructed construction shown in 10.2.6.1.2 apply. For concrete tee construction with stems spaced less than 7 ft 6 in. (2.3 m) on center, the sprinkler deflector can be located at or above a horizontal plane 1 in. (25 mm) below the bottom of the stems of the tees. This includes sprinklers located between the stems. *[See Figure A.10.2.6.1.2(5) .]*~~

~~Figure A.10.2.6.1.2(5) Typical Concrete Joist Construction.~~

10.2.6.1.2.1 Obstructed Construction for Ceilings with Slopes Not Exceeding 1 in 12.

Where the slope of the ceiling does not exceed 1 in 12, the sprinkler deflector shall be located in accordance with one of the following arrangements:

(1) Sprinklers shall be installed in each individual channel of obstructed construction with the deflectors located a minimum of 1 in. (25 mm) and a maximum of 12 in. (300 mm) below the ceiling/roof deck.

(2) Where the maximum depth of the structural members, including concrete tees, is 18 in. (450 mm), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the structural members.

(3) Where the maximum depth of the structural members, including concrete tees, is greater than 18 in. (450 mm) but does not exceed 24 in. (600 mm), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the structural members only when the channels formed by obstructed construction are firestopped to the full depth of the structural member with material equivalent to the structural member's construction so that individual channel volumes do not exceed 400 ft^3 (11.3 m^3).

(4) Where composite wood joists are firestopped to the full depth of the joists with material equivalent to the web construction so that individual channel volumes do not exceed 400 ft^3 (11.3 m^3), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the joists only when a maximum distance of 22 in. (550 mm) can be maintained between the sprinkler deflector and the ceiling/roof deck.

10.2.6.1.2.2 Obstructed Construction for Ceilings with Slopes Not Exceeding 2 in 12.

Where the slope of the ceiling is greater than 1 in 12 but does not exceed 2 in 12, the sprinkler deflector shall be located in accordance with one of the following arrangements:

(1) Sprinklers shall be installed in each individual channel of obstructed construction with the deflectors located a minimum of 1 in. (25 mm) and a maximum of 12 in. (300 mm) below the ceiling/roof deck.

(2) Where the maximum depth of the structural members, including concrete tees, is 12 in. (300 mm), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the structural members.

(3) Where the maximum depth of the structural members, including concrete tees, is greater than 12 in. (300 mm) but does not exceed 24 in. (600 mm), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the structural members only when the channels formed by obstructed construction are provided with blocking to the full depth of the structural member with material equivalent to or less combustible than the structural member's construction so that individual channel volumes do not exceed 400 ft^3 (11.3 m^3).

(4) Where composite wood joists are provided with blocking to the full depth of the joists with material equivalent to or less combustible than the web construction so that individual channel volumes do not exceed 400 ft^3 (11.3 m^3), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the joists only when a maximum distance of 22 in. (550 mm) can be maintained between the sprinkler deflector and the ceiling/roof deck.

10.2.6.1.2.3 Obstructed Construction for Ceilings with Slopes Not Exceeding 4 in 12.

Where the slope of the ceiling is greater than 2 in 12 but does not exceed 4 in 12, the sprinkler deflector shall be located in accordance with one of the following arrangements:

(1) Sprinklers shall be installed in each individual channel of obstructed construction with the deflectors located a minimum of 1 in. (25 mm) and a maximum of 12 in. (300 mm) below the ceiling/roof deck.

(2) Where the maximum depth of the structural members, including concrete tees, is 12 in. (300 mm) and are installed perpendicular to the ceiling slope, sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the structural members only when the channels formed by obstructed construction are provided with blocking to the full depth of the structural member with material equivalent to or less combustible than the structural member's construction so that individual channel volumes do not exceed 300 ft^3 (8.5 m^3).

10.2.6.1.2.4 Solid Obstructed Construction for Ceiling with Slopes Exceeding 4 in 12.

Where the slope of the ceiling is greater than 4 in 12, sprinklers shall be installed in each individual channel of obstructed construction with the deflectors located a minimum of 1 in. (25 mm) and a maximum of 12 in. (300 mm) below the ceiling/roof deck.

Supplemental Information

File Name	Description	Approved
Chapter_10_10_2_6_1_2.docx	Revised Section 10.2.6.1.2	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Fri Jul 29 10:43:12 EDT 2022

Committee Statement

Committee Statement: Based on recent fire testing on sloped ceilings in obstructed construction performed by the fire protection research foundation, existing criteria has been restructured and new requirements have been added to deal with slopes from 1 in 12 and greater. The report is "Protection of Storage Under Sloped Ceilings Phase III: Large Scale Testing Summary and Guidance" and can be found at www.nfpa.org.

Response Message: FR-1217-NFPA 13-2022

Public Input No. 165-NFPA 13-2022 [Section No. A.10.2.6.1.2(5)]

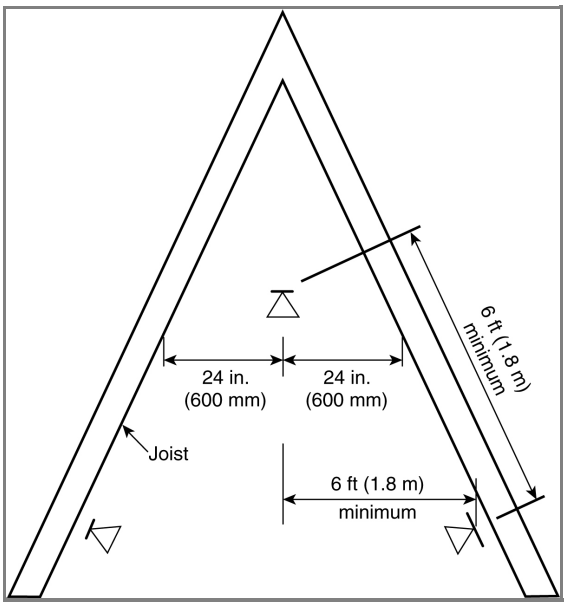
Public Input No. 476-NFPA 13-2022 [Section No. 10.2.6.1.2]

First Revision No. 1039-NFPA 13-2022 [Section No. 10.2.6.1.3.3]

10.2.6.1.3.3*

Under a steeply pitched surface, the distance from the peak to the deflectors shall be permitted to be increased to maintain a horizontal clearance of ~~not less than~~ 24 in. (600 mm) from other structural members as indicated in Figure 10.2.6.1.3.3.

Figure 10.2.6.1.3.3 Horizontal Clearance for Sprinkler at Peak of Pitched Roof.



Supplemental Information

File Name	Description	Approved
Chapter_10_10_2_6_1_3_3_PI_89.docx	For staff use	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 09:33:47 EDT 2022

Committee Statement

Committee Statement: The section as written could lead to excess distance from deflector to peak. This includes removing the “minimum” in the figure.

Response Message: FR-1039-NFPA 13-2022

Public Input No. 89-NFPA 13-2021 [Section No. 10.2.6.1.3.3]

First Revision No. 1040-NFPA 13-2022 [Section No. 10.2.6.2]

10.2.6.2 Deflector Orientation.

10.2.6.2.1

Unless the requirements of 10.2.6.2.2 or 10.2.6.2.3 are met, deflectors of sprinklers shall be aligned parallel to ceilings, roofs, hips, or the incline of stairs.

10.2.6.2.2

Where sprinklers are installed in the peak below a sloped ceiling or roof surface, the sprinkler shall be installed with the deflector ~~horizontal~~ parallel to the floor .

10.2.6.2.3

~~Roofs~~ Where roofs having a pitch not exceeding 2 in 12 (16.7 percent) are considered horizontal in the application of 10.2.6.2, and sprinklers are installed under horizontal ceilings, the sprinklers shall be permitted to be installed with deflectors ~~horizontal~~ parallel to the floor .

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 09:40:52 EDT 2022

Committee Statement

Committee Statement: Committed changed the word “level” to “parallel to the floor” for clearer language for installation.

Response Message: FR-1040-NFPA 13-2022

Public Input No. 182-NFPA 13-2022 [Section No. 10.2.6.2]

First Revision No. 1041-NFPA 13-2022 [New Section after 10.2.7.3.1.2]

10.2.7.3.1.3* Clearance Below Sprinklers in Alcoves and Below Soffits.

In light hazard occupancies, obstructions below pendent sprinklers in alcove ceilings and under soffits shall not be required to maintain an 18 in. (450 mm) clearance to the sprinkler deflector as long as all of the following conditions are met:

(1) The height of the alcove ceiling or bottom of the soffit doesn't exceed 10 ft (3 m) above the finished floor.

(2) The floor area of the alcove or the protection area below the soffit doesn't exceed 50 ft^2 (4.5 m^2).

(3) The top of the obstruction is at least 1 in. (25 mm) below the plane of the sprinkler deflector.

A.10.2.7.3.1.3

It is often difficult to maintain the 18 in. (450 mm) clearance from the bottom of the deflector to items located in alcoves and under soffits (e.g., vending machines, file cabinets, bookcases, workstations). Given the small area in an alcove or under a soffit that has a limited protection area of 50 ft^2 (4.5 m^2) or less, the sprinkler will provide adequate coverage within these small spaces regardless of the lack of clearance as long as the deflector is at least 1 in. (25 mm) above the obstruction.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 10:19:08 EDT 2022

Committee Statement

Committee Statement: There are many situations that keep coming up in the field where a small alcove is used to put vending machines, equipment carts in hospitals, and other movable items. These pieces of equipment sometimes extend to just below the ceiling. Sprinklers in a light hazard occupancy are adequate to protect this type of hazard without requiring an 18 in clearance from the top of a piece of equipment.

Response Message: FR-1041-NFPA 13-2022

Public Input No. 580-NFPA 13-2022 [New Section after 10.2.7.3.1.2]

Public Input No. 581-NFPA 13-2022 [New Section after A.10.2.7.2]

First Revision No. 1042-NFPA 13-2022 [Section No. 10.2.7.4]

10.2.7.4* Obstructions that Prevent Sprinkler Discharge from Reaching Hazard.

Continuous or noncontinuous obstructions that interrupt the water discharge in a horizontal plane more than 18 in. (450 mm) below the sprinkler deflector in a manner to limit the distribution from reaching the protected hazard shall comply with 9.5.5.3 ~~10.2.7.4~~ .

~~**10.2.7.4.1**~~

~~Continuous or noncontinuous obstructions that interrupt the water discharge in a horizontal plane more than 18 in. (450 mm) below the sprinkler deflector in a manner to limit the distribution from reaching the protected hazard shall comply with 10.2.7.4 .~~

~~**10.2.7.4.2***~~

~~Sprinklers shall be installed under fixed obstructions over 4 ft (1.2 m) wide.~~

~~**10.2.7.4.3**~~

~~Sprinklers installed under open gratings shall be of the intermediate level/rack storage type or otherwise shielded from the discharge of overhead sprinklers.~~

~~**10.2.7.4.4**~~

~~The deflector of automatic sprinklers installed under fixed obstructions shall be positioned no more than 12 in. (300 mm) below the bottom of the obstruction.~~

~~**10.2.7.4.5**~~

~~Sprinklers installed under round ducts shall be of the intermediate level/rack storage type or otherwise shielded from the discharge of overhead sprinklers.~~

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 11:28:55 EDT 2022

Committee Statement

Committee Statement: This is redundant text and therefore it has been deleted.

Response Message: FR-1042-NFPA 13-2022

Public Input No. 418-NFPA 13-2022 [Section No. 10.2.7.4]

First Revision No. 1043-NFPA 13-2022 [Section No. 10.3.2.1]

10.3.2.1

For purposes of 10.3.2(1) and 10.3.2(3), corrugated metal deck with channel depths up to ~~3~~ 4 in. (~~75~~ 100 mm) shall be considered as smooth ceilings.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 11:34:34 EDT 2022

Committee Statement

Committee Statement: The change from 3” to 4” correlates with the definition in Chapter 3 for smooth ceiling. Corrected a cross reference.

Response Message: FR-1043-NFPA 13-2022

Public Input No. 403-NFPA 13-2022 [Section No. 10.3.2.1]

Public Input No. 142-NFPA 13-2022 [Section No. 10.3.2.1]

First Revision No. 1221-NFPA 13-2022 [Section No. 10.3.6.1.4]

10.3.6.1.4

Obstructions projecting from the same wall as the one on which the sidewall sprinkler is mounted shall be in accordance with ~~Table 10.3.6.1.4(a) or Table 10.3.6.1.4(b) and Figure 10.3.6.1.4~~ one of the following:

(1) Sprinklers shall be installed in accordance with Table 10.3.6.1.4(a) or Table 10.3.6.1.4(b) and Figure 10.3.6.1.4(a).

(2) Sprinklers shall be permitted to be spaced on opposite sides of obstructions less than 4 ft (1.2 m) in width where the distance from the centerline of the obstruction to the sprinklers does not exceed one-half the allowable distance between sprinklers.

(3) Obstructions located against a wall and that are not over 30 in. (750 mm) in width shall be permitted to be protected in accordance with Figure 10.3.6.1.4(b) .

(4) Obstructions located against a wall and that are not over 24 in. (600 mm) in width shall be permitted to be protected in accordance with Figure 10.3.6.1.4(c) . The maximum distance between the sprinkler and the wall shall be measured from the sprinkler to the wall behind the obstruction and not to the face of the obstruction.

Table 10.3.6.1.4(a) Positioning of Sprinklers to Avoid Obstructions Along Wall (Standard Spray Sidewall Sprinklers)

Distance from Sprinkler to Side of Obstruction *(A)*	Allowable Distance of Deflector Above Bottom of Obstruction *(B)* (in.)
Less than 4 in.	0
4 in. or more	1 or less
6 in. or more	2 or less
1 ft or more	3 or less
1½ ft or more	4½ or less
2 ft or more	5¾ or less
2½ ft or more	7 or less
3 ft or more	8 or less
3½ ft or more	9¼ or less
4 ft or more	10 or less
4½ ft or more	11½ or less
5 ft or more	12¾ or less
5½ ft or more	14 or less
6 ft or more	15 or less
6½ ft or more	16¼ or less
7 ft or more	17½ or less

Note: For *A* and *B*, refer to Figure 10.3.6.1.4(a) .

Table 10.3.6.1.4(b) Positioning of Sprinklers to Avoid Obstructions Along Wall (Standard Spray Sidewall Sprinklers)

Distance from Sprinkler to Side of Obstruction *(A)* (mm)	Allowable Distance of Deflector Above Bottom of Obstruction *(B)* (mm)
Less than 100	0
100 or more	25 or less
150 or more	50 or less
300 or more	75 or less
450 or more	115 or less
600 or more	145 or less
750 or more	175 or less

Distance from Sprinkler to Side of Obstruction *(A)* (mm)	Allowable Distance of Deflector Above Bottom of Obstruction *(B)* (mm)
900 or more	200 or less
1100 or more	230 or less
1200 or more	250 or less
1400 or more	290 or less
1500 or more	320 or less
1700 or more	350 or less
1800 or more	375 or less
2000 or more	410 or less
2200 or more	440 or less

Note: For *A* and *B*, refer to Figure 10.3.6.1.4(a) .

Figure 10.3.6.1.4(a) Positioning of Sprinkler to Avoid Obstruction Along Wall (Standard Sidewall Spray Sprinklers).

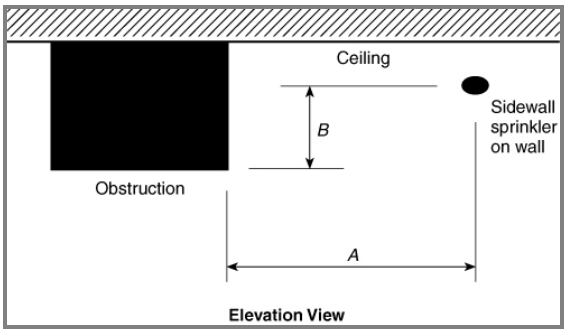


Figure 10.3.6.1.4(b) Obstruction Against Wall (Standard Sidewall Spray Sprinklers).

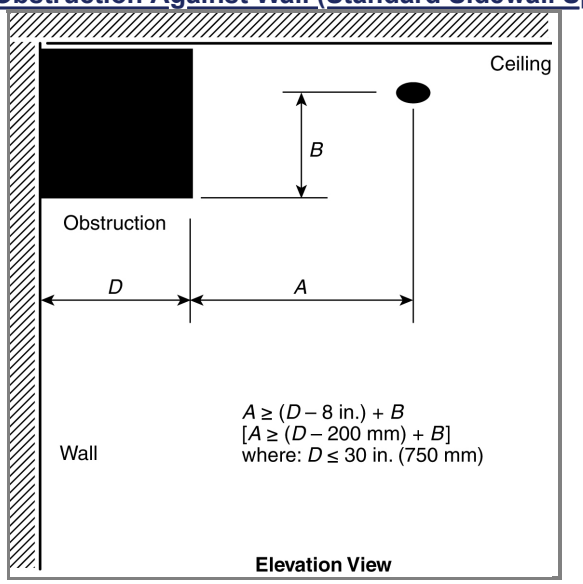
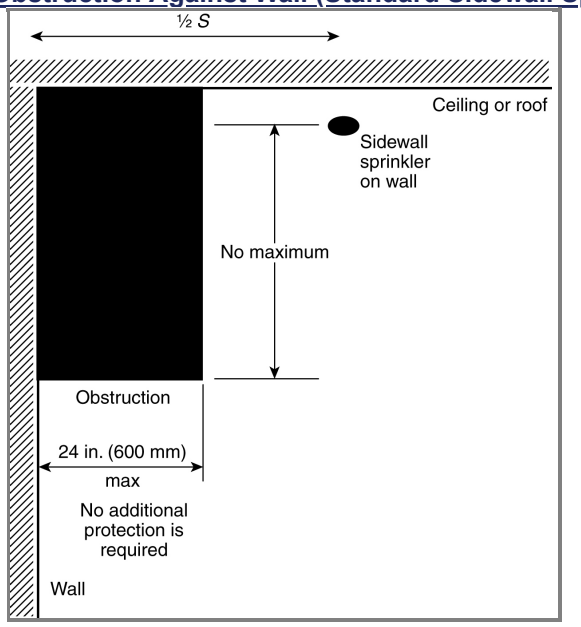


Figure 10.3.6.1.4(c) Obstruction Against Wall (Standard Sidewall Spray Sprinklers).



10.3.6.1.4.1

Isolated obstructions projecting from the same wall as the one on which the sidewall sprinkler is mounted shall be located a minimum of 4 in. (100 mm) from the sidewall sprinkler.

Supplemental Information

File Name	Description	Approved
Chapter_10_10_3_6_1_4_PI_90.docx	For Staff Use	
10_3_6_1_4_figures_b_c.pdf	New Figures (a) and (b)	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Fri Jul 29 11:06:46 EDT 2022

Committee Statement

Committee Statement: The figures are added to clarify the criteria for projections from walls that form obstruction as well as spacing of the sprinklers on each side of obstructions projecting from walls.

Response Message: FR-1221-NFPA 13-2022

Public Input No. 90-NFPA 13-2021 [Section No. 10.3.6.1.4 [Excluding any Sub-Sections]]

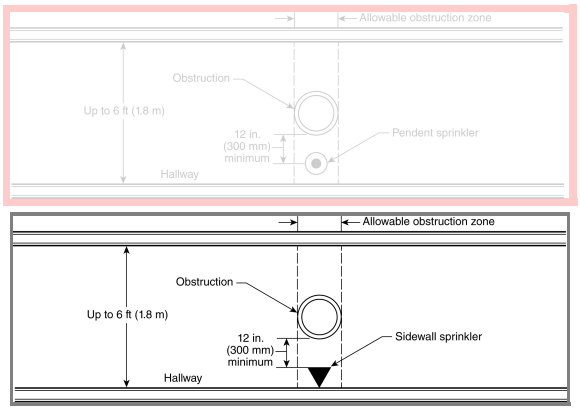
Public Input No. 31-NFPA 13-2021 [New Section after 10.3.6.1.6]

First Revision No. 1045-NFPA 13-2022 [Section No. 10.3.6.1.7]

10.3.6.1.7

Obstructions up to 12 in. (300 mm) in width in hallways up to 6 ft (1.8 m) in width shall be permitted in accordance with Figure 10.3.6.1.7 when the sprinkler is located in the allowable obstruction zone and the closest edge of the obstruction is a minimum of 12 in. (300 mm) away from the deflector.

Figure 10.3.6.1.7 Sprinkler Obstruction in Hallways (Standard Spray Sidewall Sprinklers).



Supplemental Information

File Name	Description	Approved
10.3.6.1.7.PI_214.jpg	For staff use	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 11:57:46 EDT 2022

Committee Statement

Committee Statement: Correct figure 10.3.6.1.7 to show a sidewall sprinkler.

Response Message: FR-1045-NFPA 13-2022

Public Input No. 237-NFPA 13-2022 [Section No. 10.3.6.1.7]

Public Input No. 214-NFPA 13-2022 [Section No. 10.3.6.1.7]

First Revision No. 1224-NFPA 13-2022 [Section No. 10.3.6.3]

10.3.6.3 Obstructions that Prevent Sprinkler Discharge from Reaching Hazard.

~~Continuous~~ Supplemental sprinklers shall be installed below continuous or noncontinuous fixed obstructions over 4 ft (1.2 m) in width that interrupt the water discharge in a horizontal plane more than 18 in. (450 mm) below the ceiling sprinkler deflector ~~in a manner to limit the distribution from reaching the protected hazard shall comply with this section~~ . *(See A.9.5.5.3.1 .)*

~~**A.10.3.6.3**~~

~~See A.9.5.5.3.1 .~~

~~**10.3.6.3.2***~~

~~Sprinklers shall be installed under fixed obstructions over 4 ft (1.2 m) wide.~~

~~**A.10.3.6.3.2**~~

~~When obstructions are located more than 18 in. (450 mm) below the sprinkler deflector, an adequate spray pattern develops and obstructions up to and including 4 ft (1200 mm) wide do not require additional protection underneath. Examples are ducts, stairs, landings, and other similar obstructions.~~

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Fri Jul 29 11:25:43 EDT 2022

Committee Statement

Committee Statement: The text being deleted is redundant in the standard. This is already stated in section 9.5.5.3.

Response Message: FR-1224-NFPA 13-2022

Public Input No. 419-NFPA 13-2022 [Section No. 10.3.6.3]

First Revision No. 1151-NFPA 13-2022 [Section No. 11.2.1]

11.2.1 Extended Coverage Sprinklers.

Extended coverage sprinklers shall only be installed as follows:

(1) In unobstructed construction consisting of flat, smooth ceilings with a slope not exceeding a pitch of 1 in 6 (a rise of 2 units in a run of 12 units, a roof slope of 16.7 percent)

(2) In unobstructed or noncombustible obstructed construction, where specifically listed for such use

(3) Within trusses or bar joists having web members not greater than 1 in. (25 mm) maximum dimension or where trusses are spaced greater than 7½ ft (2.3 m) on center and where the ceiling slope does not exceed a pitch of 1 in 6 (a rise of 2 units in a run of 12 units, a roof slope of 16.7 percent)

(4) Extended coverage upright and pendent sprinklers installed under smooth, flat ceilings that have slopes not exceeding a pitch of 1 in 3 (a rise of 4 units in a run of 12 units, a roof slope of 33.3 percent), where specifically listed for such use

(5) Extended coverage sidewall sprinklers installed in accordance with 11.3.5.2.1 in slopes exceeding a ceiling pitch of 2 in 12

(6) ~~In each bay of obstructed construction consisting of solid structural members that extend below the deflector of the sprinkler~~ Extended coverage upright and pendent sprinklers installed in obstructed construction, in accordance with 11.2.4.1

(7) Extended coverage sprinklers installed to protect areas below a single overhead door(s)

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 18:56:10 EDT 2022

Committee Statement

Committee Statement: This revision aligns with the revised obstructed construction requirements.

Response Message: FR-1151-NFPA 13-2022

First Revision No. 1046-NFPA 13-2022 [New Section after 11.2.3.4.2]

11.2.3.4.3

Where sprinklers are installed in every channel formed by solid obstructed construction with the deflectors above the bottom of the structural members, the structural members shall be considered baffles in accordance with 11.2.3.4.2 .

