Second Revision No. 5029-NFPA 72-2023 [Section No. 3.3.43.2]

3.3.43.2 Girder.

A support for beams or joists that runs at right angles to the beams or joists. ~~If the top of the girder is within 4 in. (100 mm) of the ceiling, the girder is a factor in determining the number of detectors and is to be considered a beam. If the top of the girder is more than 4 in. (100 mm) from the ceiling, the girder is not a factor in detector location.~~ (SIG-IDS)

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 16:34:45 EDT 2023

Committee Statement

Committee Statement: Corrects a Manual of Style issue by deleting requirements from the definition. The requirements were moved into Chapter 17.

Response Message: SR-5029-NFPA 72-2023

Public Comment No. 10-NFPA 72-2023 [Section No. 3.3.43.2]

Second Revision No. 5030-NFPA 72-2023 [Section No. 3.3.78.1]

3.3.78.1* Acoustic Leak Detector.

A device ~~which~~ that detects the presence of a gas leak through detection of the sound produced by a pressurized gas release ~~from a choked flow condition~~ . (SIG-IDS)

A.3.3.78.1 Acoustic Leak Detector.

These devices are also known as ultrasonic gas detectors. Acoustic leak detectors can be spot-type or line-type. (SIG-IDS)

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 16:35:50 EDT 2023

Committee Statement

Committee Statement: Defining the detection method based solely on choked flow limits other technologies. The included annex language further clarifies the different types of acoustic leak detection available.

Response Message: SR-5030-NFPA 72-2023

Public Comment No. 88-NFPA 72-2023 [Section No. 3.3.78.1]

Public Comment No. 89-NFPA 72-2023 [Section No. A.3.3.78.1]

Second Revision No. 5008-NFPA 72-2023 [Section No. 3.3.78.5]

3.3.78.5 Carbon Monoxide Detector.

A device ~~containing~~ that contains electrical components ~~coupled with~~ , a carbon monoxide sensing means ~~that has a provision for the connection of~~ , and connections for electrical power and signaling circuits. (SIG-IDS)

Submitter Information Verification

Committee: SIG-IDS
Submittal Date: Thu Jul 13 14:36:45 EDT 2023

Committee Statement

Committee Statement: This revision simplifies the definition and removes unnecessary language.
Response Message: SR-5008-NFPA 72-2023

Public Comment No. 23-NFPA 72-2023 [Section No. 3.3.78.5]

Second Revision No. 5011-NFPA 72-2023 [New Section after 3.3.78.10]

3.3.78.11 Fuel Gas Detector.

A device having a sensor that responds to fuel gas that is connected to an alarm control unit.
[**715**, 2023] (SIG-IDS)

Submitter Information Verification

Committee: SIG-IDS
Submittal Date: Thu Jul 13 15:17:34 EDT 2023

Committee Statement

Committee Statement: The definition for Fuel Gas Detector is added to aid the user in understanding what a fuel gas detector is and the applicability of NFPA 715, Standard for the Installation of Fuel Gas Detection and Warning Equipment.

Response Message: SR-5011-NFPA 72-2023

Second Revision No. 5010-NFPA 72-2023 [New Section after 3.3.130]

3.3.131 Fuel Gas Warning Equipment.

Any detector, alarm, device, or material related to single- and multiple-station alarms or household fuel gas detection systems. [**715**, 2023] (SIG-IDS)

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 14:53:11 EDT 2023

Committee Statement

Committee Statement: The definition for Fuel Gas Warning Equipment is added to aid the user in understanding what Fuel Gas Warning Equipment is and the applicability of NFPA 715, Standard for the Installation of Fuel Gas Detection and Warning Equipment.

Response Message: SR-5010-NFPA 72-2023

Second Revision No. 5018-NFPA 72-2023 [Section No. 17.5.3.1.1]

17.5.3.1.1

Where inaccessible areas are constructed of or contain combustible material, both of the following shall apply unless otherwise specified in 17.5.3.1.2 and ~~17.5.3.1.3~~ 17.5.3.1.4 ~~, both of the following shall apply~~ :

(1) The areas shall be made accessible.

(2) The areas shall be provided with detection.