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 13:24:00 EDT 2022

Committee Statement

Committee Statement: Solid structural members create a barrier between other sprinklers and work the same as baffles

Response Message: FR-1046-NFPA 13-2022

Public Input No. 477-NFPA 13-2022 [New Section after 11.2.3.4.2]

First Revision No. 1225-NFPA 13-2022 [Section No. 11.2.4.1.2]

11.2.4.1.2 Obstructed Construction.

~~Under obstructed construction, the sprinkler deflector shall be located in accordance with one of the following arrangements:~~

~~Installed with the deflectors within the horizontal planes of 1 in. to 6 in. (25 mm to 150 mm) below noncombustible structural members and a maximum distance of 22 in. (550 mm) below the ceiling/roof deck~~

~~Installed with the deflectors at or above the bottom of noncombustible structural member to a maximum of 22 in. (550 mm) below the noncombustible ceiling/roof deck where the sprinkler is installed in conformance with 11.2.5.1.2~~

~~Installed in each bay of combustible or noncombustible obstructed construction, with the deflectors located a minimum of 1 in. (25 mm) and a maximum of 12 in. (300 mm) below the ceiling~~

~~Installed in accordance with their listing where sprinklers are listed for use under other ceiling construction features or for different distances~~

11.2.4.1.2.1 Obstructed Construction for Ceilings with Slopes Not Exceeding 1 in 12.

~~Under obstructed construction~~ Where the slope of the ceiling does not exceed 1 in 12 under obstructed construction , the sprinkler deflector shall be located in accordance with one of the following arrangements:

(1) ~~Installed with the deflectors within the horizontal planes of 1 in. to 6 in. (25 mm to 150 mm) below noncombustible structural members and a maximum distance of 22 in. (550 mm) below the ceiling/roof deck~~ Sprinklers shall be installed in each individual channel of obstructed construction with the deflectors located a minimum of 1 in. (25 mm) and a maximum of 12 in. (300 mm) below the ceiling/roof deck.

(2) ~~Installed with the deflectors at or above the bottom of noncombustible structural member to a maximum of 22 in. (550 mm) below the noncombustible ceiling/roof deck where the sprinkler is installed in conformance with 11.2.5.1.2~~ Where the maximum depth of the noncombustible structural members is 18 in. (450 mm), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the noncombustible structural members.

(3) ~~Installed in each bay of combustible or noncombustible obstructed construction, with the deflectors located a minimum of 1 in. (25 mm) and a maximum of 12 in. (300 mm) below the ceiling~~ Where the maximum depth of the noncombustible structural members is greater than 18 in. (450 mm) but does not exceed 24 in. (600 mm), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the noncombustible structural members only when the channels formed by obstructed construction are firestopped to the full depth of the structural member with material equivalent to the structural member's construction so that individual channel volumes do not exceed 400 ft^3 (11.3 m^3).

(4) ~~Installed~~ Sprinkler deflectors shall be installed in accordance with their listing where sprinklers are listed for use under other ceiling construction features or for different distances

11.2.4.1.2.2 Obstructed Construction for Ceilings with Slopes Not Exceeding 2 in 12 with Solid Structural Members.

Where the slope of the ceiling is greater than 1 in 12 but does not exceed 2 in 12 under solid obstructed construction, the sprinkler deflector shall be located in accordance with one of the following arrangements:

(1) Sprinklers shall be installed in each individual channel of solid obstructed construction with the deflectors located a minimum of 1 in. (25 mm) and a maximum of 12 in. (300 mm) below the ceiling/roof deck.

(2) Where the maximum depth of the noncombustible solid structural members is 12 in. (300 mm), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the noncombustible structural members.

(3) Where the maximum depth of the noncombustible solid structural members is greater than 12 in. (300 mm) but does not exceed 24 in. (600 mm), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the noncombustible structural members only when the channels formed by obstructed construction are firestopped to the full depth of the structural member with material equivalent to the structural member's construction so that individual channel volumes do not exceed 400 ft^3 (11.3 m^3).

(4) Sprinkler deflectors shall be installed in accordance with their listing where sprinklers are listed for use under other ceiling construction features or for different distances.

11.2.4.1.2.3 Obstructed Construction for Ceilings with Slopes Not Exceeding 4 in 12 with Solid Structural Members.

Where the slope of the ceiling is greater than 2 in 12 but does not exceed 4 in 12 under solid obstructed construction, the sprinkler deflector shall be located in accordance with one of the following arrangements:

(1) Sprinklers shall be installed in each individual channel of solid obstructed construction with the deflectors located a minimum of 1 in. (25 mm) and a maximum of 12 in. (300 mm) below the ceiling/roof deck.

(2) Where the maximum depth of the noncombustible solid structural members is 12 in. (300 mm) and are installed perpendicular to the ceiling slope, sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the noncombustible structural members only when the channels formed by obstructed construction are firestopped to the full depth of the structural member with material equivalent to the structural member's construction so that individual channel volumes do not exceed 300 ft^3 (8.5 m^3).

(3) Sprinkler deflectors shall be installed in accordance with their listing where sprinklers are listed for use under other ceiling construction features or for different distances.

11.2.4.1.2.4 Obstructed Construction for Ceiling Slopes Exceeding 4 in 12 with Solid Structural Members.

Where the slope of the ceiling is greater than 4 in 12 under solid obstructed construction, sprinklers shall be installed in each individual channel of obstructed construction with the deflectors located a minimum of 1 in. (25 mm) and a maximum of 12 in. (300 mm) below the ceiling/roof deck.

11.2.4.1.2.5 Obstructed Construction with Nonsolid Structural Members.

Where the slope of the ceiling is greater than 1 in 12 under nonsolid obstructed construction, sprinklers shall be installed in accordance with the rules for unobstructed construction with the sprinkler deflector above the bottom of the structural member.

Supplemental Information

File Name	Description	Approved
CHFE2B_1.DOC	Revised Section 11.2.4.1.2	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Fri Jul 29 11:37:20 EDT 2022

Committee Statement

Committee Statement: Based on recent fire testing on sloped ceilings in obstructed construction performed by the fire protection research foundation, sprinkler deflector orientation has been clarified. The report is “Protection of Storage Under Sloped Ceilings Phase III: Large Scale Testing Summary and Guidance” and can be found at www.nfpa.org.

Response Message: FR-1225-NFPA 13-2022

Public Input No. 482-NFPA 13-2022 [Section No. 11.2.4.1.2]

First Revision No. 1047-NFPA 13-2022 [Section No. 11.2.4.2.1]

11.2.4.2.1

Roofs and ceilings having a pitch not exceeding 2 in 12 (16.7 percent) are considered horizontal in the application of 11.2.4.2, and sprinklers installed under horizontal ceilings shall be permitted to be installed with deflectors ~~horizontal~~ parallel to the floor .

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 13:26:45 EDT 2022

Committee Statement

Committee Statement: Committed changed the word “level” to “parallel to the floor” for clearer language for installation. The reference to the slope was left in due to changes in how slope ceilings are defined and ensure correlation with other sections. Changed the word “in” to “under” horizontal ceilings as the sprinkler is installed under and not in the ceiling.

Response Message: FR-1047-NFPA 13-2022

Public Input No. 184-NFPA 13-2022 [Section No. 11.2.4.2.1]

First Revision No. 1316-NFPA 13-2022 [Section No. 11.2.5.3]

11.2.5.3 Obstructions that Prevent Sprinkler Discharge from Reaching Hazard.

Continuous or noncontinuous obstructions that interrupt the water discharge in a horizontal plane more than 18 in. (450 mm) below the sprinkler deflector in a manner to limit the distribution from reaching the protected hazard shall comply with ~~11.2.5.3~~ 9.5.3.3 . *(See A.9.5.5.3.1 .)*

~~**A.11.2.5.3**~~

~~See A.9.5.5.3.1 .~~

~~**11.2.5.3.1**~~

~~Continuous or noncontinuous obstructions that interrupt the water discharge in a horizontal plane more than 18 in. (450 mm) below the sprinkler deflector in a manner to limit the distribution from reaching the protected hazard shall comply with 11.2.5.3 .~~

~~**11.2.5.3.2***~~

~~Sprinklers shall be installed under fixed obstructions over 4 ft (1.2 m) wide.~~

~~**A.11.2.5.3.2**~~

~~When obstructions are located more than 18 in. (450 mm) below the sprinkler deflector, an adequate spray pattern develops and obstructions up to and including 4 ft (1200 mm) wide do not require additional protection underneath. Examples are ducts, stairs, landings, and other similar obstructions.~~

~~**11.2.5.3.3**~~

~~Sprinklers shall not be required under obstructions that are not fixed in place such as conference tables.~~

~~**11.2.5.3.4**~~

~~Sprinklers installed under open gratings shall be of the intermediate level/rack storage type or otherwise shielded from the discharge of overhead sprinklers.~~

~~**11.2.5.3.5**~~

~~Sprinklers installed under round ducts shall be of the intermediate level/rack storage type or otherwise shielded from the discharge of overhead sprinklers.~~

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Thu Aug 18 12:26:57 EDT 2022

Committee Statement

Committee Statement: The text being deleted is redundant in the standard. It is already stated in section 9.5.5.3.

Response Message: FR-1316-NFPA 13-2022

Public Input No. 420-NFPA 13-2022 [Section No. 11.2.5.3]

First Revision No. 1049-NFPA 13-2022 [Section No. 11.3.2]

11.3.2

Extended coverage sidewall spray sprinklers shall only be installed as follows:

(1) Light hazard occupancies with smooth, horizontal or sloped, flat ceilings

(2) Ordinary hazard occupancies with smooth, flat ceilings where specifically listed for such use

(3) In unobstructed construction consisting of flat, smooth ceilings with a slope not exceeding a pitch of 1 in 6 (a rise of 2 units in a run of 12 units, a roof slope of 16.7 percent)

(4) In unobstructed or noncombustible obstructed construction, where specifically listed for such use

(5) Within trusses or bar joists having web members not greater than 1 in. (25 mm) maximum dimension or where trusses are spaced greater than 7½ ft (2.3 m) on center and where the ceiling slope does not exceed a pitch of 1 in 6 (a rise of 2 units in a run of 12 units, a roof slope of 16.7 percent)

(6) Extended coverage sidewall sprinklers installed in accordance with 11.3.6.2.2 in slopes exceeding a ceiling pitch of 2 in 12

(7) In each bay of obstructed construction consisting of solid structural members that extend below the deflector of the sprinkler

(8) Extended coverage sprinklers installed to protect areas below a single overhead door(s)

(9) For the protection of exterior projections and similar structures

(10) Under cars in car stackers and car lift systems with cars stacked vertically placed under each level of cars *[see A.10.3.2(9)]*

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 13:41:30 EDT 2022

Committee Statement

Committee Statement: The allowance for sidewall sprinklers to be used under car stackers was added to standard spray sidewall sprinklers but was not included for extended coverage. There is no reason an extended spray sidewall would not be the same. Annex was added to match the annex in Section 10.3.2(9).

Response Message: FR-1049-NFPA 13-2022

Public Input No. 211-NFPA 13-2022 [Section No. 11.3.2]

First Revision No. 1230-NFPA 13-2022 [Section No. 11.3.6.1.4]

11.3.6.1.4

Continuous obstructions projecting from the same wall as the one on which the sidewall sprinkler is mounted shall be in accordance with one of the following arrangements:

(1) Sprinklers shall be installed in accordance with Table 11.3.6.1.4(a) or Table 11.3.6.1.4(b) and Figure 11.3.6.1.4(a).

(2) Sprinklers shall be permitted to be spaced on opposite sides of obstructions less than 4 ft (1.2 m) in width where the distance from the centerline of the obstruction to the sprinklers does not exceed one-half the allowable distance between sprinklers.

(3) Obstructions located against the wall and that are not over 30 in. (750 mm) in width shall be permitted to be protected in accordance with Figure 11.3.6.1.4(b).

(4) Obstructions located against the wall and that are not over 24 in. (600 mm) in width shall be permitted to be protected in accordance with Figure 11.3.6.1.4(c). The maximum distance between the sprinkler and the wall shall be measured from the sprinkler to the wall behind the obstruction and not to the face of the obstruction.

(5) Obstructions with a maximum width of 12 in. (300 mm) in hallways up to 6 ft (1.8 m) in width shall be permitted in accordance with Figure 11.3.6.1.4(d) when the sprinkler is located in the allowable obstruction zone and the closest edge of the obstruction is a minimum of 12 in. (300 mm) away from the deflector.

Table 11.3.6.1.4(a) Positioning of Sprinklers to Avoid Obstructions Along Wall (Extended Coverage Sidewall)

Distance from Sprinkler to Side of Obstruction *(A)* (ft)	Allowable Distance of Deflector Above Bottom of Obstruction *(B)* (in.)
Less than 1½	0
1½ or more	1 or less
3 ft or more	3 or less
4 ft or more	5 or less
4½ or more	7 or less
6 ft or more	9 or less
6½ or more	11 or less
7 or more	14 or less

Note: For *A* and *B*, refer to Figure 11.3.6.1.4(a).

Table 11.3.6.1.4(b) Positioning of Sprinklers to Avoid Obstructions Along Wall (Extended Coverage Sidewall)

Distance from Sprinkler to Side of Obstruction *(A)* (mm)	Allowable Distance of Deflector Above Bottom of Obstruction *(B)* (mm)
Less than 450	0
450 or more	25 or less
900 or more	75 or less
1200 or more	125 or less
1400 or more	175 or less
1800 or more	225 or less
2000 or more	275 or less
2100 or more	350 or less

Note: For *A* and *B*, refer to Figure 11.3.6.1.4(a).

Figure 11.3.6.1.4(a) Positioning of Sprinkler to Avoid Obstruction Along Wall (Extended Coverage Sidewall Spray Sprinklers).

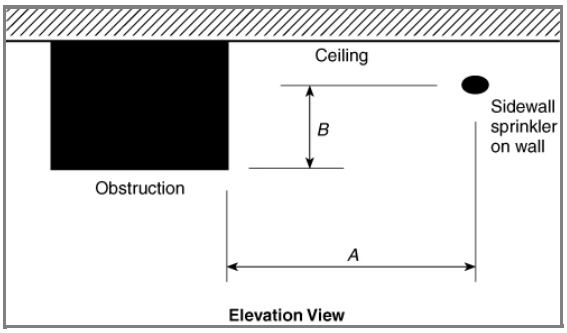


Figure 11.3.6.1.4(b) Obstruction Against Wall (Extended Coverage Sidewall Spray Sprinklers).

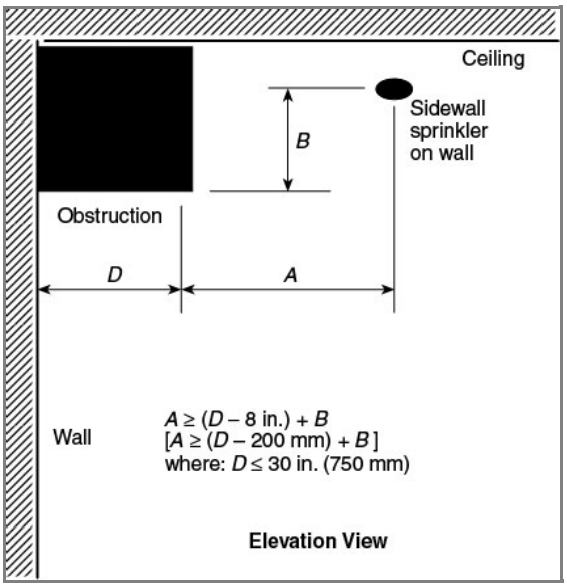


Figure 11.3.6.1.4(c) Obstruction Against Wall (Extended Coverage Sidewall Spray Sprinklers).

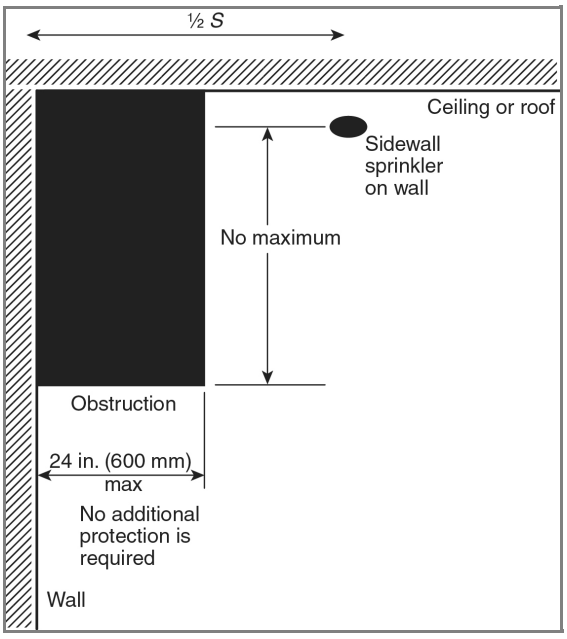
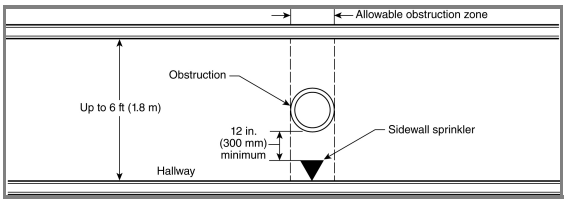


Figure 11.3.6.1.4(d) Obstruction in Hallway (Extended Coverage Sidewall Spray Sprinklers).



Supplemental Information

File Name	Description	Approved
Chapter_11_11_3_6_1_4_PI_239.docx	For staff use	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Fri Jul 29 11:59:41 EDT 2022

Committee Statement

Committee Statement: Figure 11.3.6.1.4(d) currently shows a pendent sprinkler which should be a sidewall sprinkler. This corrects the figure by removing the pendent and adding a sidewall.

Response Message: FR-1230-NFPA 13-2022

Public Input No. 239-NFPA 13-2022 [Section No. 11.3.6.1.4]

First Revision No. 1234-NFPA 13-2022 [Section No. 11.3.6.3]

11.3.6.3* Obstructions that Prevent Sprinkler Discharge from Reaching Hazard.

Continuous or noncontinuous obstructions that interrupt the water discharge in a horizontal plane more than 18 in. (450 mm) below the sprinkler deflector in a manner to limit the distribution from reaching the protected hazard shall comply with ~~this section~~ 9.5.5.3 .

~~**11.3.6.3.1**~~

~~Continuous or noncontinuous obstructions that interrupt the water discharge in a horizontal plane more than 18 in. (450 mm) below the sprinkler deflector in a manner to limit the distribution from reaching the protected hazard shall comply with this section.~~

~~**11.3.6.3.2***~~

~~Sprinklers shall be installed under fixed obstructions over 4 ft (1.2 m) wide.~~

~~**A.11.3.6.3.2**~~

~~When obstructions are located more than 18 in. (450 mm) below the sprinkler deflector, an adequate spray pattern develops and obstructions up to and including 4 ft (1200 mm) wide do not require additional protection underneath. Examples are ducts, stairs, landings, and other similar obstructions.~~

~~**11.3.6.3.3**~~

~~Sprinklers shall not be required under obstructions that are not fixed in place, such as conference tables.~~

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Fri Jul 29 12:10:05 EDT 2022

Committee Statement

Committee Statement: The text being deleted in redundant in the standard. This is already stated in section 9.5.5.3.

Response Message: FR-1234-NFPA 13-2022

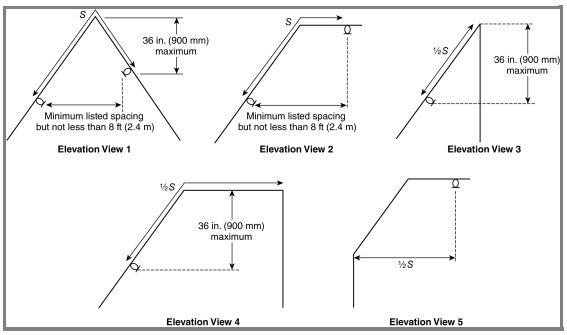
Public Input No. 421-NFPA 13-2022 [Section No. 11.3.6.3]

First Revision No. 1236-NFPA 13-2022 [Sections 12.1.7.5, 12.1.7.6]

12.1.7.5

The maximum distance shall be measured along the slope of the ceiling as shown in ~~Figure 12.1.7.5(a) and Figure 12.1.7.5(b)~~ Figure 12.1.7.5 , and the maximum vertical distance from the peak shall be no more than 3 ft (900 mm).

Figure 12.1.7.5 Sprinkler Spacing with Sloped Ceilings.



~~**Figure 12.1.7.5(a) Maximum Distance Between Sprinklers with Sloped Ceilings — Arrangement A.**~~

~~**Figure 12.1.7.5(b) Maximum Distance Between Sprinklers with Sloped Ceilings — Arrangement B.**~~

12.1.7.6

Where sprinklers are installed along sloped ceilings, a sprinkler shall be installed within 3 ft (900 mm) of the peak and the sprinklers shall maintain the minimum listed spacing, but no less than 8 ft (2.4 m), measured in the plan view from one sprinkler to another as shown in Figure 12.1.7.5 unless separated by baffles that comply with the following:

(1) Baffles shall be arranged to protect the actuating elements.

(2) Baffles shall be of solid and rigid material that will stay in place before and during sprinkler operation.

(3) Baffles shall be not less than 8 in. (200 mm) long and 6 in. (150 mm) high.

(4) The tops of baffles shall extend between 2 in. (50 mm) and 3 in. (75 mm) above the deflectors of upright sprinklers.

(5) The bottoms of baffles shall extend downward to a level at least even with the deflectors of pendent sprinklers.

~~**Figure 12.1.7.6 Sprinkler Spacing with Sloped Ceilings.**~~

Supplemental Information

File Name	Description	Approved
Fig_12.1.7.5.docx	For staff use	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Fri Jul 29 13:21:32 EDT 2022

Committee Statement

Committee Statement: Move figure 12.1.7.6 to 12.1.7.5 and replace the current figures 12.1.7.5(a) and 12.1.7.5(b). The figures shown in existing section 12.1.7.6 more accurately depict sprinklers near the peak.

Response Message: FR-1236-NFPA 13-2022

Public Input No. 302-NFPA 13-2022 [Section No. 12.1.7.5]

Public Input No. 301-NFPA 13-2022 [Section No. 12.1.7.6]

First Revision No. 1053-NFPA 13-2022 [Section No. 12.1.8.1.2]

12.1.8.1.2

Pendent-type residential sprinklers located under or adjacent to beams shall be installed in accordance with one of the following:

(1) Pendent, recessed pendent, concealed, and flush-type pendent sprinklers shall be permitted to be installed directly under a beam having a maximum depth of 14 in. (350 mm) with the sprinkler deflector 1 in. to 2 in. (25 mm to 50 mm) below the beam, or in accordance with the manufacturer's instructions for recessed or flush sprinklers if the deflector is less than 1 in. (25 mm) below the beam, as shown in Figure 12.1.8.1.2(a).

(2) Pendent sprinklers shall be permitted to be installed adjacent to beams where the vertical centerline of the sprinkler is no greater than 2 in. (50 mm) from the edge of the beam and with the sprinkler deflector 1 in. to 2 in. (25 mm to 50 mm) below the beam, or in accordance with the manufacturer's instructions for flush sprinklers if the deflector is less than 1 in. (25 mm) below the beam, as shown in Figure 12.1.8.1.2(b).

Figure 12.1.8.1.2(a) Position of Sprinkler Under Beam.

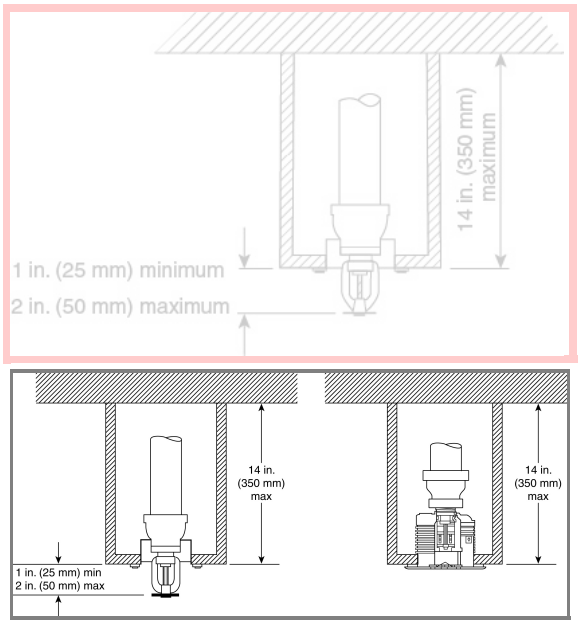
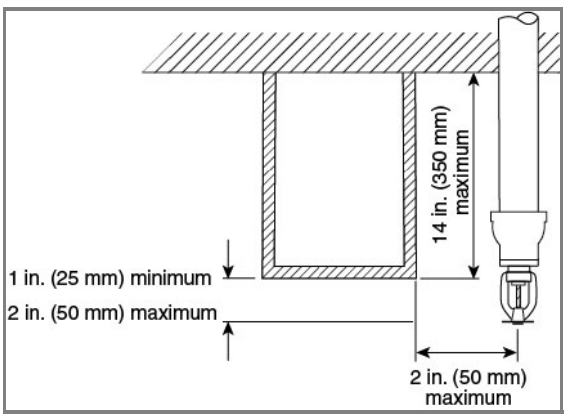


Figure 12.1.8.1.2(b) Position of Sprinkler Adjacent to Beam.



Supplemental Information

File Name	Description	Approved
Fig_12.1.8.1.2_a_.docx	For staff use	

Submitter Information Verification

Committee: AUT-SSI
Submittal Date: Tue Jul 26 14:35:18 EDT 2022

Committee Statement

Committee Statement: Adds constancy between the figures used in 13, 13D, 13R.
Response Message: FR-1053-NFPA 13-2022

Public Input No. 303-NFPA 13-2022 [Section No. 12.1.8.1.2]

First Revision No. 1054-NFPA 13-2022 [New Section after 12.1.8.7]

12.1.8.8 Deflector Orientation (Residential Sidewall Sprinklers).

Residential sidewall sprinklers, where installed under a sloped ceiling with a slope exceeding 2 in 12, shall be located in accordance with one of the following:

(1) At the high point of the slope and positioned to discharge downward along the slope

(2) Along slopes not exceeding 8 in 12 with the deflector installed parallel to the slope and positioned to discharge across the slope

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 14:37:54 EDT 2022

Committee Statement

Committee Statement: Follows the manufacture requirements for slope ceilings. This also correlates with what was accepted for NFPA 13R in the first draft meeting.

Response Message: FR-1054-NFPA 13-2022

Public Input No. 315-NFPA 13-2022 [New Section after 12.1.8.7]

First Revision No. 1055-NFPA 13-2022 [Section No. 12.1.8.7]

Global FR-1051

12.1.8.7 Deflector Orientation (Residential Upright and Pendent ~~Spray~~).

12.1.8.7.1

Unless the requirements of 12.1.8.7.2 or 12.1.8.7.3 are met, deflectors of upright and pendent sprinklers shall be aligned parallel to ceilings, roofs, or the incline of stairs.

12.1.8.7.2

Where upright or pendent sprinklers are installed at the peak below a sloped ceiling or roof surface, the sprinkler shall be installed with the deflector ~~horizontal~~ parallel to floor.

12.1.8.7.3

Roofs and ceilings having a pitch not exceeding 2 in 12 (16.7 percent) are considered horizontal in the application of 12.1.8.7, and upright and pendent sprinklers installed under horizontal ceilings shall be permitted to be installed with deflectors ~~horizontal~~ parallel to floor.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 14:38:54 EDT 2022

Committee Statement

Committee Statement: The word “level” was changed to “parallel to the floor” for clearer language for installation. The reference to the slope was left in due to changes in how slope ceilings are defined and ensure correlation with other sections. “Under” was added in front of horizontal instead of “in” as the sprinklers are not “in” the ceiling they are under it.

Response Message: FR-1055-NFPA 13-2022

Public Input No. 188-NFPA 13-2022 [Section No. 12.1.8.7]

First Revision No. 1056-NFPA 13-2022 [Section No. 12.1.10.3]

12.1.10.3* Obstructions that Prevent Sprinkler Discharge from Reaching Hazard.

Continuous or noncontinuous obstructions that interrupt the water discharge in a horizontal plane more than 18 in. (450 mm) below the sprinkler deflector in a manner to limit the distribution from reaching the protected hazard shall comply with 9.5.5.3 ~~12.1.10.3~~ .

~~**12.1.10.3.1**~~

~~Continuous or noncontinuous obstructions that interrupt the water discharge in a horizontal plane more than 18 in. (450 mm) below the sprinkler deflector in a manner to limit the distribution from reaching the protected hazard shall comply with 12.1.10.3 .~~

~~**12.1.10.3.2**~~

~~Sprinklers shall be installed under fixed obstructions over 4 ft (1.2 m) wide.~~

~~**12.1.10.3.3**~~

~~Sprinklers installed under open gratings shall be shielded from the discharge of overhead sprinklers.~~

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 15:05:43 EDT 2022

Committee Statement

Committee Statement: The text being deleted is redundant in the standard. This is already stated in section 9.5.5.3.

Response Message: FR-1056-NFPA 13-2022

Public Input No. 422-NFPA 13-2022 [Section No. 12.1.10.3]

First Revision No. 1245-NFPA 13-2022 [Section No. 12.1.11.1.5]

12.1.11.1.5* Soffits and Wall Cabinets.

Where soffits are used for the installation of sidewall sprinklers, the sprinklers and soffits shall be installed in accordance with 12.1.11.1.5.1, 12.1.11.1.5.2, or 12.1.11.1.5.3.

12.1.11.1.5.1

Where soffits exceed more than 8 in. (200 mm) in width or projection from the wall, pendent sprinklers shall be installed under the soffit.

12.1.11.1.5.2

Sidewall sprinklers shall be permitted to be installed in the face of a soffit located directly over cabinets, without requiring additional sprinklers below the soffit or cabinets, where the soffit does not project horizontally more than 12 in. (300 mm) from the wall.

12.1.11.1.5.3

Where sidewall sprinklers are more than 3 ft (900 mm) above the top of cabinets, the sprinkler shall be permitted to be installed on the wall above the cabinets where the cabinets are no greater than 12 in. (300 mm) from the wall.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Fri Jul 29 13:54:49 EDT 2022

Committee Statement

Committee Statement: This section applies when cabinets are located on the wall near the ceiling. This does not apply to base cabinets.

Response Message: FR-1245-NFPA 13-2022

First Revision No. 1058-NFPA 13-2022 [New Section after 12.1.11.2.2]

12.1.11.2.3 Shadow Areas.

Shadow areas created by walls and partitions shall be permitted in the protection area of a sprinkler as long as the cumulative areas do not exceed 15 ft^2 (1.4 m^2) per sprinkler. *[See A.9.1.1(3), Figure A.9.1.1(3)(a), and Figure A.9.1.1(3)(b).]*

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 15:12:57 EDT 2022

Committee Statement

Committee Statement: The current shadow area is only for pendent and upright sprinklers and this text addresses shadow areas for sidewall sprinklers.

Response Message: FR-1058-NFPA 13-2022

Public Input No. 383-NFPA 13-2022 [New Section after A.12.1.11.2.2]

Public Input No. 382-NFPA 13-2022 [New Section after 12.1.11.2.2]

Public Input No. 270-NFPA 13-2022 [New Section after 12.1.11.2.2]

Public Input No. 33-NFPA 13-2021 [New Section after 12.1.11.2.2]

Public Input No. 271-NFPA 13-2022 [New Section after A.12.1.11.2.2]

First Revision No. 1317-NFPA 13-2022 [Section No. 12.1.11.3]

12.1.11.3 Obstructions that Prevent Sprinkler Discharge from Reaching Hazard.

Continuous or noncontinuous obstructions that interrupt the water discharge in a horizontal plane more than 18 in. (450 mm) below the sprinkler deflector in a manner to limit the distribution from reaching the protected hazard shall comply with ~~this section~~ 9.5.5.3 .*(See A.9.5.5.3.1 .)*

~~**A.12.1.11.3**~~

~~See A.9.5.5.3.1 .~~

~~**12.1.11.3.1**~~

~~Continuous or noncontinuous obstructions that interrupt the water discharge in a horizontal plane more than 18 in. (450 mm) below the sprinkler deflector in a manner to limit the distribution from reaching the protected hazard shall comply with this section.~~

~~**12.1.11.3.2***~~

~~Sprinklers shall be installed under fixed obstructions over 4 ft (1.2 m) wide.~~

~~**A.12.1.11.3.2**~~

~~When obstructions are located more than 18 in. (450 mm) below the sprinkler deflector, an adequate spray pattern develops and obstructions up to and including 4 ft (1.2 m) wide do not require additional protection underneath. Examples are ducts, stairs, landings, and other similar obstructions.~~

~~**12.1.11.3.3**~~

~~Sprinklers installed under open gratings shall be shielded from the discharge of overhead sprinklers.~~

~~**12.1.11.3.4**~~

~~The deflector of automatic sprinklers installed under fixed obstructions shall be positioned below the bottom of the obstruction in accordance with their listed distance below ceilings.~~

~~**12.1.11.3.5**~~

~~Sprinklers installed under round ducts shall be shielded from the discharge of overhead sprinklers.~~

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Fri Aug 19 10:07:00 EDT 2022

Committee Statement

Committee Statement: The text being deleted is redundant in the standard. This is already stated in section 9.5.5.3.

Response Message: FR-1317-NFPA 13-2022

Public Input No. 423-NFPA 13-2022 [Section No. 12.1.11.3]

First Revision No. 1149-NFPA 13-2022 [New Section after 13.2.1.1]

13.2.1.2

CMSA sprinklers shall be installed only in buildings where the roof or ceiling slope does not exceed 4 in 12.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 18:46:35 EDT 2022

Committee Statement

Committee Statement: Computer simulations and full-scale fire tests as documented in the report entitled Protection of Storage Under Sloped Ceilings Phase III: Large-Scale Testing Summary and Guidance, written based on a project supported by the Fire Protection Research Foundation, have demonstrated that fire control can be achieved with sprinklers protecting storage under ceilings up to and including a slope of 4 in 12

Response Message: FR-1149-NFPA 13-2022

Public Input No. 483-NFPA 13-2022 [New Section after 13.2.1.1]

First Revision No. 1063-NFPA 13-2022 [New Section after 13.2.6.4.1]

13.2.6.4.2

Where sprinklers are installed in every channel formed by solid obstructed construction with the deflectors above the bottom of the structural members, the structural members shall be considered baffles in accordance with 13.2.6.4.1 .

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 16:02:51 EDT 2022

Committee Statement

Committee Statement: Solid structural members create a barrier between other sprinklers and work the same as baffles.

Response Message: FR-1063-NFPA 13-2022

Public Input No. 484-NFPA 13-2022 [New Section after 13.2.6.4.1]

First Revision No. 1265-NFPA 13-2022 [Section No. 13.2.7.1.2]

13.2.7.1.2 Obstructed Construction.

~~Under obstructed construction, the sprinkler deflector shall be located in accordance with one of the following arrangements:~~

~~Installed with the deflectors located a minimum of 6 in. (150 mm) and a maximum of 12 in. (300 mm) from the ceiling.~~

~~Installed with the deflectors within the horizontal planes 1 in. to 6 in. (25 mm to 150 mm) below wood joist, composite wood joist, solid obstructed noncombustible, or solid obstructed limited combustible construction, to a maximum distance of 22 in. (550 mm) below the ceiling/roof or deck. Where CMSA sprinklers are installed under open wood joist construction, their minimum operating pressure shall be 50 psi (3.4 bar) for a K-11.2 (160) sprinkler or 22 psi (1.5 bar) for a K-16.8 (240) sprinkler in accordance with 22.1.5.1 .~~

~~Installed with deflectors of sprinklers under concrete tee construction with stems spaced less than 7 ft 6 in. (2.3 m) but more than 3 ft (900 mm) on centers, regardless of the depth of the tee, located at or above a horizontal plane 1 in. (25 mm) below the bottom of the stems of the tees and in compliance with Table 13.2.8.1.2(a) or Table 13.2.8.1.2(b) .~~

13.2.7.1.2.1 Obstructed Construction for Ceilings with Slopes Not Exceeding 1 in 12.

Where the slope of the ceiling does not exceed 1 in 12, the sprinkler deflector shall be located in accordance with one of the following arrangements:

(1) Sprinklers shall be installed in each individual channel of obstructed construction with the deflectors located a minimum of 6 in. (150 mm) and a maximum of 12 in. (300 mm) below the ceiling/roof deck.

(2) Where the maximum depth of the noncombustible structural members, including concrete tees, is 18 in. (450 mm), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the noncombustible structural members.

(3) Where the maximum depth of the noncombustible structural members, including concrete tees, is greater than 18 in. (450 mm) but does not exceed 24 in. (600 mm), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the noncombustible structural members only when the channels formed by obstructed construction are provided with blocking to the full depth of the noncombustible structural member with material equivalent to the structural member's construction so that individual channel volumes do not exceed 400 ft^3 (11.3 m^3).

(4) Where wood joists or composite wood joists are provided with blocking to the full depth of the joists with material equivalent to or less combustible than the web construction so that individual channel volumes do not exceed 400 ft^3 (11.3 m^3), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the joists only when a maximum distance of 22 in. (550 mm) can be maintained between the sprinkler deflector and the ceiling/roof deck.

13.2.7.1.2.2 Obstructed Construction for Ceilings with Slopes Not Exceeding 2 in 12.

Where the slope of the ceiling is greater than 1 in 12, but does not exceed 2 in 12, the sprinkler deflector shall be located in accordance with one of the following arrangements:

(1) Sprinklers shall be installed in each individual channel of obstructed construction with the deflectors located a minimum of 6 in. (150 mm) and a maximum of 12 in. (300 mm) below the ceiling/roof deck.

(2) Where the maximum depth of the noncombustible structural members, including concrete tees, is 12 in. (300 mm), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the noncombustible structural members.

(3) Where the maximum depth of the noncombustible structural members, including concrete tees, is greater than 12 in. (300 mm) but does not exceed 24 in. (600 mm), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the noncombustible structural members only when the channels formed by obstructed construction are provided with blocking to the full depth of the noncombustible structural member with material equivalent to the structural member's construction so that individual channel volumes do not exceed 400 ft^3 (11.3 m^3).

(4) Where wood joists or composite wood joists are provided with blocking to the full depth of the joists with material equivalent to or less combustible than the web construction so that individual channel volumes do not exceed 400 ft^3 (11.3 m^3), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the joists only when a maximum distance of 22 in. (550 mm) can be maintained between the sprinkler deflector and the ceiling/roof deck.

13.2.7.1.2.3 Obstructed Construction for Ceilings with Slopes Not Exceeding 4 in 12.

Where the slope of the ceiling is greater than 2 in 12, but does not exceed 4 in 12, the sprinkler deflector shall be located in accordance with one of the following arrangements:

(1) Sprinklers shall be installed in each individual channel of obstructed construction with the deflectors located a minimum of 6 in. (150 mm) and a maximum of 12 in. (300 mm) below the ceiling/roof deck.

(2) Where the maximum depth of the structural members, including concrete tees, is 12 in. (300 mm) and are installed perpendicular to the ceiling slope, sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the structural members only when the channels formed by obstructed construction are provided with blocking to the full depth of the structural member with material equivalent to or less combustible than the structural member's construction so that individual channel volumes do not exceed 300 ft^3 (8.5 m^3).

Supplemental Information

File Name	Description	Approved
Revised_Section_13_2_7_1_2.docx	Revised 13.2.7.1.2	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Fri Jul 29 16:29:50 EDT 2022

Committee Statement

Committee Statement: Based on recent fire testing on sloped ceilings in obstructed construction performed by the fire protection research foundation, existing criteria has been restructured and new requirements have been added to deal with slopes from 1 in 12 and greater. The report is “Protection of Storage Under Sloped Ceilings Phase III: Large Scale Testing Summary and Guidance” and can be found at www.nfpa.org.

Response Message: FR-1265-NFPA 13-2022

Public Input No. 164-NFPA 13-2022 [Section No. 13.2.7.1.2]

Public Input No. 485-NFPA 13-2022 [Section No. 13.2.7.1.2]

First Revision No. 1319-NFPA 13-2022 [Section No. 13.2.8]

13.2.8* Obstructions to Sprinkler Discharge (CMSA Sprinklers).

13.2.8.1 ~~Performance Objective~~ General .

13.2.8.1.1

~~Sprinklers shall be located so as~~ In addition to the requirements of 9.5.5 , CMSA sprinklers shall be arranged in accordance with 13.2.8 to minimize obstructions~~s~~ to their discharge ~~as defined in 9.5.5.2 and 9.5.5.3~~ pattern , or ~~additional~~ supplemental sprinklers shall be provided to ensure adequate coverage of the hazard.

13.2.8.1.2

Sprinklers CMSA sprinklers with a special obstruction allowance shall be arranged to comply with 9.5.5.2 , Table 13.2.8.1.2(a) or Table 13.2.8.1.2(b) , and Figure 13.2.8.1.2 installed according to their listing .

Table 13.2.8.1.2(a) Positioning of Sprinklers to Avoid Obstructions to Discharge (CMSA Sprinklers)

Distance from Sprinkler to Side of Obstruction *(A)* (ft)	Allowable Distance of Deflector Above Bottom of Obstruction *(B)* (in.)
Less than 1	0
1 or more	1 ½ or less
1 ½ or more	3 or less
2 ft or more	5 ½ or less
2 ½ or more	8 or less
3 or more	10 or less
3 ½ or more	12 or less
4 or more	15 or less
4 ½ or more	18 or less
5 or more	22 or less
5 ½ or more	26 or less
6 or more	31 or less

Note: For *A* and *B* , refer to Figure 13.2.8.1.2.

Table 13.2.8.1.2(b) Positioning of Sprinklers to Avoid Obstructions to Discharge (CMSA Sprinklers)

Distance from Sprinkler to Side of Obstruction *(A)* (mm)	Allowable Distance of Deflector Above Bottom of Obstruction *(B)* (mm)
Less than 300	0
300 or more	40 or less
450 or more	75 or less
600 or more	140 or less
750 or more	200 or less
900 or more	250 or less
1100 or more	300 or less
1200 or more	375 or less
1400 or more	450 or less
1500 or more	550 or less
1700 or more	650 or less
1800 or more	775 or less

Note: For *A* and *B* , refer to Figure 13.2.8.1.2.

Figure 13.2.8.1.2 Positioning of Sprinkler to Avoid Obstruction to Discharge (CMSA Sprinklers).

~~13.2.8.1.3~~

~~The requirements of 13.2.8.1.2 shall not apply where sprinklers are positioned on opposite sides of the obstruction.~~

13.2.8.2 Obstructions to Sprinkler Discharge Pattern Development.

13.2.8.2.1* ~~General.~~

In addition to the requirements of 13.2.8.2.2 , CMSA sprinklers shall be arranged in accordance with 14.2.11.2 to minimize obstruction to the development of their discharge pattern.

A.13.2.8.2.1

The obstruction rules are essentially the same for CMSA and ESFR sprinklers other than 13.2.8.2.2 . Even though Chapter 13 covers CMSA sprinklers, the user is directed to Chapter 14 for the other obstruction rules.

~~13.2.8.2.1.1~~

~~Continuous or noncontinuous obstructions less than or equal to 36 in. (900 mm) below the sprinkler deflector that prevent the pattern from fully developing shall comply with 13.2.8.2 .~~

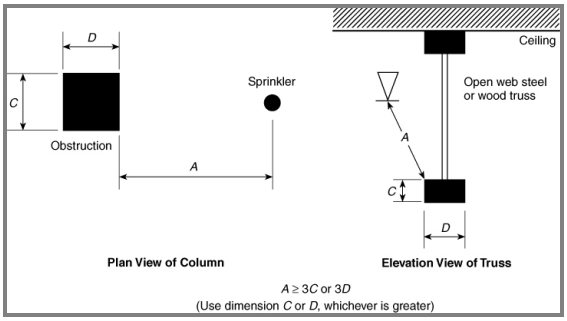
~~13.2.8.2.1.2~~

~~Regardless of the rules of this section, solid continuous obstructions shall meet the requirements of 13.2.8.1.2 or 13.2.8.1.3 .~~

13.2.8.2.2*

Unless the requirements of 14.2.11.2 ~~13.2.8.1.2 or 13.2.8.1.3~~ are met, for obstructions 8 in. (200 mm) wide or less in width, as shown in Figure 13.2.8.2.2, sprinklers shall be positioned such that they are located at least a distance three times greater than the maximum dimension of the obstruction from the sprinkler ~~(e.g., webs and chord members, pipe, columns, and fixtures)~~ .

Figure 13.2.8.2.2 Minimum Distance from Obstruction (CMSA Sprinklers).



A.13.2.8.2.2

The rules of 13.2.8.2.2 (known as the Three Times Rule) have been written to apply to obstructions (e.g., webs and chord members, pipe, columns, and fixtures) where the sprinkler can be expected to get water to both sides of the obstruction without allowing a significant shadow area on the other side of the obstruction. This works for small noncontinuous obstructions and for continuous obstructions where the sprinkler can throw water over and under the obstruction, such as the bottom chord of an open truss or joist. For solid continuous obstructions, such as a beam, the Three Times Rule is ineffective since the sprinkler cannot throw water over and under the obstruction~~. Sufficient water must be thrown under the obstruction~~ to adequately cover the floor area on the other side of the obstruction. To ensure this, compliance with the rules of ~~13.2.8.1.2~~ 14.2.11.2 is necessary.

~~**13.2.8.2.3** Branch Lines.~~

~~Upright sprinklers shall be positioned with respect to branch lines in accordance with one of the following:~~

~~Upright sprinklers shall be permitted to be attached directly to branch lines less than or equal to 4 in. (100 mm) nominal in diameter.~~

~~Upright sprinklers shall be permitted to be offset horizontally a minimum of 12 in. (300 mm) from the pipe.~~

~~Upright sprinklers shall be permitted to be supplied by a riser nipple (sprig) to elevate the sprinkler deflector a minimum of 12 in. (300 mm) from the centerline of any pipe over 4 in. (100 mm) nominal in diameter.~~

13.2.8.3 Obstructions that Prevent Sprinkler Discharge from Reaching Hazard.

CMSA sprinklers shall be arranged in accordance with 14.2.11.3 to minimize obstruction to sprinkler discharge reaching the hazard. *(See A.9.5.5.3.1 .)*

~~**A.13.2.8.3**~~

~~See A.9.5.5.3.1 .~~

~~**13.2.8.3.1**~~

~~Continuous or noncontinuous obstructions that interrupt the water discharge in a horizontal plane below the sprinkler deflector in a manner to limit the distribution from reaching the protected hazard shall comply with 13.2.8.3 .~~

13.2.8.3.2

Sprinklers shall be positioned with respect to fluorescent lighting fixtures, ducts, and obstructions more than 24 in. (600 mm) wide and located entirely below the sprinklers so that the minimum horizontal distance from the near side of the obstruction to the center of the sprinkler is not less than the value specified in Table 13.2.8.3.2(a) or Table 13.2.8.3.2(b) and Figure 13.2.8.3.2 .

Table 13.2.8.3.2(a) Obstructions Entirely Below Sprinkler (CMSA Sprinklers)

Distance from Sprinkler to Side of Obstruction *(A)* (ft)	Allowable Distance of Deflector Above Bottom of Obstruction *(B)* (in.)
1 ½ or more	Less than 6
3 or more	Less than 12
4 or more	Less than 18
5 or more	Less than 24
5 ½ or more	Less than 30
6 or more	Less than 36

Note: For *A* and *B* , refer to Figure 13.2.8.3.2.

Table 13.2.8.3.2(b) Obstructions Entirely Below Sprinkler (CMSA Sprinklers)

Distance from Sprinkler to Side of Obstruction *(A)* (mm)	Allowable Distance of Deflector Above Bottom of Obstruction *(B)* (mm)
450 or more	Less than 150
900 or more	Less than 300
1200 or more	Less than 450
1500 or more	Less than 600
1700 or more	Less than 750
1800 or more	Less than 900

Note: For *A* and *B* , refer to Figure 13.2.8.3.2.

Figure 13.2.8.3.2 Obstruction Entirely Below Sprinkler (CMSA Sprinklers).

13.2.8.3.3

Sprinklers installed under open gratings shall be shielded from the discharge of overhead sprinklers.

~~13.2.8.3.4~~

~~Where the bottom of the obstruction is located 24 in. (600 mm) or more below the sprinkler deflectors, the following shall occur:~~

~~Sprinklers shall be positioned so that the obstruction is centered between adjacent sprinklers in accordance with Figure 13.2.8.3.4 .~~

~~The obstruction width shall meet the following requirements:~~

~~The obstruction shall be limited to a maximum width of 24 in. (600 mm) in accordance with Figure 13.2.8.3.4 .~~

~~Where the obstruction is greater than 24 in. (600 mm) wide, one or more lines of sprinklers shall be installed below the obstruction.~~

~~The obstruction extension shall meet the following requirements:~~

~~The obstruction shall not extend more than 12 in. (300 mm) to either side of the midpoint between sprinklers in accordance with Figure 13.2.8.3.4 .~~

~~Where the extensions of the obstruction exceed 12 in. (300 mm), one or more lines of sprinklers shall be installed below the obstruction.~~

~~At least 18 in. (450 mm) clearance shall be maintained between the top of storage and the bottom of the obstruction in accordance with Figure 13.2.8.3.4 .~~

~~Figure 13.2.8.3.4 Obstruction More Than 24 in. (600 mm) Below Sprinklers (CMSA Sprinklers).~~

~~13.2.8.3.5~~

~~In the special case of an obstruction running parallel to or directly below a branch line, the following shall occur:~~

~~The sprinkler shall be located at least 36 in. (900 mm) above the top of the obstruction in accordance with Figure 13.2.8.3.5 .~~

~~The obstruction shall be limited to a maximum width of 12 in. (300 mm) in accordance with Figure 13.2.8.3.5 .~~

~~The obstruction shall be limited to a maximum extension of 6 in. (150 mm) to either side of the centerline of the branch line in accordance with Figure 13.2.8.3.5 .~~

~~Figure 13.2.8.3.5 Obstruction More Than 36 in. (900 mm) Below Sprinklers (CMSA Sprinklers).~~

Supplemental Information

File Name	Description	Approved
Revised_Section_13_2_8.docx	Revised 13.2.8	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Fri Aug 19 11:02:51 EDT 2022

Committee Statement

Committee Statement: .The current CMSA obstruction rules are not practical and were added to the standard in the 1980s based on large drop sprinkler testing. With more recent ESFR obstruction testing it is appropriate to apply the same obstruction rules, with the exception of the 3 times rule.