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 15:41:58 EDT 2023

Committee Statement

Committee Statement: The public comment correctly noted 17.5.3.1.3 did not address the conditions of 17.5.3.1.1, but upon review of the section it was found that 17.5.3.1.4 does meet the conditions of 17.5.3.1.1, so the section is amended to change 17.5.3.1.3 to 17.5.3.1.4. This accomplishes the goal of PC#30, so it is incorporated into this change.

Response Message: SR-5018-NFPA 72-2023

Public Comment No. 29-NFPA 72-2023 [Section No. 17.5.3.1.1]

Public Comment No. 30-NFPA 72-2023 [Section No. 17.5.3.1.4]

Second Revision No. 5014-NFPA 72-2023 [Section No. 17.6.1.2]

17.6.1.2

Designs not in accordance with 17.6.1.3 shall be ~~both of the following:~~ designed in accordance with the prescriptive requirements of this chapter.

~~Deemed as prescriptive designs~~

~~Designed in accordance with the prescriptive requirements of this chapter~~

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 15:28:41 EDT 2023

Committee Statement

Committee Statement: The revision simplifies the normative text without creating any issues.

Response Message: SR-5014-NFPA 72-2023

Public Comment No. 83-NFPA 72-2023 [Section No. 17.6.1.2]

Second Revision No. 5015-NFPA 72-2023 [Section No. 17.6.1.4]

17.6.1.4*

Heat-sensing fire detectors shall be listed in accordance with applicable standards ~~such as UL 521, *Heat Detectors for Fire Protective Signaling Systems*~~ .

A.17.6.1.4

An example of an applicable standard for heat-sensing fire detectors is UL 521, *Heat Detectors for Fire Protective Signaling Systems* .

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 15:30:01 EDT 2023

Committee Statement

Committee Statement: The manual of style does not permit examples to be contained within the text. This revision moved the examples to Appendix A which avoids changing the mandatory text to limit the standard applicable to heat detectors to only UL 521.

Response Message: SR-5015-NFPA 72-2023

Public Comment No. 146-NFPA 72-2023 [Section No. 17.6.1.4]

Second Revision No. 5031-NFPA 72-2023 [New Section after 17.6.3.3.2]

17.6.3.3.3 Girders.

17.6.3.3.3.1

A girder shall be considered a beam where the top of the girder is within 4 in. (100 mm) of the ceiling.

17.6.3.3.3.2

A girder shall not be a factor in detector location where the top of the girder is more than 4 in. (100 mm) from the ceiling.

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 17:14:55 EDT 2023

Committee Statement

Committee Statement: Corrects a Manual of Style issue by relocating requirements previously found in the definition of girder into chapter 17.

Response Message: SR-5031-NFPA 72-2023

Public Comment No. 11-NFPA 72-2023 [New Section after 17.6.3.3.2]

Second Revision No. 5023-NFPA 72-2023 [Section No. 17.7.1.2]

17.7.1.2*

Designs not in accordance with 17.7.1.3 shall be ~~both of the following:~~ designed in accordance with the prescriptive requirements of this chapter.

~~Deemed as prescriptive designs~~

~~Designed in accordance with the prescriptive requirements of this chapter~~

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 16:05:09 EDT 2023

Committee Statement

Committee Statement: This revision makes the language clearer and easier to understand.

Response Message: SR-5023-NFPA 72-2023

Public Comment No. 86-NFPA 72-2023 [Section No. 17.7.1.2]

Second Revision No. 5024-NFPA 72-2023 [Section No. 17.7.2]

17.7.2* Protection During Construction.

17.7.2.1

Detectors installed for signal initiation during new construction or building alterations shall comply with one of the following:

(1) Detectors shall be cleaned and verified to be operating in accordance with the listed sensitivity prior to the final acceptance test of the system .

(2) Detectors shall be replaced prior to the final acceptance test of the system.

17.7.2.2

Detectors installed but not operational during ~~construction~~ building alterations shall comply with one of the following:

(1) Detectors shall be protected from construction debris, dust, dirt, and damage in accordance with the manufacturer's recommendations and verified to be operating in accordance with the listed sensitivity prior to the final acceptance test of the system .

(2) Detectors shall be replaced prior to the final acceptance test of the system.