Response Message: FR-1319-NFPA 13-2022

Public Input No. 535-NFPA 13-2022 [Global Input]

Public Input No. 425-NFPA 13-2022 [Section No. 13.2.8.3]

Public Input No. 424-NFPA 13-2022 [Section No. 13.2.8.2.2]

Public Input No. 444-NFPA 13-2022 [New Section after A.13.2.8.3]

Public Input No. 166-NFPA 13-2022 [Section No. 13.2.8.3.2]

Public Input No. 439-NFPA 13-2022 [New Section after A.13.2.8.3]

First Revision No. 1150-NFPA 13-2022 [Section No. 14.2.3]

14.2.3

ESFR sprinklers shall be installed only in buildings where the roof or ceiling slope ~~above the sprinklers~~ does not exceed a pitch of ~~2~~ 4 in 12 ~~(a rise of 2 units in a run of 12 units, a roof slope of 16.7 percent)~~ .

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 18:51:15 EDT 2022

Committee Statement

Committee Statement: Computer simulations and full-scale fire tests as documented in the report entitled Protection of Storage Under Sloped Ceilings Phase III: Large-Scale Testing Summary and Guidance, written based on a project supported by the Fire Protection Research Foundation, have demonstrated that fire control can be achieved with sprinklers protecting storage under ceilings up to and including a slope of 4 in 12.

Response Message: FR-1150-NFPA 13-2022

Public Input No. 187-NFPA 13-2022 [Section No. 14.2.3]

Public Input No. 486-NFPA 13-2022 [Section No. 14.2.3]

First Revision No. 1065-NFPA 13-2022 [Sections 14.2.8.2.3, 14.2.8.2.4]

14.2.8.2.3*

~~Deviations from the maximum sprinkler spacing shall be permitted to eliminate obstructions created by structural elements (such as trusses, bar joists, and wind bracing) by moving a sprinkler along the branch line a maximum of 1 ft (300 mm) from its allowable spacing, provided coverage for that sprinkler does not exceed 110 ft^2 (10 m^2) per sprinkler where all of the following conditions are met~~ Where obstructions that prevent sprinkler discharge from reaching the hazard exist, ceiling sprinklers shall be permitted to exceed their maximum allowable spacing to avoid these obstructions as follows :

~~The average actual floor area protected by the moved sprinkler and the adjacent sprinklers shall not exceed 100 ft^2 (9 m^2).~~

~~Adjacent branch lines shall maintain the same pattern.~~

~~In no case shall the distance between sprinklers exceed 12 ft (3.7 m).~~

(1) The linear spacing of the obstructed sprinkler, in the direction the sprinkler is moved, shall not exceed 1 ft (0.3 m) beyond the maximum allowable linear spacing.

(2) The linear spacing of the obstructed sprinkler, in the direction the sprinkler is moved, shall not exceed 12 ft (3.7 m).

(3) The area of coverage of the obstructed sprinkler shall not exceed 110 ft^2 (10 m^2).

(4) Where the obstructed sprinkler has been moved in a direction along the branch line, the linear and area spacing of the sprinklers on either side of the obstructed sprinkler along the branch line shall comply with the allowable sprinkler spacing requirements.

(5) Where the obstructed sprinkler has been moved in a direction between the branch lines, the linear spacing and area of coverage of the sprinklers on either side of the obstructed sprinkler between the branch lines shall comply with the allowable sprinkler spacing requirements.

~~14.2.8.2.4~~

~~Deviations from the maximum sprinkler spacing shall be permitted to eliminate obstructions created by structural elements (such as trusses, bar joists, and wind bracing) by moving a single branch line a maximum of 1 ft (300 mm) from its allowable spacing, provided coverage for the sprinklers on that branch line and the sprinklers on the branch line it is moving away from does not exceed 110 ft^2 (10 m^2) per sprinkler where all of the following conditions are met:~~

~~The average actual floor area protected by the sprinklers on the moved branch line and the sprinklers on the adjacent branch lines shall not exceed 100 ft^2 (9 m^2) per sprinkler.~~

~~In no case shall the distance between sprinklers exceed 12 ft (3.7 m).~~

~~It shall not be permitted to move a branch line where there are moved sprinklers on a branch line that exceed the maximum sprinkler spacing.~~

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 17:02:10 EDT 2022

Committee Statement

Committee Statement: This consolidates the guidelines of these two sections and prevents the need for adjacent sprinklers from having to create the same area of coverage.

Response Message: FR-1065-NFPA 13-2022

Public Input No. 447-NFPA 13-2022 [Section No. 14.2.8.2.4]

Public Input No. 6-NFPA 13-2021 [Section No. 14.2.8.2.4]

Public Input No. 446-NFPA 13-2022 [Section No. 14.2.8.2.3]

First Revision No. 1066-NFPA 13-2022 [New Section after 14.2.9.4.2]

14.2.9.4.3

Where sprinklers are installed in every channel formed by solid obstructed construction with the deflectors above the bottom of the structural members, the structural members shall be considered baffles in accordance with 14.2.9.4.2 .

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 17:08:17 EDT 2022

Committee Statement

Committee Statement: Solid structural members create a barrier between other sprinklers and work the same as baffles.

Response Message: FR-1066-NFPA 13-2022

Public Input No. 487-NFPA 13-2022 [New Section after 14.2.9.4.2]

First Revision No. 1126-NFPA 13-2022 [Section No. 14.2.10.1]

14.2.10.1 Distance Below Ceilings.

14.2.10.1.1 Unobstructed Construction.

~~Pendent sprinklers with a nominal K-factor of K-14.0 (K-200), K-16.8 (K-240), and K-28.0 (K-400) shall be positioned so that deflectors are a maximum 14 in. (350 mm) and a minimum 6 in. (150 mm) below the ceiling.~~

14.2.10.1.1.1

~~Pendent sprinklers with a~~ Where nominal ~~K-factor of~~ K-14.0 (K-200), K-16.8 (K-240), and K-28.0 (K-400) pendent sprinklers are installed under unobstructed construction, the deflectors shall be positioned ~~so that deflectors are a maximum 14 in. (350 mm) and~~ a minimum 6 in. (150 mm) and a maximum of 14 in. (350 mm) below the ceiling/roof deck .

14.2.10.1.1.2

~~Pendent sprinklers with a~~ Where nominal ~~K-factor of~~ K-22.4 (K-320), K-25.2 (K-360), and K-33.6 (K-480) pendent sprinklers are installed under unobstructed construction, the deflectors shall be positioned ~~so that deflectors are a maximum 18 in. (450 mm) and~~ a minimum 6 in. (150 mm) and a maximum of 18 in. (450 mm) below the ceiling/roof deck .

14.2.10.1.1.3

~~Upright sprinklers with a~~ Where nominal ~~K-factor of~~ K-14.0 (K-200) and K-16.8 (K-240) upright sprinklers are installed under unobstructed construction, the deflectors shall be positioned ~~so that the deflector is~~ a minimum of 3 in. (75 mm) ~~to~~ and a maximum of 12 in. (300 mm) below the ceiling/roof deck .

~~**14.2.10.1.2**~~

~~With obstructed construction, the branch lines shall be permitted to be installed across the beams, but sprinklers shall be located in the bays and not under the beams.~~

14.2.10.1.2 Obstructed Construction.

14.2.10.1.2.1 Obstructed Construction for Ceilings with Slopes Not Exceeding 1 in 12.

Where the slope of the ceiling does not exceed 1 in 12, the sprinkler deflector shall be located in accordance with one of the following arrangements:

(1) Sprinklers shall be installed in each individual channel of obstructed construction with the deflectors located below the ceiling/roof deck in accordance with 14.2.10.1.1 .

(2) Where the maximum depth of the structural members, including concrete tees, is 18 in. (450 mm), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the structural members.

(3) Where the maximum depth of the structural members, including concrete tees, is greater than 18 in. (450 mm) but does not exceed 24 in. (600 mm), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the structural members only when the channels formed by obstructed construction are provided with blocking to the full depth of the structural member with material equivalent to or less combustible than the structural member's construction so that individual channel volumes do not exceed 400 ft^3 (11.3 m^3).

14.2.10.1.2.2 Obstructed Construction for Ceilings with Slopes Not Exceeding 2 in 12.

Where the slope of the ceiling is greater than 1 in 12, but does not exceed 2 in 12, the sprinkler deflector shall be located in accordance with one of the following arrangements:

(1) Sprinklers shall be installed in each individual channel of obstructed construction with the deflectors located below the ceiling/roof deck in accordance with 14.2.10.1.1 .

(2) Where the maximum depth of the structural members, including concrete tees, is 12 in. (300 mm), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the structural members.

(3) Where the maximum depth of the structural members, including concrete tees, is greater than 12 in. (300 mm) but does not exceed 24 in. (600 mm), sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the structural members only when the channels formed by obstructed construction are provided with blocking to the full depth of the structural member with material equivalent to or less combustible than the structural member's construction so that individual channel volumes do not exceed 400 ft^3 (11.3 m^3).

14.2.10.1.2.3 Obstructed Construction for Ceilings with Slopes Not Exceeding 4 in 12.

Where the slope of the ceiling is greater than 2 in 12, but does not exceed 4 in 12, the sprinkler deflector shall be located in accordance with one of the following arrangements:

(1) Sprinklers shall be installed in each individual channel of obstructed construction with the deflectors located below the ceiling/roof deck in accordance with 14.2.10.1.1 .

(2) Where the maximum depth of the structural members, including concrete tees, is 12 in. (300 mm) and are installed perpendicular to the ceiling slope, sprinkler deflectors shall be permitted to be installed within a horizontal plane not exceeding 6 in. (150 mm) vertically below the bottom of the structural members only when the channels formed by obstructed construction are provided with blocking to the full depth of the structural member with material equivalent to or less combustible than the structural member's construction so that individual channel volumes do not exceed 300 ft^3 (8.5 m^3).

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 15:22:03 EDT 2022

Committee Statement

Committee Statement: Based on recent fire testing on sloped ceilings in obstructed construction performed by the fire protection research foundation, existing criteria has been restructured and new requirements have been added to deal with slopes from 1 in 12 and greater. The report is "Protection of Storage Under Sloped Ceilings Phase III: Large Scale Testing Summary and Guidance" and can be found at www.nfpa.org.

Response Message: FR-1126-NFPA 13-2022

Public Input No. 35-NFPA 13-2021 [Section No. 14.2.10.1.4]

Public Input No. 488-NFPA 13-2022 [Section No. 14.2.4]

Public Input No. 489-NFPA 13-2022 [Section No. 14.2.10.1]

First Revision No. 1067-NFPA 13-2022 [Section No. 14.2.10.2]

14.2.10.2 Deflector Orientation.

Deflectors of sprinklers shall be aligned ~~parallel to ceilings or roofs~~ in accordance with 9.5.4.3 .

Supplemental Information

File Name	Description	Approved
TG3_-_PI-428_-_Section_14.2.11_for_2025_Edition_of_NFPA_13.docx	For staff use	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 17:14:10 EDT 2022

Committee Statement

Committee Statement: The obstruction rules were reorganized and cleaned up for redundancy.

Response Message: FR-1067-NFPA 13-2022

Public Input No. 490-NFPA 13-2022 [Section No. 14.2.10.2]

Public Input No. 440-NFPA 13-2022 [Section No. A.14.2.11]

Public Input No. 441-NFPA 13-2022 [New Section after A.14.2.11.2]

Public Input No. 442-NFPA 13-2022 [Section No. A.14.2.11.2(8)]

Public Input No. 445-NFPA 13-2022 [Section No. A.14.2.11.3.4]

Public Input No. 443-NFPA 13-2022 [New Section after A.14.2.11.3.4]

First Revision No. 1068-NFPA 13-2022 [Section No. 14.2.11]

14.2.11* Obstructions to Sprinkler Discharge (Early Suppression Fast-Response ~~Sprinklers~~).

14.2.11.1 General.

14.2.11.1.1

In addition to the requirements of 9.5.5 , ESFR sprinklers shall be arranged in accordance with 14.2.11 to minimize obstruction to their discharge pattern, or supplemental sprinklers shall be provided to ensure adequate coverage of the hazard.

14.2.11.1.2

ESFR sprinklers with a special obstruction allowance shall be installed according to their listing.

14.2.11.1.3*

Where high-piled storage is not physically separated from an adjacent light or ordinary hazard area, the sprinkler obstruction criteria of 14.2.11 shall apply to all ceiling sprinklers located within 15 ft (4.6 m) horizontally of any high-piled storage.

A.14.2.11.1.3

Examples of high-piled storage are rack structures and solid-piled storage.

14.2.11.2 Obstructions ~~at or Near Ceiling~~ to Sprinkler Discharge Pattern Development .

14.2.11.2.1

~~Sprinklers~~ ESFR sprinklers shall be arranged to comply with Table 14.2.11.2.1(a) or Table 14.2.11.2.1(b) and Figure 14.2.11.2.1 for obstructions at the ceiling, such as beams, ducts, lights, and top chords of trusses and bar joists.

Table 14.2.11.2.1(a) Positioning of Sprinklers to Avoid Obstructions to Discharge (ESFR Sprinklers)

Distance from Sprinkler to Side of Obstruction *(A)* (ft)	Allowable Distance of Deflector Above Bottom of Obstruction *(B)* (in.)
Less than 1	0
1 or more	1½ or less
1½ or more	3 or less
2 or more	5½ or less
2½ or more	8 or less
3 or more	10 or less
3½ or more	12 or less
4 or more	15 or less
4½ or more	18 or less
5 or more	22 or less
5½ or more	26 or less
6 or more	31 or less

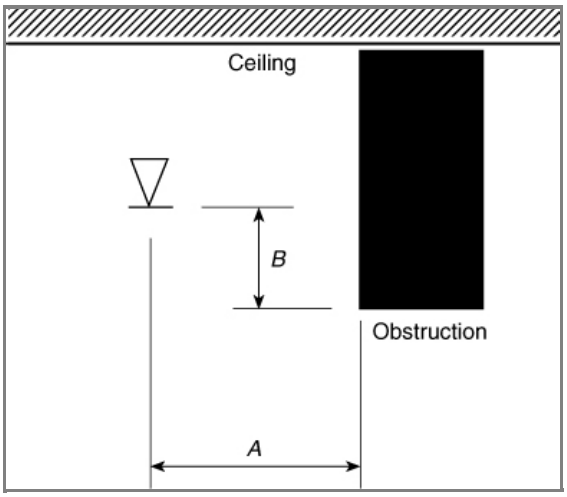
Note: For *A* and *B*, refer to Figure ~~14.2.11.1.1~~ 14.2.11.2.1 .

Table 14.2.11.2.1(b) Positioning of Sprinklers to Avoid Obstructions to Discharge (ESFR Sprinklers)

Distance from Sprinkler to Side of Obstruction *(A)* (mm)	Allowable Distance of Deflector Above Bottom of Obstruction *(B)* (mm)
Less than 300	0
300 or more	40 or less
450 or more	75 or less
600 or more	140 or less
750 or more	200 or less
900 or more	250 or less
1100 or more	300 or less
1200 or more	375 or less
1400 or more	450 or less
1500 or more	550 or less
1700 or more	650 or less
1800 or more	775 or less

Note: For *A* and *B*, refer to Figure ~~14.2.11.1.1~~ 14.2.11.2.1 .

Figure 14.2.11.2.1 Positioning of Sprinkler to Avoid Obstruction to Discharge (~~ESFR~~ CMSA Sprinklers).



14.2.11.2.2

The requirements of 14.2.11.2.1 shall not apply where ~~sprinklers are spaced on opposite sides of obstructions less than 24 in. (600 mm) wide, provided the distance from the centerline on the obstructions to the sprinklers does not exceed one-half the allowable distance between sprinklers.~~ one of the following conditions is satisfied:

(1) Sprinklers are spaced on opposite sides of an ~~obstruction~~ an obstruction less than 24 in. (600 mm) wide, provided the distance from the centerline of the obstruction to the sprinklers does not exceed one-half the allowable distance between sprinklers.

(2) Supplemental sprinklers have been installed under the obstruction.

~~**14.2.11.2.3**~~

~~Sprinklers with a special obstruction allowance shall be installed according to their listing.~~

~~**14.2.11.2***~~ ~~Isolated Obstructions Below Elevation of Sprinklers.~~

~~Sprinklers shall be arranged with respect to obstructions in accordance with one of the following:~~

~~Sprinklers shall be installed below isolated noncontinuous obstructions that restrict only one sprinkler and are located below the elevation of sprinklers such as light fixtures and unit heaters.~~

~~Additional sprinklers shall not be required below isolated noncontiguous obstructions where the obstruction is 1 ½ in. (38 mm) or less in width and is located horizontally a minimum of 12 in. (300 mm) below the elevation of the sprinkler deflector.~~

~~Additional sprinklers shall not be required below isolated noncontiguous obstructions where the obstruction is 6 in. (150 mm) or less in width and is located a minimum of 6 in. (150 mm) horizontally from the sprinkler.~~

~~Additional sprinklers shall not be required below isolated noncontiguous obstructions where the obstruction is 24 in. (600 mm) or less in width and is located a minimum of 12 in. (300 mm) horizontally from the sprinkler.~~

~~Additional sprinklers shall not be required below isolated noncontiguous obstructions where sprinklers are positioned with respect to the bottom of obstructions in accordance with 14.2.11.2 .~~

~~Sprinklers with a special obstruction allowance shall be installed according to their listing.~~

~~Additional sprinklers shall not be required where the occupancy is protected in accordance with 14.2.7 and obstructions comply with 9.5.5.3 .~~

~~* Where high-piled storage is not physically separated from an adjacent light or ordinary hazard area, the sprinkler obstruction criteria of 14.2.11.3 shall apply to all ceiling sprinklers located within 6 ft (1.8 m) horizontally of any high-piled storage.~~

~~**A.14.2.11.2(8)** –~~

~~Examples of high-piled storage are rack structures and solid-piled storage.~~

~~**A.14.2.11.2**~~

~~Isolated obstructions that block adjacent sprinklers in a similar manner should be treated as a continuous obstruction. High-volume, low-speed fans with large diameters [(20 ft (6.1 m)] represent potential obstructions for ESFR sprinklers and should be positioned in accordance with the provisions of 14.2.11.2 with regard to both the fan motor unit and the blades.~~

~~Examples include obstructions such as light fixtures and unit heaters.~~

14.2.11.3 ~~Continuous~~ Obstructions ~~Below Sprinklers~~ that Prevent Sprinkler Discharge from Reaching Hazard .

See A.9.5.5.2 .

~~**14.2.11.3.1** General Continuous Obstructions.~~

~~Sprinklers shall be arranged with respect to obstructions in accordance with one of the following:~~

~~Sprinklers shall be installed below continuous obstructions, or they shall be arranged to comply with Table 14.2.11.2.1(a) or Table 14.2.11.2.1(b) for horizontal obstructions entirely below the elevation of sprinklers that restrict sprinkler discharge pattern for two or more adjacent sprinklers such as ducts, lights, and pipes.~~

~~Additional sprinklers shall not be required where the obstruction is 1 ½ in. (38 mm) or less in width and is located a minimum of 12 in. (300 mm) below the elevation of the sprinkler deflector.~~

~~Additional sprinklers shall not be required where the obstruction is 6 in. (150 mm) or less in width and located a minimum of 6 in. (150 mm) horizontally from the sprinkler.~~

~~Additional sprinklers shall not be required where the obstruction is 24 in. (600 mm) or less in width and located a minimum of 12 in. (300 mm) horizontally from the sprinkler.~~

~~Ceiling sprinklers shall not be required to comply with Table 14.2.11.2.1(a) or Table 14.2.11.2.1(b) where a row of sprinklers is installed under the obstruction.~~

~~Additional sprinklers shall not be required where the occupancy is protected in accordance with 14.2.7 and obstructions comply with 9.5.5.3 .~~

~~**14.2.11.3.2** Bottom Chords of Bar Joists or Open Trusses.~~

~~ESFR sprinklers shall be arranged with respect to the bottom chord of a bar joist or open truss in accordance with the following:~~

~~Where the bottom cord is 6 in. (150 mm) or less in width, the sprinkler shall be located a minimum 6 in. (150 mm) horizontally from the nearest edge of the bottom chord.~~

~~Where the bottom cord is 24 in. (600 mm) or less in width, the sprinkler shall be located a minimum 12 in. (300 mm) horizontally from the nearest edge of the bottom chord.~~

~~**14.2.11.3.2.1**~~

~~The requirements of 14.2.11.3.2 shall not apply where upright sprinklers are located over the bottom chords of bar joists or open trusses that are 4 in. (100 mm) maximum in width.~~

~~**14.2.11.3.3** Branchlines.~~

~~Upright sprinklers shall be positioned with respect to branch lines in accordance with one of the following:~~

~~Attached directly to branch lines less than or equal to 4 in. (100 mm) nominal diameter~~

~~Offset horizontally a minimum of 12 in. (300 mm) from the pipe~~

~~Supplied by a riser nipple (sprig) to elevate the sprinkler deflector a minimum of 12 in. (300 mm) from the centerline of any pipe over 4 in. (100 mm) nominal in diameter~~

14.2.11.3.1

Obstructions, continuous or noncontinuous, individual or grouped, that interrupt the water discharge in a horizontal plane below the sprinkler deflector in a manner to limit the distribution from reaching the protected hazard shall comply with 14.2.11.3 .

14.2.11.3.2*

For pipes, conduits, or groups of pipes and conduit to be considered individual, they shall be separated from the closest adjacent pipe, conduit, cable tray, or similar obstructions by a minimum of three times the width of the adjacent pipe, conduit, cable tray, or similar obstruction.

14.2.11.3.3

Supplemental sprinklers shall be installed under obstructions located entirely below the elevation of ceiling sprinklers where the obstruction(s) interferes with the sprinkler discharge pattern reaching the hazard.

14.2.11.3.4

Supplemental sprinklers shall not be required below obstructions when the obstruction or occupancy is in accordance with one of the following:

(1) The location of the obstruction relative to the ceiling sprinklers complies with Table 14.2.11.2.1(a) or Table 14.2.11.2.1(b) .

(2) The obstruction is 1 ½ in. (38 mm) or less in width and is located a minimum of 12 in. (300 mm) below the elevation of the sprinkler deflector.

(3) The obstruction is 6 in. (150 mm) or less in width and is located a minimum of 6 in. (150 mm) horizontally from the sprinkler.

(4) The obstruction is 24 in. (600 mm) or less in width and is located a minimum of 12 in. (300 mm) horizontally from the sprinkler.

(5) The obstruction is 4 in. (100 mm) or less in width, and is located entirely below the sprinkler pipe connected to the ceiling sprinkler, and the ceiling sprinkler is upright.

(6) The occupancy is protected in accordance with 14.2.7 , and obstructions comply with 9.5.5.3 .

14.2.11.3.5 Sprinkler Pipe.

Upright sprinklers shall be permitted to be positioned with respect to the sprinkler pipe that feeds them in accordance with one of the following:

(1) Attached directly to sprinkler pipe less than or equal to 4 in. (100 mm) nominal in diameter

(2) Offset horizontally a minimum of 6 in. (150 mm) from the sprinkler pipe

(3) Supplied by a riser nipple (sprig) to elevate the sprinkler deflector a minimum of 12 in. (300 mm) from the centerline of any sprinkler pipe over 4 in. (100 mm) nominal in diameter

~~**14.2.11.3.6** Open Gratings.~~

~~Sprinklers installed under open gratings shall be of the intermediate level/rack storage type or otherwise shielded from the discharge of overhead sprinklers.~~

14.2.11.3.6 Overhead Doors.

Quick-response spray sprinklers shall be permitted to be utilized under overhead doors.

~~**14.2.11.3.8** Special Obstruction Allowance.~~

~~Sprinklers with a special obstruction allowance shall be installed according to their listing.~~

14.2.11.3.7 Conveyors.

Sprinklers shall be arranged with respect to conveyors in accordance with one of the following:

(1) Quick-response standard spray sprinklers shall be permitted to be installed below conveyors without high-piled storage located underneath.

(2) Ceiling-level sprinklers shall be installed below conveyors with high-piled storage located underneath.

(3) Additional sprinklers shall not be required below belt or similar type conveyors where the conveyor ~~in~~ has a horizontal profile that is a minimum 70 percent open.

(4) Additional sprinklers shall not be required below belt conveyors up to 4 ft (1.2 m) wide where the area below the conveyor is void of high-piled storage.

(5) Additional sprinklers shall not be required below roller conveyors where the horizontal opening between rollers equals or exceeds the width of the roller.

(6) Additional sprinklers shall not be required below roller conveyors where the area below the conveyor is void of high-piled storage.

Supplemental Information

File Name	Description	Approved
Revised_Section_14_2_11.docx	Revised 14.2.11	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 17:19:59 EDT 2022

Committee Statement

Committee Statement: The obstruction rules were reorganized and cleaned up redundancy.

Response Message: FR-1068-NFPA 13-2022

Public Input No. 158-NFPA 13-2022 [Section No. 14.2.11.2]

Public Input No. 123-NFPA 13-2022 [Section No. 14.2.11.2]

Public Input No. 426-NFPA 13-2022 [Section No. 14.2.11.2]

Public Input No. 205-NFPA 13-2022 [Section No. 14.2.11.3.3]

Public Input No. 157-NFPA 13-2022 [Section No. 14.2.11.2]

Public Input No. 427-NFPA 13-2022 [Section No. 14.2.11.2]

Public Input No. 213-NFPA 13-2022 [Section No. 14.2.11.3.2 [Excluding any Sub-Sections]]

Public Input No. 159-NFPA 13-2022 [Section No. 14.2.11.3.2.1]

Public Input No. 160-NFPA 13-2022 [Section No. 14.2.11.3.3]

Public Input No. 429-NFPA 13-2022 [Section No. 14.2.11.3]

Public Input No. 428-NFPA 13-2022 [Section No. 14.2.11]

First Revision No. 1069-NFPA 13-2022 [New Section after 15.1.2]

15.1.3*

Where open sprinklers or open nozzles are used and automatic activation is achieved by hydraulic, pneumatic, or other means, the deflector of the open sprinklers or nozzles shall be permitted to exceed the maximum distance below the ceiling indicated in the applicable section for that style of sprinkler.

A.15.1.3

Automatic systems using open sprinklers or open nozzles are reliant on the separate detection system installed in the appropriate range from the ceiling that collects the heat or byproducts produced by the fire. The sprinklers or nozzles still need to be arranged for appropriate coverage of the hazard and with respect to any obstructions so that the spray pattern can develop and reach the hazard.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 17:39:02 EDT 2022

Committee Statement

Committee Statement: Open sprinklers and nozzles rely on a supplemental detection system, the position to the ceiling may not be a concern.

Response Message: FR-1069-NFPA 13-2022

Public Input No. 36-NFPA 13-2021 [New Section after 15.1.2]

First Revision No. 1070-NFPA 13-2022 [Section No. 15.2.1]

15.2.1

Special sprinklers that are intended for the protection of specific hazards or construction features shall be permitted where such devices have been evaluated and listed for performance under the following conditions:

(1) Fire tests related to the intended hazard

(2) Distribution of the spray pattern with respect to wetting of floors and walls

(3) Distribution of the spray pattern with respect to obstructions

(4) Evaluation of the thermal sensitivity of the sprinkler

(5) Performance under horizontal or sloped ceilings

(6) ~~Area of design~~ Hydraulic design criteria

(7) Allowable clearance to ceilings

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 17:48:35 EDT 2022

Committee Statement

Committee Statement: The current provisions of 15.2.1 provide for the development of special sprinklers for specific conditions that can be addressed including the Area of design in item #6. Since the design of the system is based on both the discharge and area (or number of operating sprinklers), this should be changed to Hydraulic design criteria to address the subject more appropriately.

Response Message: FR-1070-NFPA 13-2022

Public Input No. 567-NFPA 13-2022 [Section No. 15.2.1]

First Revision No. 1071-NFPA 13-2022 [New Section after 15.2.2]

15.2.3

Where special sprinklers are listed for protection of features, system design shall be based on the listing requirements identified in the manufacturer's instructions for the individual sprinkler being used, unless otherwise approved.

Submitter Information Verification

Committee: AUT-SSI
Submittal Date: Tue Jul 26 18:17:59 EDT 2022

Committee Statement

Committee Statement: Special sprinklers are required to be installed within their listing.
Response Message: FR-1071-NFPA 13-2022

Public Input No. 208-NFPA 13-2022 [New Section after 15.2.2]

First Revision No. 1072-NFPA 13-2022 [New Section after 15.2.2]

15.2.4*

Listed sprinklers that have been tested at an approved testing laboratory for specific special use conditions as indicated in 15.2.1(1) through 15.2.1(7) as applicable shall be permitted to be used for equivalent fire protection schemes developed in accordance with Section 1.5 where acceptable to the AHJ.

A.15.2.4

The development and use of test data to evaluate special use conditions at an approved testing laboratory that evaluate the performance of listed sprinklers under special use conditions can be used as a basis to demonstrate the equivalency of a proposed usage.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 18:19:05 EDT 2022

Committee Statement

Committee Statement: Provides an opportunity to meet the requirement of 1.5.

Response Message: FR-1072-NFPA 13-2022

Public Input No. 568-NFPA 13-2022 [New Section after 15.2.2]

First Revision No. 1095-NFPA 13-2022 [Section No. 16.2.7.2]

See FR-1093

16.2.7.2

The sprinklers shall correspond to the types, orientations, and temperature ratings of the sprinklers in the property.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 10:46:53 EDT 2022

Committee Statement

Committee Statement: When sprinklers are replaced, it is important that they are of the same orientation. Thus, sprinklers need to be provided in the spare sprinkler box that represent the orientation of those sprinklers installed.

Response Message: FR-1095-NFPA 13-2022

First Revision No. 1097-NFPA 13-2022 [Section No. 16.2.7.5]

16.2.7.5

The stock of spare sprinklers shall include all types, orientations, and ratings installed and shall be as follows:

(1) For protected facilities having under 300 sprinklers — no fewer than six sprinklers

(2) For protected facilities having 300 to 1000 sprinklers — no fewer than 12 sprinklers

(3) For protected facilities having over 1000 sprinklers — no fewer than 24 sprinklers

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 10:52:22 EDT 2022

Committee Statement

Committee Statement: When sprinklers are replaced, it is important that they are of the same orientation. Thus, sprinklers need to be provided in the spare sprinkler box that represent the orientation of those sprinklers installed.

Response Message: FR-1097-NFPA 13-2022

First Revision No. 1078-NFPA 13-2022 [Section No. 16.2.7.7.1]

16.2.7.7.1*

The list shall include the following:

(1) Sprinkler Identification Number (SIN) if equipped; or the manufacturer, model, K-factor, deflector type, thermal sensitivity, and pressure rating

(2) Manufacturer's sprinkler wrench model number for each sprinkler type

(3) General description

(4) Quantity of each type to be contained in the cabinet

(5) Issue or revision date of the list

A.16.2.7.7.1

The minimum information in the list contained in the spare sprinkler cabinet should be marked with the sprinkler identification described in 7.2.1; a general description of the sprinkler, including upright, pendent, residential, ESFR, and so forth; ~~and~~ the quantity of sprinklers that is to be maintained in the spare sprinkler cabinet; and a sprinkler wrench type .

An example of the list is shown in Figure A.16.2.7.7.1.

Figure A.16.2.7.7.1 Sample List.

Sprinklers Contained in this Cabinet

Sprinkler Identification, SIN	General Description	Temperature Rating, °F	Sprinkler Quantity Maintained
TY9128	Extended Coverage, K-25, upright	165	6
VK494	Residential concealed pendent	155	6

Issued: 8/31/19 Revised:

Sprinklers Contained in this Cabinet

Sprinkler Identification, SIN	General Description	Temperature Rating, °F	Sprinkler Quantity Maintained	Sprinkler Wrench Type
TY9128	Extended coverage, K-25, upright	165	6	W-Type 1 sprinkler wrench
VK494	Residential concealed pendent	155	6	Standard sprinkler wrench 21475MB

Supplemental Information

File Name	Description	Approved
13_AUT_SSI_FDM_16.2.7.7.1_FR1078.docx	For staff use only	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 19:39:31 EDT 2022

Committee Statement

Committee Statement: It is recommended to have the wrench type identified so that the proper wrench type will be on site for use in replacing sprinklers that have activated or been damaged.

Response Message: FR-1078-NFPA 13-2022

Public Input No. 37-NFPA 13-2021 [Section No. 16.2.7.7.1]

First Revision No. 1074-NFPA 13-2022 [Section No. 16.3.1]

16.3.1 General.

16.3.1.1 Black and Galvanized Steel Pipe.

~~Steel pipe shall be in accordance with 16.3.2 , 16.3.3 , or 16.3.4 .~~

16.3.1.1.1

~~Steel~~ Black and galvanized steel pipe shall be in accordance with 16.3.2, 16.3.3, or 16.3.4.

16.3.1.1.2

Black and galvanized pipe sizes shall be no less than 1 in. (25 mm) nominal.

16.3.1.2 Copper Tube.

~~Copper tube shall be in accordance with 16.3.5 .~~

16.3.1.2.1

Copper tube shall be in accordance with 16.3.5.

16.3.1.2.2

Copper tube shall be no less than ¾ in. (20 mm) nominal.

16.3.1.3 Nonmetallic Pipe.

~~Nonmetallic pipe shall be in accordance with 16.3.9 .~~

16.3.1.3.1

Nonmetallic pipe shall be in accordance with 16.3.9.

16.3.1.3.2

Nonmetallic pipe shall be no less than ¾ in. (20 mm) nominal.

16.3.1.4 Brass Pipe.

~~Brass pipe shall be in accordance with 16.3.6 .~~

16.3.1.4.1

Brass pipe shall be in accordance with 16.3.6.

16.3.1.4.2

Brass pipe shall be no less than ¾ in. (20 mm) nominal.

16.3.1.5 Stainless Steel Pipe.

~~Stainless steel pipe shall be in accordance with 16.3.7 .~~

16.3.1.5.1

Stainless steel pipe shall be in accordance with 16.3.7.

16.3.1.5.2

Stainless steel pipe shall be no less than ¾ in. (20 mm) nominal.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 19:27:53 EDT 2022

Committee Statement

Committee Statement: The changes clarify the requirements for various pipe types.

Response Message: FR-1074-NFPA 13-2022

Public Input No. 74-NFPA 13-2021 [Section No. 16.3.1]

First Revision No. 1075-NFPA 13-2022 [Section No. 16.3.8.2]

16.3.8.2

For Schedule 40 steel pipe and Types K and L copper tubing, the minimum radius of a bend shall be six pipe diameters for pipe sizes 2 in. (50 mm) and smaller and five pipe diameters for pipe sizes 2½ in. (65 mm) and larger.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 19:29:12 EDT 2022

Committee Statement

Committee Statement: This change provides specific requirements for bending pipe and tube and clarifies that Type M copper should not be bent.

Response Message: FR-1075-NFPA 13-2022

Public Input No. 279-NFPA 13-2022 [Section No. 16.3.8.2]

First Revision No. 1320-NFPA 13-2022 [Section No. 16.3.12.1]

16.3.12.1*

In new installations expected to supply sprinklers below a ceiling utilizing black or galvanized steel piping , minimum 1 in. (25 mm) outlets shall be provided.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Aug 23 13:46:44 EDT 2022

Committee Statement

Committee Statement: This clarifies requirements when using various pipe types.

Response Message: FR-1320-NFPA 13-2022

Public Input No. 38-NFPA 13-2021 [Section No. 16.3.12]

First Revision No. 1077-NFPA 13-2022 [Section No. 16.4.1.1 [Excluding any Sub-Sections]]

Where any portion of a system is subject to freezing, ~~and the temperatures cannot be reliably maintained at or above 40°F (4°C), the~~ system shall be installed as a dry pipe or preaction system.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 19:34:51 EDT 2022

Committee Statement

Committee Statement: Portions of systems can be exposed to temperatures between 32 and 40 and not be subject to freezing.

Response Message: FR-1077-NFPA 13-2022

Public Input No. 39-NFPA 13-2021 [Section No. 16.4.1.1 [Excluding any Sub-Sections]]

First Revision No. 1091-NFPA 13-2022 [Section No. 16.4.1.1.1]

16.4.1.1.1*

The weather temperature used to determine if an unheated portion of a system is subject to freezing and required to be protected in accordance with 16.4.1.1 shall be the lowest mean temperature for one day, obtained from an approved source.

A.16.4.1.1.1

The internal temperature and duration of exposure that water-filled piping could be subjected to, under freezing conditions, in an unconditioned space should be carefully considered and approved by the AHJ.

Dependable sources of information on historic temperatures include the following:

(1) National Oceanic and Atmospheric Administration — National Climatic Data Center

(2) National Weather Service

(3) Plant Hardiness Zone Maps (See Oregon State University)

(4) American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

(5) Other approved sources

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 10:24:15 EDT 2022

Committee Statement

Committee Statement: The figure provided in one of the examples (in color) however in black and white, the value of the example is greatly diminished and should not be used. The examples can be looked up individually online by users.

Response Message: FR-1091-NFPA 13-2022

Public Input No. 497-NFPA 13-2022 [New Section after A.16.4.1.1]

First Revision No. 1079-NFPA 13-2022 [Section No. 16.4.2]

16.4.2* Protection of Piping Against Corrosion.

16.4.2.1*

Where corrosive conditions are known to exist due to moisture or fumes from corrosive chemicals or both, special types of fittings, pipes, and hangers that resist corrosion shall be used, or a protective coating shall be applied to all unprotected exposed surfaces of the sprinkler system.

~~16.4.2.2~~

~~Where water supplies or environmental conditions are known to have unusual corrosive properties, piping shall have a corrosion resistance ratio (CRR) of 1 or more, and the system shall be treated in accordance with 5.1.4 .~~

16.4.2.2

Where corrosive conditions exist or piping is exposed to the weather, corrosion-resistant types of pipe, fittings, and hangers or protective corrosion-resistant coatings shall be used.

16.4.2.3

Where steel pipe is used underground, the pipe shall be protected against corrosion.

16.4.2.4

Where conditions that contribute to MIC are found, the owner(s) shall notify the sprinkler system installer and develop a plan to treat the system using one of the following methods:

(1) Install system piping that will not be affected by the MIC microbes.

(2) Treat all water that enters the system using a listed bacterial inhibitor.

(3) Implement an approved plan for monitoring the interior conditions of the pipe at established time intervals and locations.

(4) Install a corrosion monitoring station and monitor at established intervals.

16.4.2.5

Where conditions are found that contribute to unusual corrosive properties, the owner(s) shall notify the sprinkler system installer, and a plan shall be developed to treat the system using at least one of the following methods:

(1) Install system piping that is corrosion resistant.

(2) Treat water that enters the system using a listed corrosion inhibitor.

(3) Implement an approved plan for monitoring the interior conditions of the pipe at established intervals and locations.

(4) Install approved corrosion monitoring stations and monitor at established intervals.

(5) Fill dry-pipe or preaction systems with at least 98 percent pure nitrogen in lieu of air to mitigate against corrosion.

(6) Use a listed nitrogen generator that is sized and installed in accordance with the manufacturer's instructions.

16.4.2.6

Where water supplies or environmental conditions are known to have unusual corrosive properties, piping shall have a corrosion resistance ratio (CRR) of 1 or more, and the system shall be treated in accordance with 5.1.4 .

Supplemental Information

File Name	Description	Approved
Revised_16_4_2.docx	Revised 16.4.2	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 19:51:02 EDT 2022

Committee Statement

Committee Statement: Where water supplies or environmental conditions are known to have unusual corrosive properties, piping shall have a corrosion resistance ratio (CRR) of 1 or more, and the system shall be treated in accordance with 5.1.4.

Response Message: FR-1079-NFPA 13-2022

Public Input No. 345-NFPA 13-2022 [Section No. 16.4.2]

First Revision No. 1080-NFPA 13-2022 [Section No. 16.4.4]

16.4.4 Protection of Piping Subject to Mechanical Damage.

Where concealed pipe other than steel is run ~~horizontally or vertically~~ through ~~wood~~ holes or ~~metal studs~~ notches in studs, joists, rafters, or similar members less than 1.25 in. (32 mm) from the nearest edge of the member, the following provisions shall apply:

(1) Steel shield plates shall be provided ~~where the face of the piping is less than 1.25 in. (32 mm) from the nearest edge of the member~~ .

(2) Steel shield plates shall have a minimum thickness of 0.0575 in. (1.463 mm) (No. 16 gauge).

(3) Steel shield plates shall cover the area of the pipe where the member is notched or bored.

(4)* Steel shield plates shall extend a minimum of 2 in. (50 mm) along the member.

A.16.4.4(4)

Nail plates should only cover the stud or structural member that the pipe is penetrating — the nail plate should not extend past the width of the member. Only the length of the nail plate along the member should be extended a minimum of 2 in. (50 mm).

Supplemental Information

File Name	Description	Approved
Revised_16_4_4.docx	Revised 16.4.4	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 19:57:24 EDT 2022

Committee Statement

Committee Statement: Aligns the nail plate requirements with other recognized codes.

Response Message: FR-1080-NFPA 13-2022

Public Input No. 40-NFPA 13-2021 [Section No. 16.4.4]

First Revision No. 1081-NFPA 13-2022 [Section No. 16.7]

16.7* Air Venting.

The vent required by 8.1.5 shall be located near a high point in the system to allow air to be removed from that portion of the system by one of the following methods:

(1) Manual valve, minimum ½ in. (15 mm) size

(2) Automatic air vent

(3) ~~Remote inspector's~~ Inspector's test valve

(4) Other approved means

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 20:06:32 EDT 2022

Committee Statement

Committee Statement: This section addresses the requirement for the venting to be at a high point in the system. The remote area may not be a high point in a system.

Response Message: FR-1081-NFPA 13-2022

Public Input No. 479-NFPA 13-2022 [Section No. 16.7]

Public Input No. 480-NFPA 13-2022 [New Section after A.16.7]

First Revision No. 1082-NFPA 13-2022 [Section No. 16.9.4.1]

16.9.4.1

Where a fire department connection is installed or there is more than one source of water supply, a check valve shall be installed in each connection.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 08:17:17 EDT 2022

Committee Statement

Committee Statement: Clarifies the need for a check valve in all sources of water, including the FDC.

Response Message: FR-1082-NFPA 13-2022

Public Input No. 113-NFPA 13-2021 [Section No. 16.9.4.1]

First Revision No. 1101-NFPA 13-2022 [Section No. 16.9.4.3]

~~16.9.4.3~~

~~Where cushion tanks are used with automatic fire pumps, no check valve is required in the cushion tank connection.~~

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 11:36:59 EDT 2022

Committee Statement

Committee Statement: This is addressing fire pumps which are the purview of NFPA 20.

Response Message: FR-1101-NFPA 13-2022

Public Input No. 198-NFPA 13-2022 [Section No. 16.9.4.3]

First Revision No. 1083-NFPA 13-2022 [Section No. 16.10.3]

16.10.3 Dry Pipe and Preaction Systems.

Piping shall be pitched to drain as stated in 16.10.3.1 through 16.10.3.2.

16.10.3.1 Dry Pipe and Preaction Systems in Nonrefrigerated Areas.

~~In dry pipe system, branch~~ Branch lines shall be pitched at least ½ in. per 10 ft (4 mm/m), and mains shall be pitched at least ¼ in. per 10 ft (2 mm/m) in nonrefrigerated areas.

~~**16.10.3.2** Preaction Systems.~~

~~In preaction systems, branch lines shall be pitched at least ½ in. per 10 ft (4 mm/m), and mains shall be pitched at least ¼ in. per 10 ft (2 mm/m).~~

16.10.3.2 Dry Pipe and Preaction Systems in Refrigerated Areas.

Branch lines shall be pitched at least ½ in. per 10 ft (4 mm/m), and mains shall be pitched at least ½ in. per 10 ft (4 mm/m) in refrigerated areas.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 08:23:10 EDT 2022

Committee Statement

Committee Statement: The submitters language combines two requirements to eliminate redundancy.

Response Message: FR-1083-NFPA 13-2022

Public Input No. 92-NFPA 13-2021 [Section No. 16.10.3]

First Revision No. 1084-NFPA 13-2022 [Section No. 16.10.4.2]

16.10.4.2*

~~Drain~~ Main drain test connections for system ~~supply~~ risers ~~and~~ mains shall be sized as shown in Table 16.10.4.2.

Table 16.10.4.2 Drain Size

Riser ~~or Main~~ Size		Size of Drain Connection	
in.	mm	in.	mm
Up to 2	Up to 50	¾ or larger	20 or larger
2½, 3, 3½	65, 80, 90	1¼ or larger	32 or larger
4 and larger	100 and larger	2 or larger	50 or larger

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 08:31:51 EDT 2022

Committee Statement

Committee Statement: As this section is currently worded, one could interpret that any drain installed on a main (cross main, feed main) would have to be sized in accordance with Table 16.10.4.2 instead of the requirements for auxiliary drains. Sprinkler system supply risers is not a defined term. The term system riser is defined and is inclusive of vertical and horizontal pipes supplying sprinkler system

Response Message: FR-1084-NFPA 13-2022

Public Input No. 42-NFPA 13-2021 [Section No. 16.10.4.2]

First Revision No. 1087-NFPA 13-2022 [New Section after 16.11.1.2]

16.11.1.3 Documentation Cabinet.

16.11.1.3.1

A documentation cabinet shall be installed at an approved location at the protected premises.

16.11.1.3.2

The documentation cabinet shall be sized so that it can contain all necessary documentation.

16.11.1.3.3

All record documentation shall be stored in the documentation cabinet in an electronic or hardcopy format.

16.11.1.3.4

The documentation cabinet shall contain at a minimum the final record of completion documents, final shop drawings, and as-builts of the fire sprinkler system.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 09:01:24 EDT 2022

Committee Statement

Committee Statement: Providing a permanent cabinet for documentation on the premises is necessary for future ITM activities, building modifications, etc. Storing electronic media within the cabinet is acceptable.

Response Message: FR-1087-NFPA 13-2022

Public Input No. 344-NFPA 13-2022 [New Section after 16.11.1.2]

First Revision No. 1088-NFPA 13-2022 [Section No. 16.12.3.1.3]

16.12.3.1.3

A single-~~outlet~~ inlet fire department connection shall be acceptable where piped to a 3 in. (80 mm) or smaller riser.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 09:44:46 EDT 2022

Committee Statement

Committee Statement: The proper term is “inlet.”

Response Message: FR-1088-NFPA 13-2022

Public Input No. 45-NFPA 13-2021 [Section No. 16.12.3.1.3]

First Revision No. 1089-NFPA 13-2022 [Section No. 16.13.3]

16.13.3

The required pressure gauges shall be approved and shall have a maximum limit not less than ~~twice~~ one and a half times the normal system working pressure at the point where installed.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 09:46:22 EDT 2022

Committee Statement

Committee Statement: Gauges are most accurate in the middle third and this would permit a 300 psi gauge to be installed on systems with a working pressure of 175 psi.

Response Message: FR-1089-NFPA 13-2022

Public Input No. 46-NFPA 13-2021 [Section No. 16.13.3]

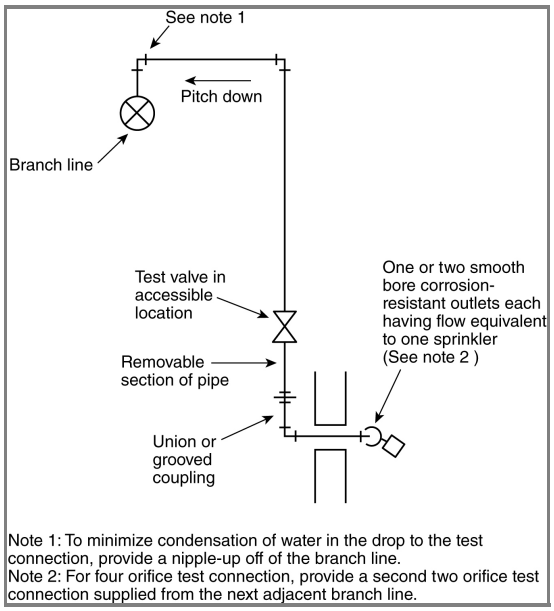
First Revision No. 1090-NFPA 13-2022 [Sections 16.14.2, 16.14.3]

16.14.2* Dry Pipe Systems.

A.16.14.2

Specific water delivery time, when required, is based upon the actual or calculated flow from a particular number of sprinklers. The system test connection shall be provided with that number of smooth-bore orifices. See Figure A.16.14.2 ~~and Figure A.8.2.3.7~~ .

Figure A.16.14.2 System Test Connection on Dry Pipe System.



16.14.2.1

A trip test connection ~~or manifold~~ not less than 1 in. (25 mm) in diameter, terminating in a smooth bore corrosion-resistant orifice, to provide a flow equivalent to one sprinkler of a type installed on the ~~particular~~ system, shall be installed on each system, except as modified in 16.14.2.2 and 16.14.2.3 .

16.14.2.2

When the water delivery requirement has been determined in accordance with 8.2.4.7 or 8.2.4.8 for two sprinklers, the test connection shall be arranged to simulate two sprinklers on the most remote sprinkler branch line.

16.14.2.3

When the water delivery requirement has been determined in accordance with 8.2.4.7 or 8.2.4.8 for four sprinklers, the test connection shall be arranged to simulate two sprinklers on the most remote sprinkler branch line and two sprinklers on the next adjacent branch line.

16.14.2.4

The trip test connection ~~or manifold~~ shall be located on the end of the most distant sprinkler pipe (s) ~~in the upper story~~ and shall be equipped with an accessible shutoff valve ~~and a plug~~ not less than 1 in. (25 mm)~~,~~ size ~~of which at least one shall be brass~~ .

16.14.2.4.1

Disconnection of the trip test connection and plugging of the valve between test cycles shall be permitted.

~~16.14.2.5~~

~~In lieu of a plug, a nipple and cap shall be acceptable.~~

~~16.14.2.6~~

~~When the capacity (volume) of the dry pipe system has been determined in accordance with 8.2.3.2 , 8.2.3.3 , 8.2.3.2 , or 8.2.3.5, a trip test connection shall be permitted to provide a flow equivalent to one sprinkler in accordance with 16.14.2.1 through 16.14.2.3 .~~

~~16.14.2.7~~

~~When the capacity (volume) of the dry pipe system has been determined in accordance with 8.2.3.7, the following shall apply:~~

~~When flow is from four sprinklers, the trip test manifold shall be arranged to simulate two sprinklers on each of two sprinkler branch lines.~~

~~When flow is from three sprinklers, the test manifold shall be arranged to simulate two sprinklers on the most remote branch line and one sprinkler on the next adjacent branch line.~~

~~When flow is from two sprinklers, the test manifold shall be arranged to simulate two sprinklers on the most remote branch line.~~

~~When flow is from one sprinkler, the test manifold shall be installed per the requirements for a trip test connection in accordance with 16.14.2.1 through 16.14.2.3 .~~

16.14.2.5

The connection used to control the level of priming water or to remove excess water from above the clapper shall be considered adequate to test the operation of the alarms monitoring the supervisory pneumatic pressure.

16.14.3 Preaction Systems.

16.14.3.1

~~A test connection shall be provided on a preaction system using supervisory air.~~ A trip test connection in accordance with 16.14.2 shall be installed on each double interlock and noninterlock preaction systems.

16.14.3.2

The connection used to control the level of priming water or to remove excess water from above the clapper shall be considered adequate to test the operation of the alarms monitoring the supervisory ~~air~~ pneumatic pressure.

16.14.3.3

For double interlock preaction systems, a trip test connection or manifold not less than 1 in. (25 mm) in diameter, terminating in a smooth bore corrosion-resistant orifice to provide a flow equivalent to one sprinkler of a type installed on the particular system, shall be installed.

~~**16.14.3.4**~~

~~For double interlock preaction systems, the trip test connection or manifold shall be located on the end of the most distant sprinkler pipe in the upper story and shall be equipped with an accessible shutoff valve and a plug not less than 1 in. (25 mm), of which at least one shall be brass.~~

~~**16.14.3.5**~~

~~In lieu of a plug, a nipple and cap shall be acceptable.~~

~~**16.14.3.6**~~

~~When the capacity (volume) of the double interlock preaction system has been determined in accordance with 8.3.2.3.1.1 , 8.3.2.3.1.2 , or 8.3.2.3.1.3 , a trip test connection shall be permitted to provide a flow equivalent to one sprinkler in accordance with 16.14.3.3 through 16.14.3.5 .~~

~~**16.14.3.7**~~

~~When the capacity (volume) of the double interlock preaction system has been determined in accordance with 8.3.2.3.1.4 , the following shall apply:~~

~~When flow is from four sprinklers, the trip test manifold shall be arranged to simulate two sprinklers on each of two sprinkler branch lines.~~

~~When flow is from three sprinklers, the test manifold shall be arranged to simulate two sprinklers on the most remote branch line and one sprinkler on the next adjacent branch line.~~

~~When flow is from two sprinklers, the test manifold shall be arranged to simulate two sprinklers on the most remote branch line.~~

~~When flow is from one sprinkler, the test manifold shall be installed as per the requirements for a trip test connection in accordance with 16.14.3.3 through 16.14.3.5 .~~

Supplemental Information

File Name	Description	Approved
16_14_2_and_16_14_3.docx	Replace 16.4.2 and 16.4.3	

Submitter Information Verification

Committee: AUT-SSI
Submittal Date: Wed Jul 27 09:56:57 EDT 2022

Committee Statement

Committee Statement: Reorganized dry pipe and preaction requirements to eliminate redundancy.
Response Message: FR-1090-NFPA 13-2022

Public Input No. 565-NFPA 13-2022 [Section No. 16.14.3]

Public Input No. 288-NFPA 13-2022 [Section No. 16.14.2.1]

Public Input No. 289-NFPA 13-2022 [Section No. 16.14.3.3]

Public Input No. 563-NFPA 13-2022 [Section No. 16.14.2]

First Revision No. 1133-NFPA 13-2022 [Section No. 29.2.1.4 [Excluding any Sub-Sections]]

Where a fire pump is used for a system, the test pressure shall be determined using the shutoff pressure of the pump plus the maximum static pressure of the water supply adjusted for elevation .

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 16:50:50 EDT 2022

Committee Statement

Committee Statement: Clarifies that the pressure should be calculated by combining the pump churn and maximum static including any elevation gain or loss.

Response Message: FR-1133-NFPA 13-2022

Public Input No. 286-NFPA 13-2022 [Section No. 29.2.1.4 [Excluding any Sub-Sections]]

First Revision No. 1136-NFPA 13-2022 [Section No. 29.2.1.4.1]

29.2.1.4.1

Where a fire pump uses a pressure limiting device or variable speed motor, the test pressure shall be ~~calculated ignoring the settings of the pressure limiting device~~ based on the set pressure of the main relief valve .

29.2.1.4.2

Where a main relief valve is not provided, the pressure shall be calculated ignoring the settings of the pressure limiting device.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 16:55:27 EDT 2022

Committee Statement

Committee Statement: Where you have two protective components the lower pressure is permitted to be used.

Response Message: FR-1136-NFPA 13-2022

Public Input No. 1-NFPA 13-2021 [Section No. 29.2.1.4.1]

First Revision No. 1138-NFPA 13-2022 [Section No. 29.2.1.8]

29.2.1.8

Piping between the ~~exterior~~ fire department connection and the check valve in the fire department inlet pipe shall be hydrostatically tested in the same manner as the balance of the system. ~~After repair or replacement work affecting the fire department connection, the piping between the exterior and the check valve in the fire department inlet pipe shall be isolated and hydrostatically tested at 150 psi (10 bar).~~

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 17:12:34 EDT 2022

Committee Statement

Committee Statement: Language addressing existing systems is being moved to Chapter 30.

Response Message: FR-1138-NFPA 13-2022

Public Input No. 282-NFPA 13-2022 [Section No. 29.2.1.8]

First Revision No. 1140-NFPA 13-2022 [Section No. 29.2.1.13]

29.2.1.13

When subject to hydrostatic test pressures, the clapper of a ~~differential-type~~ dry pipe valve shall be ~~held off its seat~~ in the position as stated by the manufacturer's published instructions to prevent damaging the valve.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 17:15:17 EDT 2022

Committee Statement

Committee Statement: Each manufacturer has different recommendations. This allows for the valves to be tested in such a way as to not damage the components.

Response Message: FR-1140-NFPA 13-2022

Public Input No. 117-NFPA 13-2022 [Section No. 29.2.1.13]

First Revision No. 1141-NFPA 13-2022 [New Section after 29.2.3.2.3.2]

29.2.3.2.4

Systems shall be filled with air through the approved air supply until the required set pressure of the valve is met.

29.2.3.2.4.1

The system shall reach the required set pressure within 30 minutes from the time the air supply is opened.

29.2.3.2.4.2

Systems maintained at or below 5°F (-15°C) shall be permitted to reach the required set pressure within 60 minutes.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 17:26:19 EDT 2022

Committee Statement

Committee Statement: Added test requirements for dry systems that are outlined on the test certificate. Renumber subsequent section.

Response Message: FR-1141-NFPA 13-2022

Public Input No. 58-NFPA 13-2021 [New Section after 29.2.3.2.3]

First Revision No. 1142-NFPA 13-2022 [Section No. 29.2.3.2.4]

29.2.3.2.5

The results shall be recorded using the contractor's material and test certificate for aboveground piping *(see Figure A.29.1)* and the general information sign *(see Figure A.29.6)*.

Submitter Information Verification

Committee: AUT-SSI
Submittal Date: Wed Jul 27 17:35:08 EDT 2022

Committee Statement

Committee Statement: Closed parentheses added.
Response Message: FR-1142-NFPA 13-2022

First Revision No. 1143-NFPA 13-2022 [New Section after 29.2.3.5]

29.2.3.6 Wet Pipe System Air Venting Valves.

29.2.3.6.1

Where manual valves are installed in accordance with Section 16.7 to meet the air venting requirements of 8.1.5 , they shall be operated during filling of the system.

29.2.3.6.2

Manual valves shall remain open until water reaches the valve and trapped air has escaped.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 17:38:09 EDT 2022

Committee Statement

Committee Statement: This new language provides additional clarity regarding the proper use of air venting valves.

Response Message: FR-1143-NFPA 13-2022

Public Input No. 313-NFPA 13-2022 [New Section after 29.2.3.5]

First Revision No. 1144-NFPA 13-2022 [Section No. 29.6.1.2]

29.6.1.2

Such signs shall be placed at each system ~~control~~ riser~~, antifreeze loop, and auxiliary system control valve~~ .

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 17:57:07 EDT 2022

Committee Statement

Committee Statement: System Control riser is not a recognized term. Other areas of the standard cover signs for antifreeze and auxiliary system control valves.

Response Message: FR-1144-NFPA 13-2022

Public Input No. 119-NFPA 13-2022 [Section No. 29.6.1.2]

First Revision No. 1145-NFPA 13-2022 [Section No. 29.6.2]

29.6.2

The sign shall include the following information:

(1) Name and location of the facility protected
(2) Edition of NFPA 13
(3) Occupancy classification
(4) Commodity classification
(5) Presence of high-piled and/or rack storage
(6) Maximum height of storage planned
(7) Aisle width planned
(8) Encapsulation of pallet loads
(9) Presence of solid shelving
(10) Flow test data
(11) Presence of flammable/combustible liquids
(12) Presence of hazardous materials
(13) Presence of other special storage
(14) Location of venting valve
(15) Location of auxiliary drains and low point drains on dry pipe and preaction systems
(16) Original results of main drain flow test
(17) Original results of dry pipe and double interlock preaction valve test
(18) Name of installing contractor or designer
(19) Indication of presence and location of antifreeze or other auxiliary systems
(20) Where injection systems are installed to treat MIC or corrosion, the type of chemical, concentration of the chemical, and where information can be found as to the proper disposal of the chemical
(21) Indication of presence of nitrogen where used to allow for increased *C* value in dry or preaction systems

Submitter Information Verification

Committee: AUT-SSI
Submittal Date: Wed Jul 27 18:04:42 EDT 2022

Committee Statement

Committee Statement: The edition of NFPA 13 that was applicable at the time of design.
Response Message: FR-1145-NFPA 13-2022

Public Input No. 148-NFPA 13-2022 [Section No. 29.6.2]

First Revision No. 1322-NFPA 13-2022 [Chapter 30 [Title Only]]

Existing System Modifications or Evaluation

Submitter Information Verification

Committee: AUT-SSI
Submittal Date: Wed Aug 24 10:01:39 EDT 2022

Committee Statement

Committee Statement: Modified title to represent the criteria covered in this chapter.
Response Message: FR-1322-NFPA 13-2022

Public Input No. 60-NFPA 13-2021 [Global Input]

Public Input No. 538-NFPA 13-2022 [Global Input]

First Revision No. 1323-NFPA 13-2022 [Section No. 30.1.1]

30.1.1

In addition to the applicable requirements of this standard, the requirements of Chapter ~~29~~ 30 shall apply where modifications, evaluations, or additions are made to existing systems.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Aug 24 10:03:53 EDT 2022

Committee Statement

Committee Statement: The Chapter reference has been corrected and the term evaluation was added to reference new criteria in this chapter on evaluating an existing sprinkler system.

Response Message: FR-1323-NFPA 13-2022

First Revision No. 1298-NFPA 13-2022 [New Section after 30.1.4]

30.1.5

Where existing system modifications include added or relocated sprinklers, or flexible sprinkler hose fittings are retroactively installed on existing systems, a hydraulic analysis or revised hydraulic calculations using current water supply data to accommodate the additional friction loss shall be completed as a part of the installation.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Aug 10 13:55:26 EDT 2022

Committee Statement

Committee Statement: The analysis of the system demand should be considered when revamping existing systems, regardless of the method used to add and relocate sprinklers.

Response Message: FR-1298-NFPA 13-2022

Public Input No. 56-NFPA 13-2021 [New Section after 30.1.4]

First Revision No. 1324-NFPA 13-2022 [Section No. 30.1.4]

30.1.4*

When backflow prevention devices are to be retroactively installed on existing systems, a ~~thorough~~ hydraulic analysis, including revised hydraulic calculations, new fire flow data, and all ~~necessary~~ modifications to accommodate the additional friction loss, shall be completed as a part of the installation.

A.30.1.4

It is not the intent of this section to require a full hydraulic analysis of the existing piping system. This requirement should only verify that the additional friction loss through the backflow prevention device is not detrimental to the original calculations when compared with the new flow test data.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Aug 24 10:10:52 EDT 2022

Committee Statement

Committee Statement: Removed vague terms from the body and reinserted the annex language that was in the 2016 edition.

Response Message: FR-1324-NFPA 13-2022

First Revision No. 1279-NFPA 13-2022 [New Section after 30.3.7]

30.3.8

Sprinklers having a K-factor exceeding K-5.6 (80) and having 1½ in. (15 mm) National Pipe Thread (NPT) shall be permitted to be installed in existing sprinkler systems if listed for such use.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Sat Jul 30 09:51:11 EDT 2022

Committee Statement

Committee Statement: Current NFPA 13 chapter 9.4.5 provides for this allowance by limiting 5.6 K-factor sprinklers to new system only. While making revisions to the existing systems chapter we should directly provide this allowance in the body of that chapter. 9.4.5 will remain as guidance for new systems.

Response Message: FR-1279-NFPA 13-2022

First Revision No. 1326-NFPA 13-2022 [Section No. 30.4]

30.5 Modification of Existing Systems.

30.5.1 Revamping of Pipe Schedule Systems.

30.5.1.1

The pipe schedule method shall be permitted as follows:

(1) Additions or modifications to existing pipe schedule systems sized according to the pipe schedules of Section 28.6

(2) Additions or modifications to existing extra hazard pipe schedule systems sized according to the extra hazard pipe schedule in Table 30.5.1.1

Table 30.5.1.1 Extra Hazard Pipe Schedule

Steel			Copper		
Size		Number of Sprinklers	Size		Number of Sprinklers
in.	mm		in.	mm	
1	25	1	1	25	1
1 1/4	32	2	1 1/4	32	2
1 1/2	40	5	1 1/2	40	5
2	50	8	2	50	8
2 1/2	65	15	2 1/2	65	20
3	80	27	3	80	30
3 1/2	90	40	3 1/2	90	45
4	100	55	4	100	65
5	125	90	5	125	100
6	150	150	6	150	170

Detail FR-1343

30.5.2 Revamping of Hydraulic Design Systems.

30.5.2.1

When hydraulically designed systems are revamped, any existing bushing shall be removed and a nipple not exceeding 4 in. (100 mm) in length shall be permitted to be installed in the branch line fitting.

30.5.2.2*

Calculations shall be provided to verify that the system design flow rate will be achieved.

30.5.2.3

When it is necessary to pipe two new ceiling sprinklers from an existing outlet in an overhead system, any bushings shall be removed and the use of a nipple not exceeding 4 in. (100 mm) in length and of the same pipe thread size as the existing outlet shall be permitted, provided that a hydraulic calculation verifies that the design flow rate will be achieved.

30.5.2.4

Where an armover is attached to connect to a sprinkler, the use of pipe nipples less than 1 in. (25 mm) in diameter shall not be permitted where seismic design is required on the system.

30.5.3

When pipe schedule systems are revamped to accommodate added ceilings, sprinkler outlets utilized for new armover or drop nipples shall have hexagonal bushings removed when present.

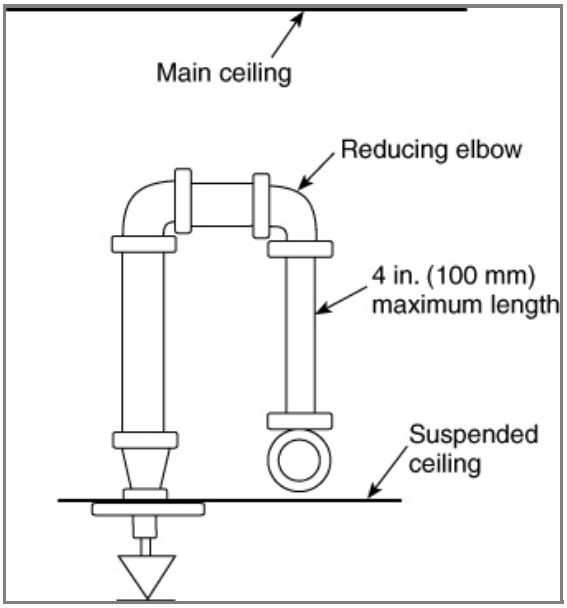
30.5.4

When pipe schedule systems are revamped, a nipple not exceeding 4 in. (100 mm) in length shall be permitted to be installed in the branch line fitting.

30.5.5

All piping other than the nipple permitted in 30.5.4 and 30.5.6 shall be a minimum of 1 in. (25 mm) in diameter in accordance with Figure 30.5.5.

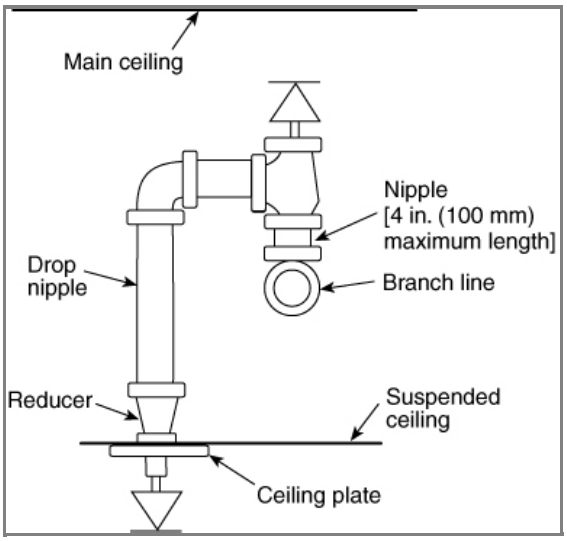
Figure 30.5.5 Nipple and Reducing Elbow Supplying Sprinkler Below Ceiling.



30.5.6

When it is necessary to pipe two new ceiling sprinklers from an existing outlet in an overhead system, the use of a nipple not exceeding 4 in. (100 mm) in length and of the same pipe thread size as the existing outlet shall be permitted in accordance with Figure 30.5.6, provided that a hydraulic calculation verifies that the design flow rate will be achieved.

Figure 30.5.6 Sprinklers in Concealed Space and Below Ceiling.



30.5.7

Where an armover is attached to connect to a sprinkler, the use of pipe nipples less than 1 in. (25 mm) in diameter shall not be permitted where seismic design is required on the system.

Supplemental Information

File Name	Description	Approved
Table_30.5.1.1_FR_1326.docx	For staff use	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Aug 24 13:46:39 EDT 2022

Committee Statement

Committee Statement: This section has been revised in an effort to differentiate sprinkler system modifications from sprinkler system evaluations.

Response Message: FR-1326-NFPA 13-2022

First Revision No. 1327-NFPA 13-2022 [Section No. 30.5]

~~**30.6***~~ ~~Existing Systems Area/Density Curves.~~

~~Where modifications are being made to an existing system designed based on CMDA criteria differing from the single point densities identified for new systems in Chapters 19 , 21 , or 25 , the criteria included in the respective area/density curves for existing systems shall be permitted to be applied.~~

~~**A.30.6**~~

~~The density/area curves have been maintained in the standard for use with existing systems. This includes the allowance for the use of the density/area curves for re-evaluation of existing sprinkler systems when changes in use or occupancy occur. This also allows the use of the density/area curves when modifications to existing systems are made.~~

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Aug 24 14:04:37 EDT 2022

Committee Statement

Committee Statement: The existing system information is being removed from the standard. In Chapter 30 a reference has been added that states that you can reference legacy editions that were used to design the system, using the density/area curves.

Response Message: FR-1327-NFPA 13-2022

First Revision No. 1330-NFPA 13-2022 [Section No. 30.8]

30.7 Testing.

30.7.1

Modifications to existing piping systems shall ~~require testing at system working pressure~~ be isolated and hydrostatically tested in accordance with 29.2.1 .

30.7.1.1

Where modifications ~~is made to an existing system affecting more than~~ affect 20 sprinklers or less , the new portion shall be ~~isolated and~~ hydrostatically tested at ~~not less than 200 psi (14 bar) for 2 hours~~ system working pressure .

30.7.1.2

~~Modifications~~ Regardless of the number of sprinklers affected, modifications that cannot be isolated~~, such as relocated drops,~~ shall ~~require testing~~ be hydrostatically tested at system working pressure.

30.7.1.3

Modifications to deluge systems shall be permitted to be flow tested in lieu of hydrostatic testing, to verify all the following:

(1) Water discharge patterns from all the open spray nozzles or sprinklers

(2) Adequate coverage of wetting surfaces to be protected

(3) Design pressure at the most remote nozzle or sprinkler

(4) Design pressure at the deluge valve

30.7.2

Modifications to existing dry pipe or double interlock preaction systems shall be tested for air leakage using one of the following test methods:

(1) An air pressure test at 40 psi (2.7 bar) shall be performed for 2 hours as follows:

   (a) The system shall be permitted to lose up to 3 psi (0.2 bar) during the duration of the test.

   (b) Air leaks shall be addressed if the system loses more than 3 psi (0.2 bar) during this test.

(2) With the system at normal system air pressure, the air source shall be shut off for 4 hours. If the low pressure alarm goes off within this period, the leaks shall be addressed.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Aug 24 14:18:58 EDT 2022

Committee Statement

Committee Statement:	Section renumbering. Cleaned up the requirements in order to explain when a modified system had to be hydrostatically tested in accordance with Chapter 29 and when system pressure could be used. Added requirements for modifications to deluge system since they do not use closed sprinklers or nozzles.
Response Message:	FR-1330-NFPA 13-2022

First Revision No. 1023-NFPA 13-2022 [Section No. A.3.3.215.2]

A.3.3.220.2 General Sprinkler Characteristics.

The response time index (RTI) is a measure of the sensitivity of the sprinkler's thermal element as installed in a specific sprinkler. It is usually determined by plunging a sprinkler into a heated laminar airflow within a test oven. The plunge test is not currently applicable to certain sprinklers.

The RTI is calculated using the following:

(1) The operating time of the sprinkler

(2) The operating temperature of the sprinkler's heat-responsive element (as determined in a bath test)

(3) The air temperature of the test oven

(4) The air velocity of the test oven

(5) The sprinkler's conductivity (*c*) factor, which is the measure of conductance between the sprinkler's heat-responsive element and the sprinkler oven mount

Other factors affecting response include the temperature rating, sprinkler position, fire exposure, and radiation.

ISO 6182-1, *Fire protection — Automatic sprinkler systems — Part 1: Requirements and test methods for sprinklers*, currently recognizes the RTI range of greater than 50 (meters-seconds)$^{1/2}$ and less than 80 (meters-seconds)$^{1/2}$ as special response. Such sprinklers can be recognized as special sprinklers under 15.2.1.

It should be recognized that the term *fast response*~~(like the term *quick response* used to define a particular type of sprinkler)~~ refers to the thermal sensitivity within the operating element of a sprinkler, not the time of operation in a particular installation. Many other factors, such as ceiling height, spacing, ambient room temperature, and distance below ceiling, affect the time of response of sprinklers. In most fire scenarios, sprinkler activation times will be shortest where the thermal elements are located 1 in. (25 mm) to 3 in. (75 mm) below the ceiling. A fast-response ~~sprinkler~~ element is expected to operate quicker than a standard-response ~~sprinkler~~ element in the same installation orientation. For modeling purposes, concealed sprinklers can be considered equivalent to pendent sprinklers having a similar thermal response sensitivity installed 12 in. (300 mm) below smooth unobstructed ceilings, and recessed sprinklers can be considered equivalent to pendent sprinklers having a similar thermal response sensitivity installed 8 in. (200 mm) below smooth unobstructed ceilings. (AUT-SSI)

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 14:49:35 EDT 2022

Committee Statement

Committee Statement: Clarifies this paragraph of the Standard.

Response Message: FR-1023-NFPA 13-2022

Public Input No. 62-NFPA 13-2021 [Section No. A.3.3.215.2]

First Revision No. 1021-NFPA 13-2022 [Section No. A.7.2.5.1]

A.16.2.2.1

Examples of such locations include the following:

(1) Paper mills
(2) Packing houses
(3) Tanneries
(4) Alkali plants
(5) Organic fertilizer plants
(6) Foundries
(7) Forge shops
(8) Fumigation, pickle, and vinegar works
(9) Stables
(10) Storage battery rooms
(11) Electroplating rooms
(12) Galvanizing rooms
(13) Steam rooms of all descriptions, including moist vapor dry kilns
(14) Salt storage rooms
(15) Locomotive sheds or houses
(16) Driveways
(17) Areas exposed to outside weather, such as piers and wharves exposed to salt air
(18) Areas under sidewalks
(19) Areas around bleaching equipment in flour mills
(20) All portions of cold storage buildings where a direct ammonia expansion system is used
(21) Portions of any plant where corrosive vapors prevail
(22) Area over and around swimming pools, chlorine storage rooms, and pool pump rooms

Submitter Information Verification

Committee: AUT-SSI
Submittal Date: Mon Jul 25 14:07:27 EDT 2022

Committee Statement

Committee Statement: Relocate the annex to the correct location.
Response Message: FR-1021-NFPA 13-2022

Public Input No. 216-NFPA 13-2022 [New Section after A.16.2.1.1]
Public Input No. 215-NFPA 13-2022 [Section No. A.7.2.5.1]

First Revision No. 1019-NFPA 13-2022 [Section No. A.7.2.6.2]

A.7.2.6.2

The use of the wrong type of escutcheon with recessed or flush-type sprinklers can result in severe disruption of the ~~spray pattern~~ operating characteristics , which can destroy the effectiveness of the sprinkler.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 13:55:42 EDT 2022

Committee Statement

Committee Statement: Improper escutcheons could affect response time, activation, and spray pattern so a more general term is more appropriate for the annex language.

Response Message: FR-1019-NFPA 13-2022

Public Input No. 65-NFPA 13-2021 [Section No. A.7.2.6.2]

First Revision No. 1022-NFPA 13-2022 [Section No. A.8.8.2.4]

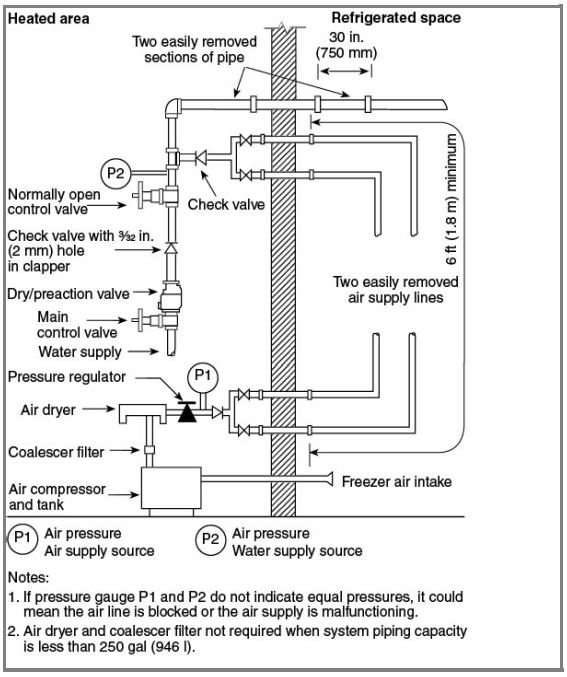
A.8.8.2.4

A higher degree of preventing the formation of ice blocks can be achieved by lowering the moisture of the air supply entering the refrigerated space to a pressure dew point ~~no greater than~~ of 20°F (−~~6.6~~ 11 °C) below the lowest nominal temperature of the refrigerated space or lower . The pressure dew point of the air supply can cause moisture to condense and freeze in sprinkler pipe even when the air supply is from the freezer. One method of reducing the moisture content of the air by use of air drying systems is illustrated in Figure A.8.8.2.4.

When compressors and dryers are used for an air supply, consideration should be given to pressure requirements of the regenerative dryers, compressor size, air pressure regulator capacity, and air fill rate. Application of these factors could necessitate the use of increased air pressures and a larger air compressor.

The compressed air supply should be properly prepared prior to entering a regenerative-type air dryer, such as minimum air pressure, maximum inlet air temperature, and proper filtration of compressed air.

Figure A.8.8.2.4 Refrigerator Area Sprinkler Systems Used to Minimize Chances of Developing Ice Plugs.



Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Mon Jul 25 14:26:05 EDT 2022

Committee Statement

Committee Statement: The value for degrees Celsius has been revised for the value of 20 degrees Fahrenheit correcting a conversion error.

Response Message: FR-1022-NFPA 13-2022

Public Input No. 170-NFPA 13-2022 [Section No. A.8.8.2.4]

First Revision No. 1318-NFPA 13-2022 [Section No. A.9.2.1.2.2]

A.9.2.1.2.2

Noncombustible and limited-combustible spaces with non-fuel-fired equipment and access panels should be considered a concealed space and should not require sprinkler protection. Localized protection in accordance with 9.3.17.1.2 should be considered where fuel-fired equipment is present in these spaces.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Fri Aug 19 10:10:34 EDT 2022

Committee Statement

Committee Statement: The statement is added to help provide some guidance that sprinklers may be needed in specific situation (such as a concealed space with fuel-fired equipment) and it may be possible to utilize section 9.3.17.1.2.

Response Message: FR-1318-NFPA 13-2022

Public Input No. 370-NFPA 13-2022 [Section No. A.9.2.1.2.2]

First Revision No. 1313-NFPA 13-2022 [Section No. A.9.2.11]

A.9.2.11

Equipment having access for routine maintenance should not be considered as intended for occupancy. This includes a service corridor space within rooftop air handling unit enclosures, accessible through a standard height side-hinged door.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Aug 16 16:12:35 EDT 2022

Committee Statement

Committee Statement: The added annex language helps to clarify that large rooftop HVAC systems are considered equipment.

Response Message: FR-1313-NFPA 13-2022

Public Input No. 246-NFPA 13-2022 [Section No. A.9.2.11]

Public Input No. 247-NFPA 13-2022 [Section No. 9.2.11]

First Revision No. 1250-NFPA 13-2022 [Section No. A.9.4.2.5]

A.9.4.2.5

A diffuser in ceiling sheathing labeled by the manufacturer as “horizontal discharge” has directional vanes to move air further along the ceiling, and sprinklers located within the 2 ft 6 in. (750 mm) radius should have an intermediate-temperature rating. See Figure A.9.4.2.5(a) through Figure A.9.4.2.5(d).

Figure A.9.4.2.5(a) Ordinary-Temperature Sprinkler over Recessed Fireplace.

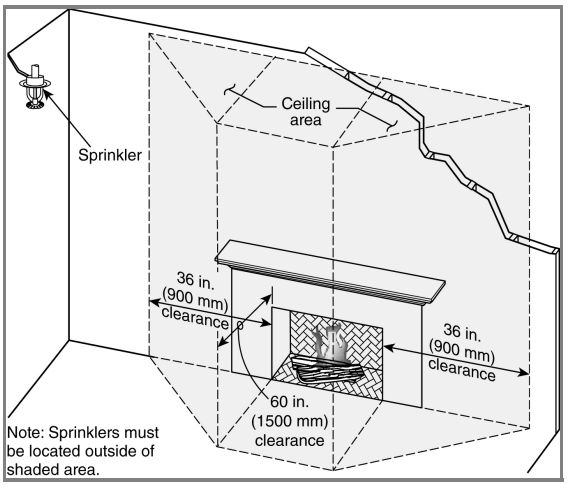


Figure A.9.4.2.5(b) Intermediate-Temperature Sprinkler over Recessed Fireplace.

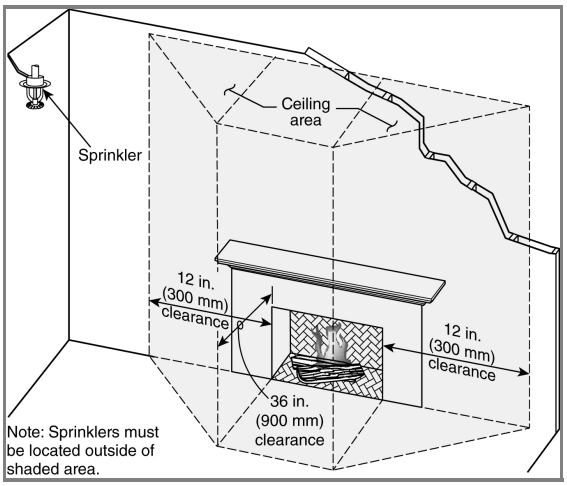


Figure A.9.4.2.5(c) Ordinary-Temperature Sprinkler over Open Fireplace.

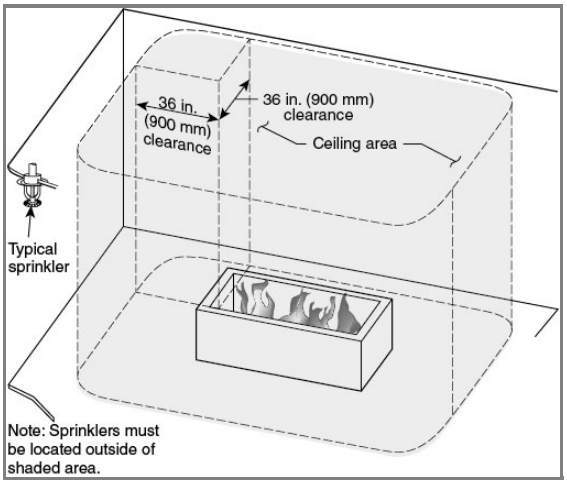
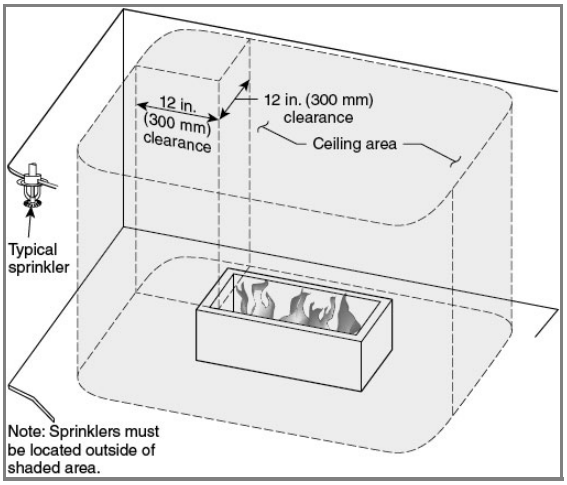


Figure A.9.4.2.5(d) Intermediate-Temperature Sprinkler over Open Fireplace.



Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Fri Jul 29 14:45:00 EDT 2022

Committee Statement

Committee Statement:	The current dimension line for Figure 9.4.2.5(a) and Figure 9.4.2.5(b) are incorrect. This corrects the dimension line for the 36” arrow and the 60” arrow. The figures in 13R and 13D were both corrected during the first draft meeting.
Response Message:	FR-1250-NFPA 13-2022

First Revision No. 1061-NFPA 13-2022 [Section No. A.10.2.5.2.3]

A.10.2.5.2.3

Examples of sprinklers in small rooms are shown in Figure A.10.2.5.2.3(a), Figure A.10.2.5.2.3(b), Figure A.10.2.5.2.3(c), and Figure A.10.2.5.2.3(d). The area of coverage of the sprinkler, as determined by dividing the area of the room by the number of sprinklers, cannot exceed the maximum area of coverage for the sprinkler being utilized in the small room.

Figure A.10.2.5.2.3(a) Small Room Provision — One Sprinkler.

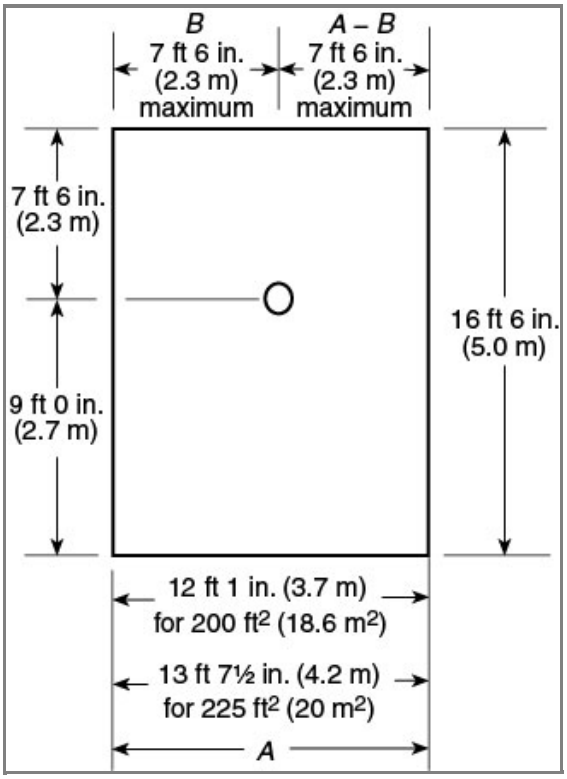


Figure A.10.2.5.2.3(b) Small Room Provision — Two Sprinklers Centered Between Sidewalls.

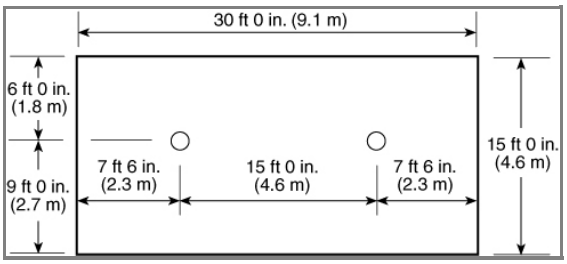


Figure A.10.2.5.2.3(c) Small Room Provision — Two Sprinklers Centered Between Top and Bottom Walls.

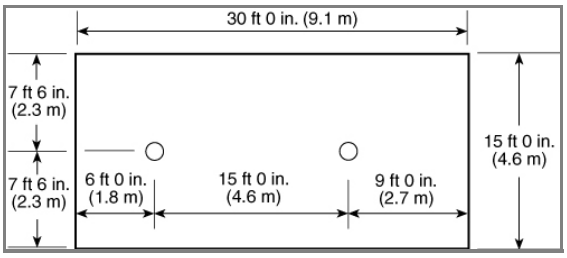
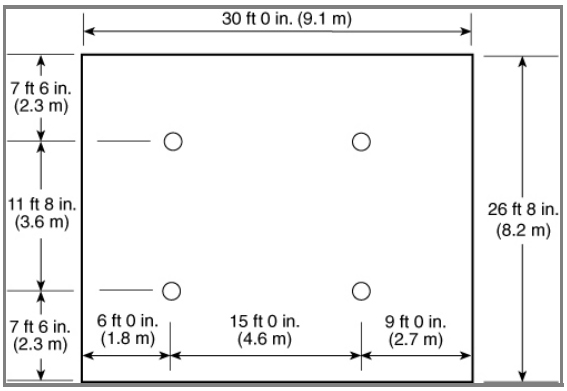


Figure A.10.2.5.2.3(d) Small Room Provision — Four Sprinklers.



Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 15:25:42 EDT 2022

Committee Statement

Committee Statement: The added statement will help understanding and applying figures A.10.2.5.2.3(a) and A.10.2.5.2.3(d).

Response Message: FR-1061-NFPA 13-2022

Public Input No. 66-NFPA 13-2021 [Section No. A.10.2.5.2.3]

First Revision No. 1062-NFPA 13-2022 [Section No. A.11.2.2.2.1]

A.11.2.5.2.2.1

Testing has shown that privacy curtains supported from the ceiling by mesh fabric do not obstruct the distribution pattern in a negative way as long as the mesh is 70 percent or more open and extends from the ceiling a minimum of 22 in. (550 mm).

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Tue Jul 26 15:47:26 EDT 2022

Committee Statement

Committee Statement: Annex does not go with Section 11.2.2.2.1 and has been relocated to A.11.2.5.2.2.1.

Response Message: FR-1062-NFPA 13-2022

Public Input No. 573-NFPA 13-2022 [Section No. A.11.2.2.2.1]

Public Input No. 575-NFPA 13-2022 [New Section after A.11.2.5.2.1.9]

First Revision No. 1092-NFPA 13-2022 [Section No. A.16.2.7.1]

A.16.2.7.1

It is the intent of this section to require spare sprinklers and associated manufacturer's sprinkler wrenches based on the facility as opposed to individual buildings or systems. Spare sprinklers for campus arrangements such as schools, hospitals, or multifamily complexes should be located under the owner's control and are not necessarily required to be provided at each building or riser location. A sufficiently sized cabinet(s) capable of meeting the requirements for a single building is adequate. The spare sprinkler cabinet should contain all the various types found on the property based on in the quantities prescribed in Chapter 16 .

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 10:33:16 EDT 2022

Committee Statement

Committee Statement: Incorporating annex language from 16.2.7.2 so that the topic of a single cabinet for large buildings and campus style buildings is contained in one section.

Response Message: FR-1092-NFPA 13-2022

Public Input No. 73-NFPA 13-2021 [Section No. A.16.2.7.1]

First Revision No. 1093-NFPA 13-2022 [Section No. A.16.2.7.2]

~~A.16.2.7.2~~

~~It is not the intent to provide a spare sprinkler box for each building in the one location. A sufficiently sized cabinet(s) capable of meeting the requirements for a single building is adequate. The box should contain all the various types found on the property in the quantities prescribed in Chapter 16 . A prime example is an apartment complex.~~

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 10:36:46 EDT 2022

Committee Statement

Committee Statement: The text was revised and relocated to 16.2.7.1. Each sprinkler orientation needs to be represented in the spare sprinkler cabinet.

Response Message: FR-1093-NFPA 13-2022

Public Input No. 72-NFPA 13-2021 [Section No. A.16.2.7.2]

First Revision No. 1340-NFPA 13-2022 [Section No. A.16.3.2]

A.16.3.2

See Table A.16.3.2.

Table A.16.3.2 Steel Pipe Dimensions

Nominal Pipe Size		Outside Diameter		Schedule 5				Schedule 10[a]				Sche	
				Inside Diameter		Wall Thickness		Inside Diameter		Wall Thickness		Inside Diameter	
in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
½[b]	15	0.840	21.3	—	—	—	—	0.674	17.1	0.083	2.1	—	—
¾[b]	20	1.050	26.7	—	—	—	—	0.884	22.4	0.083	2.1	—	—
1	25	1.315	33.4	1.185	30.1	0.065	1.7	1.097	27.9	0.109	2.8	—	—
1¼	32	1.660	42.2	1.530	38.9	0.065	1.7	1.442	36.6	0.109	2.8	—	—
1½	40	1.900	48.3	1.770	45.0	0.065	1.7	1.682	42.7	0.109	2.8	—	—
2	50	2.375	60.3	2.245	57.0	0.065	1.7	2.157	54.8	0.109	2.8	—	—
2½	65	2.875	73.0	2.709	68.8	0.083	2.1	2.635	66.9	0.120	3.0	—	—
3	80	3.500	88.9	3.334	84.7	0.083	2.1	3.260	82.8	0.120	3.0	—	—
3½	90	4.000	101.6	3.834	97.4	0.083	2.1	3.760	95.5	0.120	3.0	—	—
4	100	4.500	114.3	4.334	110.1	0.083	2.1	4.260	108.2	0.120	3.0	—	—
5	125	5.563	141.3	—	—	—	—	5.295	134.5	0.134	3.4	—	—
6	150	6.625	168.3	6.407	162.7	0.109	2.8	6.357	161.5	0.134[c]	3.4	—	—
8	200	8.625	219.1	—	—	—	—	8.249	209.5	0.188[c]	4.8	8.071	205.0
10	250	10.750	273.1	—	—	—	—	10.370	263.4	0.188[c]	4.8	10.140	257.6
12	300	12.750	—	—	—	—	—	—	—	—	—	12.090	—

[a]Schedule 10 defined to 5 in. (127 mm) nominal pipe size by ASTM A135, *Standard Specification for Electric-Resistance-Welded Steel Pipe*.

[b]These values applicable when used in conjunction with Section ~~30.4~~ 30.5.1 and Section ~~30.6~~ 30.5.2 .

[c]Wall thickness specified in 16.3.2.

[d]Wall thickness specified in 16.3.3.

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Sep 07 08:05:58 EDT 2022

Committee Statement

Committee Statement: Updated references in table footnote.

Response Message: FR-1340-NFPA 13-2022

First Revision No. 1099-NFPA 13-2022 [Section No. A.16.8.4]

~~A.16.8.4~~

~~Listed flexible connections are permissible and encouraged for sprinkler installations in racks to reduce the possibility of physical damage. Where flexible tubing is used, it should be located so that it will be protected against mechanical injury.~~

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 10:54:54 EDT 2022

Committee Statement

Committee Statement: Flexible couplings are required by the standard for drops to racks, where subject to earthquakes.

Response Message: FR-1099-NFPA 13-2022

Public Input No. 67-NFPA 13-2021 [Section No. A.16.8.4]

First Revision No. 1100-NFPA 13-2022 [Section No. A.16.10.5.2.1]

~~A.16.10.5.2.1~~

~~An example of an accessible location would be a valve located approximately 7 ft (2.1 m) above the floor level to which a hose could be connected to discharge the water in an acceptable manner.~~

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Wed Jul 27 11:09:32 EDT 2022

Committee Statement

Committee Statement: Auxiliary drains for wet systems do not need to be within 7 ft of the floor as they can be accessible by use of ladders, lifts, or other methods to drain sections when performing maintenance work. These valves would not have to be readily accessible during an emergency.

Response Message: FR-1100-NFPA 13-2022

Public Input No. 594-NFPA 13-2022 [Section No. A.16.10.5.2.1]

First Revision No. 1147-NFPA 13-2022 [Section No. A.29.1]

A.29.1

See Figure A.29.1.

Figure A.29.1 Contractor's Material and Test Certificate for Aboveground Piping.

Contractor's Material and Test Certificate for Aboveground Piping

PROCEDURE

Upon completion of work, inspection and tests shall be made by the contractor's representative and witnessed by the property owner or their authorized agent. All defects shall be corrected and system left in service before contractor's personnel finally leave the job.

A certificate shall be filled out and signed by both representatives. Copies shall be prepared for approving authorities, owners, and contractor. It is understood the owner's representative's signature in no way prejudices any claim against contractor for faulty material, poor workmanship, or failure to comply with approving authority's requirements or local ordinances.

Property name | Date

Property address

New installation? ❑ Yes ❑ No

Modification? If yes, complete applicable portions of the form. ❑ Yes ❑ No

Provide a description of the scope of work on page 3.

Plans

Accepted by approving authorities (names)

Address

Installation conforms to accepted plans ❑ Yes ❑ No

Equipment used is approved ❑ Yes ❑ No

If no, explain deviations

Instructions

Has person in charge of fire equipment been instructed as to location of control valves and care and maintenance of this new equipment? ❑ Yes ❑ No

If no, explain

Have copies of the following been left on the premises? ❑ Yes ❑ No

1. System components instructions ❑ Yes ❑ No
2. Care and maintenance instructions ❑ Yes ❑ No
3. NFPA 25 ❑ Yes ❑ No

Location of system

Supplies buildings

Sprinklers

Make	Model	Year of manufacture	Orifice size	Quantity	Temperature rating

Pipe and fittings

Type of pipe

Type of fittings

Alarm valve or flow indicator

Alarm device			Maximum time to operate through test connection	
Type	Make	Model	Minutes	Seconds

Dry pipe and double-interlock preaction operating test

Dry valve			Q. O. D.		
Make	Model	Serial no.	Make	Model	Serial no.

	Time to trip through test connection[a,b]		Water pressure	Air pressure	Trip point air pressure	Time water reached test outlet[a,b]		Alarm operated properly	
	Minutes	Seconds	psi	psi	psi	Minutes	Seconds	Yes	No
Without Q.O.D.									
With Q.O.D.									

If no, explain

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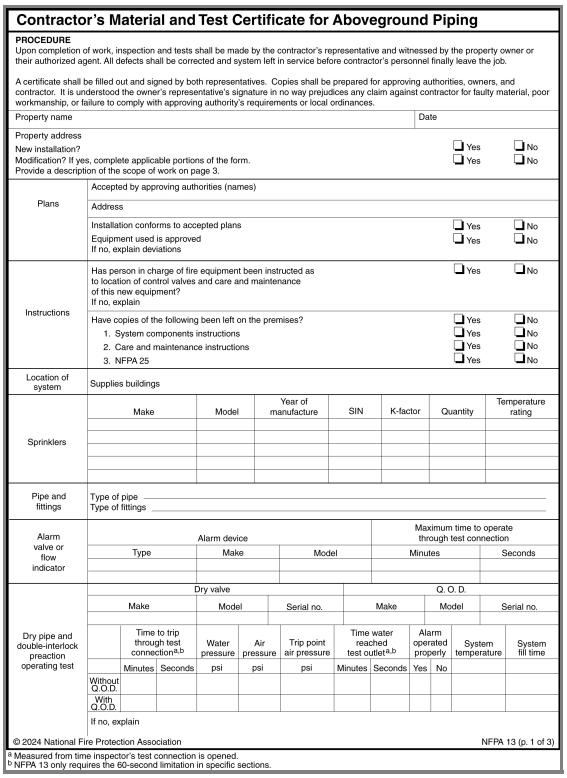
[a] Measured from time inspector's test connection is opened.
[b] NFPA 13 only requires the 60-second limitation in specific sections.



Contractor's Material and Test Certificate for Aboveground Piping

PROCEDURE

Upon completion of work, inspection and tests shall be made by the contractor's representative and witnessed by the property owner or their authorized agent. All defects shall be corrected and system left in service before contractor's personnel finally leave the job.

A certificate shall be filled out and signed by both representatives. Copies shall be prepared for approving authorities, owners, and contractor. It is understood the owner's representative's signature in no way prejudices any claim against contractor for faulty material, poor workmanship, or failure to comply with approving authority's requirements or local ordinances.

Property name | Date

Property address

New installation? ❑ Yes ❑ No

Modification? If yes, complete applicable portions of the form. ❑ Yes ❑ No

Provide a description of the scope of work on page 3.

Plans

Accepted by approving authorities (names)

Address

Installation conforms to accepted plans ❑ Yes ❑ No

Equipment used is approved ❑ Yes ❑ No

If no, explain deviations

Instructions

Has person in charge of fire equipment been instructed as to location of control valves and care and maintenance of this new equipment? ❑ Yes ❑ No

If no, explain

Have copies of the following been left on the premises? ❑ Yes ❑ No

1. System components instructions ❑ Yes ❑ No
2. Care and maintenance instructions ❑ Yes ❑ No
3. NFPA 25 ❑ Yes ❑ No

Location of system

Supplies buildings

Sprinklers

Make	Model	Year of manufacture	SIN	K-factor	Quantity	Temperature rating

Pipe and fittings

Type of pipe

Type of fittings

Alarm valve or flow indicator

Alarm device			Maximum time to operate through test connection	
Type	Make	Model	Minutes	Seconds

Dry pipe and double-interlock preaction operating test

Dry valve			Q. O. D.		
Make	Model	Serial no.	Make	Model	Serial no.

	Time to trip through test connection[a,b]		Water pressure	Air pressure	Trip point air pressure	Time water reached test outlet[a,b]		Alarm operated properly		System temperature	System fill time
	Minutes	Seconds	psi	psi	psi	Minutes	Seconds	Yes	No		
Without Q.O.D.											
With Q.O.D.											

If no, explain

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[a] Measured from time inspector's test connection is opened.
[b] NFPA 13 only requires the 60-second limitation in specific sections.

Deluge and preaction valves

Operation ❑ Pneumatic ❑ Electric ❑ Hydraulics

Piping supervised ❑ Yes ❑ No — Detecting media supervised ❑ Yes ❑ No

Does valve operate from the manual trip, remote, or both control stations? ❑ Yes ❑ No

Is there an accessible facility in each circuit for testing? ❑ Yes ❑ No — If no, explain

Make	Model	Does each circuit operate supervision loss alarm? Yes	No	Does each circuit operate valve release? Yes	No	Maximum time to operate release: Minutes	Seconds

Pressure-reducing valve test

Location and floor	Make and model	Setting	Static pressure: Inlet (psi)	Outlet (psi)	Residual pressure (flowing): Inlet (psi)	Outlet (psi)	Flow rate: Flow (gpm)

Backflow device forward flow test

Indicate means used for forward flow test of backflow device: _____

When means to test device was opened, was system flow demand created? ❑ Yes ❑ No ❑ N/A

Test description

Hydrostatic: Hydrostatic tests shall be made at not less than 200 psi (13.8 bar) for 2 hours or 50 psi (3.4 bar) above static pressure in excess of 150 psi (10.3 bar) for 2 hours. Differential dry pipe valve clappers shall be left open during the test to prevent damage. All aboveground piping leakage shall be stopped.

Pneumatic: Establish 40 psi (2.7 bar) air pressure and measure drop, which shall not exceed 1½ psi (0.1 bar) in 24 hours. Test pressure tanks at normal water level and air pressure and measure air pressure drop, which shall not exceed 1½ psi (0.1 bar) in 24 hours.

Tests

All piping hydrostatically tested at _____ psi (____ bar) for _____ hours ❑ Yes ❑ No — If no, state reason

Dry piping pneumatically tested ❑ Yes ❑ No

Equipment operates properly ❑ Yes ❑ No

Do you certify as the sprinkler contractor that additives and corrosive chemicals, sodium silicate or derivatives of sodium silicate, brine, or other corrosive chemicals were not used for testing systems or stopping leaks? ❑ Yes ❑ No

Drain test — Reading of gauge located near water supply test connection: _____ psi (____ bar) — Residual pressure with valve in test connection open wide: _____ psi (____ bar)

Underground mains and lead-in connections to system risers flushed before connection made to sprinkler piping

Verified by copy of the Contractor's Material and Test Certificate for Underground Piping. ❑ Yes ❑ No

Flushed by installer of underground sprinkler piping ❑ Yes ❑ No

Other Explain

If powder-driven fasteners are used in concrete, has representative sample testing been satisfactorily completed? ❑ Yes ❑ No — If no, explain

Blank testing gaskets

Number used — Locations — Number removed

Welding

Welding piping ❑ Yes ❑ No

If yes . . .

Do you certify as the sprinkler contractor that welding procedures used complied with the minimum requirements of AWS B2.1, ASME Section IX *Welding and Brazing Qualifications*, or other applicable qualification standard as required by the AHJ? ❑ Yes ❑ No

Do you certify that all welding was performed by welders or welding operators qualified in accordance with the minimum requirements of AWS B2.1, ASME Section IX *Welding and Brazing Qualifications*, or other applicable qualification standard as required by the AHJ? ❑ Yes ❑ No

Do you certify that the welding was conducted in compliance with a documented quality control procedure to ensure that (1) all discs are retrieved; (2) that openings in piping are smooth, that slag and other welding residue are removed; (3) the internal diameters of piping are not penetrated; (4) completed welds are free from cracks, incomplete fusion, surface porosity greater than 1/16 in. (1.6 mm) diameter, undercut deeper than the lesser of 25% of the wall thickness or 1/32 in. (0.8 mm); and (5) completed circumferential butt weld reinforcement does not exceed 3/32 in. (2.4 mm)? ❑ Yes ❑ No

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Deluge and preaction valves

Operation ❑ Pneumatic ❑ Electric ❑ Hydraulics

Piping supervised ❑ Yes ❑ No — Detecting media supervised ❑ Yes ❑ No

Does valve operate from the manual trip, remote, or both control stations? ❑ Yes ❑ No

Is there an accessible facility in each circuit for testing? ❑ Yes ❑ No — If no, explain

Make	Model	Does each circuit operate supervision loss alarm? Yes	No	Does each circuit operate valve release? Yes	No	Maximum time to operate release: Minutes	Seconds

Pressure-reducing valve test

Location and floor	Make and model	Setting	Static pressure: Inlet (psi)	Outlet (psi)	Residual pressure (flowing): Inlet (psi)	Outlet (psi)	Flow rate: Flow (gpm)

Backflow device forward flow test

Indicate means used for forward flow test of backflow device: _____

When means to test device was opened, was system flow demand created? ❑ Yes ❑ No ❑ N/A

Test description

Hydrostatic: Hydrostatic tests shall be made at not less than 200 psi (13.8 bar) for 2 hours or 50 psi (3.4 bar) above static pressure in excess of 150 psi (10.3 bar) for 2 hours. Differential dry pipe valve clappers shall be left open during the test to prevent damage. All aboveground piping leakage shall be stopped.

Pneumatic: Establish 40 psi (2.7 bar) air pressure and measure drop, which shall not exceed 1½ psi (0.1 bar) in 24 hours. Test pressure tanks at normal water level and air pressure and measure air pressure drop, which shall not exceed 1½ psi (0.1 bar) in 24 hours.

Tests

All piping hydrostatically tested at _____ psi (____ bar) for _____ hours ❑ Yes ❑ No — If no, state reason

Dry piping pneumatically tested ❑ Yes ❑ No

Equipment operates properly ❑ Yes ❑ No

Do you certify as the sprinkler contractor that additives and corrosive chemicals, sodium silicate or derivatives of sodium silicate, brine, or other corrosive chemicals were not used for testing systems or stopping leaks? ❑ Yes ❑ No

Drain test — Reading of gauge located near water supply test connection: _____ psi (____ bar) — Residual pressure with valve in test connection open wide: _____ psi (____ bar)

Underground mains and lead-in connections to system risers flushed before connection made to sprinkler piping

Verified by copy of the Contractor's Material and Test Certificate for Underground Piping. ❑ Yes ❑ No

Flushed by installer of underground sprinkler piping ❑ Yes ❑ No

Other Explain

If powder-driven fasteners are used in concrete, has representative sample testing been satisfactorily completed? ❑ Yes ❑ No — If no, explain

Blank testing gaskets

Number used — Locations — Number removed

Welding

Welding piping ❑ Yes ❑ No

If yes . . .

Do you certify as the sprinkler contractor that welding procedures used complied with the minimum requirements of AWS B2.1, ASME Section IX *Welding, Brazing, and Fusing Qualifications*, or other applicable qualification standard as required by the AHJ? ❑ Yes ❑ No

Do you certify that all welding was performed by welders or welding operators qualified in accordance with the minimum requirements of AWS B2.1, ASME Section IX *Welding, Brazing, and Fusing Qualifications*, or other applicable qualification standard as required by the AHJ? ❑ Yes ❑ No

Do you certify that the welding was conducted in compliance with a documented quality control procedure to ensure that (1) all discs are retrieved; (2) that openings in piping are smooth, that slag and other welding residue are removed; (3) the internal diameters of piping are not penetrated; (4) completed welds are free from cracks, incomplete fusion, surface porosity greater than 1/16 in. (1.6 mm) diameter, undercut deeper than the lesser of 25% of the wall thickness or 1/32 in. (0.8 mm); and (5) completed circumferential butt weld reinforcement does not exceed 3/32 in. (2.4 mm)? ❑ Yes ❑ No

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Cutouts (discs)	Do you certify that you have a control feature to ensure that all cutouts (discs) are retrieved? ❑ Yes ❑ No	
Hydraulic data nameplate	Nameplate provided ❑ Yes ❑ No	If no, explain
Sprinkler contractor removed all caps and straps? ❑ Yes ❑ No		
Remarks	Date left in service with all control valves open	
Signatures	Name of sprinkler contractor	
	Tests witnessed by	
	The property owner or their authorized agent (signed) Title Date	
	For sprinkler contractor (signed) Title Date	

Additional explanations and notes

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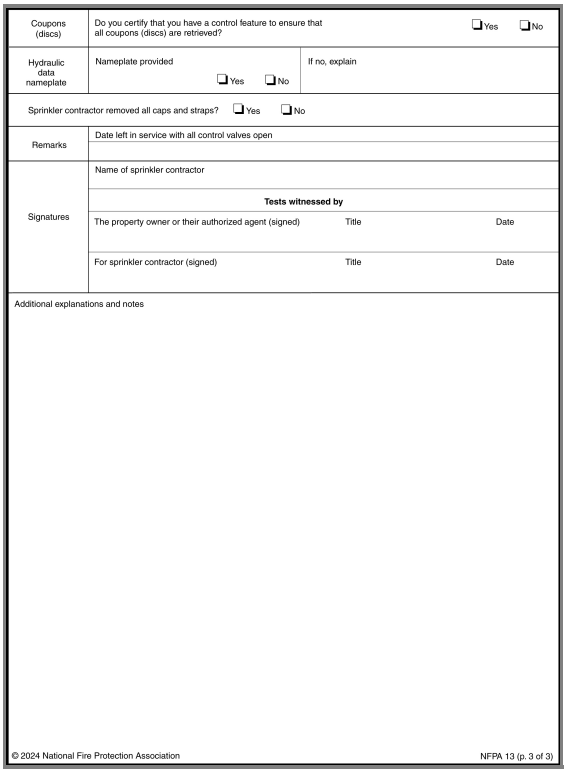

Coupons (discs)	Do you certify that you have a control feature to ensure that all coupons (discs) are retrieved? ❑ Yes ❑ No	
Hydraulic data nameplate	Nameplate provided ❑ Yes ❑ No	If no, explain
Sprinkler contractor removed all caps and straps? ❑ Yes ❑ No		
Remarks	Date left in service with all control valves open	
Signatures	Name of sprinkler contractor	
	Tests witnessed by	
	The property owner or their authorized agent (signed) Title Date	
	For sprinkler contractor (signed) Title Date	

Additional explanations and notes

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Supplemental Information

File Name	Description	Approved
Image_for_Figure_A.29.1_revisions.pdf	For staff use	

Submitter Information Verification

Committee: AUT-SSI
Submittal Date: Wed Jul 27 18:31:22 EDT 2022

Committee Statement

Committee Statement: These modifications to the document are appropriate.
Response Message: FR-1147-NFPA 13-2022

Public Input No. 585-NFPA 13-2022 [Section No. A.29.1]

Public Input No. 556-NFPA 13-2022 [Section No. A.29.1]

First Revision No. 1182-NFPA 13-2022 [Chapter F]

Annex G Informational References

G.1 Referenced Publications.

The documents or portions thereof listed in this annex are referenced within the informational sections of this standard and are not part of the requirements of this document unless also listed in Chapter 2 for other reasons.

G.1.1 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1, *Fire Code*, ~~2021~~ 2024 edition.

NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*, ~~2022~~ 2025 edition.

NFPA 13E, *Recommended Practice for Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems*, 2020 edition.

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NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection*, ~~2022~~ 2025 edition.

NFPA 22, *Standard for Water Tanks for Private Fire Protection*, ~~2018~~ 2023 edition.

NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*, ~~2020~~ 2023 edition.

NFPA 70®, *National Electrical Code®*, ~~2020~~ 2023 edition.

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NFPA *101®*, *Life Safety Code®*, ~~2021~~ 2024 edition.

NFPA 170, *Standard for Fire Safety and Emergency Symbols*, ~~2021~~ 2024 edition.

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NFPA 220, *Standard on Types of Building Construction*, ~~2021~~ 2024 edition.

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NFPA 259, *Standard Test Method for Potential Heat of Building Materials*, ~~2018~~ 2023 edition.

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NFPA 409, *Standard on Aircraft Hangars*, ~~2016~~ 2022 edition.

NFPA 750, *Standard on Water Mist Fire Protection Systems*, ~~2019~~ 2023 edition.

NFPA 780, *Standard for the Installation of Lightning Protection Systems*, ~~2020~~ 2023 edition.

G.1.2 Other Publications.

G.1.2.1 ACI Publications.

American Concrete Institute, 38800 Country Club Drive, Farmington Hills, MI 48331-3439.

ACI 318, *Building Code Requirements for Structural Concrete and Commentary*, 2019.

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G.1.2.2 ACPA Publications.

American Concrete Pipe Association, ~~8445 Freeport Pkwy, Suite 350, Irving, TX 75063~~ 5605 N. MacArthur Blvd., Suite 340, Irving, TX 75038 .

Concrete Pipe Handbook.

G.1.2.3 AISC Publications.

American Institute of Steel Construction, 130 East Randolph, Suite 2000, Chicago, IL 60601.

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Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings.

G.1.2.4 ASCE Publications.

American Society of Civil Engineers, 1801 Alexander Bell Drive, Reston, VA 20191-4400.

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ASCE 19, *Structural Applications of Steel Cables for Buildings*, 2016.

G.1.2.5 ASME Publications.

~~ASME International~~ American Society of Mechanical Engineers , Two Park Avenue, New York, NY 10016-5990.

Boiler and Pressure Vessel Code, Section IX, "Welding, Brazing, and Fusing Qualifications," 2021.

ASME A17.1/CSA B44 , *Safety Code for Elevators and Escalators*, ~~2016~~ 2019 .

ASME B16.1, *Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250*, ~~2015~~ 2020 .

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ASTM D2487, *Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)*, ~~2017~~ 2020 .

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G.1.2.10 FM Publications.

FM Global, 270 Central Avenue, ~~P.O. Box 7500,~~ Johnston, RI 02919-~~4923~~ 4949 .

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FM Approvals 1011/1012/1013, *Deluge and Preaction Sprinkler Systems*, ~~2009~~ 2020 .

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FM Approvals 2008, *~~Suppression Mode ESFR Automatic Sprinklers~~ Quick Response Storage Sprinklers for Fire Protection* , ~~2006~~ 2018 .

FM Approvals 2030, *Residential Automatic Sprinklers for Fire Protection* , 2009.

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G.1.2.12 FPRF Publications.

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Protection of Rack Stored Exposed Expanded Group A Plastics with ESFR Sprinklers and Vertical Barriers, 2014.

Protection of Storage Under Sloped Ceilings Phase III: Large-Scale Testing Summary and Guidance ,

G.1.2.13 ICC Publications.

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AC193, *Acceptance Criteria for Mechanical Anchors in Concrete Elements*, 2018.

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International Building Code,~~2018~~ 2021 .

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G.1.2.14 IMO Publications.

International Maritime Organization, 4 Albert Embankment, London, SEI 7SR, United Kingdom.

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G.1.2.15 ISO Publications.

International Organization for Standardization, ISO Central Secretariat, BIBC II, Chemin de Blandonnet, 8, CP 401, 1214 Vernier, Geneva Switzerland.

ISO 6182-1, *Fire protection — Automatic sprinkler systems — Part 1: Requirements and test methods for sprinklers*, ~~2014~~ 2021 .

G.1.2.16 NFSA Publications.

National Fire Sprinkler Association, ~~40 Jon Barrett Road, Patterson, NY 12563~~ 514 Progress Drive, Suite A, Linthicum Heights, MD 21090 .

Valentine and Isman, *Kitchen Cabinets and Residential Sprinklers,* November 2005.

G.1.2.17 SNAME Publications.

Society of Naval Architects and Marine Engineers, 99 Canal Center Plaza, Suite ~~310~~ 500 , Alexandria, VA 22314.

Technical Research Bulletin 2-21, “Aluminum Fire Protection Guidelines.”

G.1.2.18 UL Publications.

Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

Commodity Hazard Comparison of Expanded Plastic in Portable Bins and Racking, Project 99NK29106, NC4004, September 8, 2000.

"Fact Finding Report on Automatic Sprinkler Protection for Fur Storage Vaults," November 25, 1947.

Technical Report of Fire Testing of Automotive Parts in Portable Storage Racking, Project 99NK29106, NC4004, January 5, 2001.

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~~UL~~ CAN/UL/ULC 199, *Automatic Sprinklers for Fire Protection Service*, ~~2005, revised 2020~~ 2022 .

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UL 262, *Gate Valves for Fire-Protection Service*, 2004, revised 2018.

UL 263, *Fire Tests of Building Construction and Materials*, 2011, revised ~~2018~~ 2022 .

UL 312, *Check Valves for Fire-Protection Service*, 2010, revised 2018.

UL 346, *Waterflow Indicators for Fire Protective Signaling Systems*, 2005, revised 2019.

UL 515A, *Outline of Investigation for Electrical Resistance Trace Heating and Associated Controls for Use in Sprinkler and Standpipe Systems,*~~2015~~ 2019 .

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UL 1091, *Butterfly Valves for Fire Protection Service*, 2004, revised 2010.

~~UL~~ CAN/UL/ULC 1285, *Pipe and Couplings, Polyvinyl Chloride (PVC)* ~~*Pipes and Couplings*~~ *, and Oriented Polyvinyl Chloride (PVCO) for Underground Fire Service*, ~~2016~~ 2022 .

UL 1468, *Direct Acting Pressure Reducing and Pressure Restricting Valves*, 2016, revised 2018 .

UL 1474, *Adjustable Drop Nipples for Sprinkler Systems*, 2004.

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UL 1739, *Pilot-Operated Pressure-Control Valves for Fire Protection Service*, 2017, revised 2019 .

~~UL~~ CAN/UL 1821, *Thermoplastic Sprinkler Pipe and Fittings for Fire Protection Service*, ~~2015, revised~~ 2019.

UL 2443, *Flexible Sprinkler Hose with Fittings for Fire Protection Service*, 2015, revised ~~2016~~ 2021 .

UL 2901, *Antifreeze Solutions for Use in Fire Sprinkler Systems*, 2019.

UL 2901A, *Outline of Investigation for Corrosion Control Additives for Use in Fire Sprinkler Systems*, 2019.

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G.1.2.19 U. S. Government Publications.

U. S. Government Publishing Office, 732 North Capitol Street, NW, Washington, DC 20401-0001.

Title 46, Code of Federal Regulations, Part 72.05-5, “Definitions.”

G.1.2.20 Other Publications.

Thrust Restraint Design Equations and Tables for Ductile Iron and PVC Pipe, EBAA Iron, Inc.

Wire Rope Users Manual .

G.2 Informational References.

The following documents or portions thereof are listed here as informational resources only. They are not a part of the requirements of this document.

G.2.1 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

~~NFPA 13E , *Recommended Practice for Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems* , 2020 edition.~~

~~NFPA 33 , *Standard for Spray Application Using Flammable or Combustible Materials* , 2018 edition.~~

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American Water Works Association, 6666 West Quincy Avenue, Denver, CO 80235.

~~AWWA C104/A21.4, *Cement-Mortar Lining for Ductile-Iron Pipe and Fittings* , 2016.~~

~~AWWA C110/A21.10, *Ductile-Iron and Gray-Iron Fittings* , 2012.~~

AWWA C116/A21.16, *Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray Iron Fittings ~~for Water Supply Service~~* , 2015.

~~AWWA C151/A21.51, *Ductile-Iron Pipe, Centrifugally Cast* , 2017, errata, 2018.~~

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AWWA C203, *Coal-Tar Protective Coatings and Linings for Steel Water Pipe*, ~~2015~~ 2020 .

AWWA C205, *Cement-Mortar Protective Lining and Coating for Steel Water Pipe 4 in. (100 mm) and Larger — Shop Applied*, 2018.

AWWA C208, *Dimensions for Fabricated Steel Water Pipe ~~Fittings~~* , 2017.

~~AWWA C300, *Reinforced Concrete Pressure Pipe, Steel-Cylinder Type* , 2016.~~

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G.2.3 DIPRA Publications.

Ductile Iron Pipe Research Association, P.O. Box ~~19206, Golden, CO 80402~~ 190306, Birmingham, AL 35219 .

Installation Guide for Ductile Iron Pipe, ~~2016~~ 2021 .

G.2.4 FM Publications.

FM Global, 270 Central Avenue, P.O. Box 7500, Johnston, RI 02919-~~4923~~ 4949 .

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G.2.5 SAE Publications.

SAE International, Society of Automotive Engineers, ~~400 Commonwealth Drive, Warrendale, PA 15096~~ 901 15th Street, NW, Suite 520, Washington, DC 20005 .

SAE AIR 4127, *Steel: Chemical Composition and Hardenability (Stabilized Type), Revision A, Stabilized*, December 2015.

G.2.6 Uni-Bell PVC Pipe Publications.

Uni-Bell PVC Pipe Association, ~~2711 Lyndon B Johnson Fwy., Suite 1000, Dallas, TX 75234~~ 201 E. John Carpenter Freeway, Suite 750, Irving, TX 75062 .

Handbook of PVC Pipe, 5th edition.

G.2.7 U.S. Government Publications.

U.S. Government Publishing Office, 732 North Capitol Street, NW, Washington, DC 20401-0001.

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NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*, ~~2022~~ 2025 edition.

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Supplemental Information

File Name	Description	Approved
13-2022_Annex_F.docx	Revised Annex F	

Submitter Information Verification

Committee: AUT-SSI

Submittal Date: Thu Jul 28 13:41:47 EDT 2022

Committee Statement

Committee Statement: Reference dates, names, and general information updated.

Response Message: FR-1182-NFPA 13-2022

Public Input No. 405-NFPA 13-2022 [Section No. F.1.2.6]

Public Input No. 579-NFPA 13-2022 [Section No. F.1.2.17]