17.7.2.3

Where detection is not required during new construction, detectors shall not be installed until after all other construction trades have completed cleanup.

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 16:13:58 EDT 2023

Committee Statement

Committee Statement: This revision clarifies that cleaning and/or replacement shall be performed prior to the final acceptance of the system.

Response Message: SR-5024-NFPA 72-2023

Public Comment No. 156-NFPA 72-2023 [Section No. 17.7.2]

Public Comment No. 87-NFPA 72-2023 [Section No. 17.7.2.1]

Public Comment No. 126-NFPA 72-2023 [Section No. 17.7.2.2]

Second Revision No. 5025-NFPA 72-2023 [Section No. 17.7.4.2.3.1]

17.7.4.2.3.1*

In the absence of specific performance-based design criteria, detectors on ceilings up to 40 ft (12.2 m) in height ~~detectors~~ shall be spaced in accordance with either of the following:

(1) The detectors shall comply with the following:

(a) The distance between detectors shall not exceed a nominal spacing of 30 ft (9.1 m).

(b) There shall be detectors within a distance of one-half the nominal spacing, measured at right angles from all walls or partitions extending upward to within the top 15 percent of the ceiling height.

(2)* All points on the ceiling shall have a detector within a distance equal to or less than 0.7 times the nominal 30 ft (9.1 m) spacing (0.7*S*).

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 16:19:07 EDT 2023

Committee Statement

Committee Statement: The revision places a maximum on the prescriptive spacing of smoke detectors on ceiling heights above 10 feet. Unlike almost all other fire alarm installation standards worldwide, NFPA 72 does not provide any prescriptive guidance for smoke detector spacing based on ceiling height. NFPA 72 essentially says that there are many factors that should be considered when spacing detectors on high ceilings. One of the questions asked most frequently, is around how to space detectors on high ceilings. Using a height of 40 feet, below which standard spacings apply, is a conservative approach based on what other countries and regions have decided to do. Much of Europe is currently at 12 meters (39.4 feet). It is important to keep in mind that current smoke detector thresholds are based on enabling individuals to escape an occupancy with a 10-foot ceiling prior to the visibility being reduced to less than 0.25 OD/m at the five foot level. Once the ceiling height becomes higher than ten feet, there is even more time to escape based on a standard size fire based on the time it takes for the smoke layer to descend. Data from the Fire Protection Research Foundation project, Smoke Detector Spacing in High Ceiling Spaces, and research that was identified in Part 1 of the FPRF project was used as the basis for this revision.

Response Message: SR-5025-NFPA 72-2023

Public Comment No. 73-NFPA 72-2023 [Section No. 17.7.4.2.3.1]

Second Revision No. 5027-NFPA 72-2023 [New Section after 17.7.4.2.4.1]

17.7.4.2.4.2

For joist and beam construction using girders, the following shall apply:

(1) A girder shall be considered a beam where the top of the girder is within 4 in. (100 mm) of the ceiling.

(2) A girder shall not be a factor in detector location where the top of the girder is more than 4 in. (100 mm) from the ceiling.

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 16:27:41 EDT 2023

Committee Statement

Committee Statement: This revision moves requirements from definition of Girder, which is not permitted in the Manual of Style, into the section for smoke sensing detectors.

Response Message: SR-5027-NFPA 72-2023

Public Comment No. 15-NFPA 72-2023 [New Section after 17.7.4.2.4.1]

Second Revision No. 5028-NFPA 72-2023 [Section No. 17.7.6.5.4.2]

17.7.6.5.4.2

Detectors installed inside ducts shall be accessible for ~~cleaning~~ inspection, testing, and maintenance through access doors or panels provided in accordance with NFPA 90A.

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 16:30:49 EDT 2023

Committee Statement

Committee Statement: This revision clarifies the intent of the section, but using language more consistent with the NFPA Standards.

Response Message: SR-5028-NFPA 72-2023

Public Comment No. 8-NFPA 72-2023 [Section No. 17.7.6.5.4.2]

Second Revision No. 5012-NFPA 72-2023 [New Section after 17.10.1]

17.10.1.1

Fuel gas detector and warning equipment shall be installed in accordance with NFPA 715 .

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 15:21:58 EDT 2023

Committee Statement

Committee Statement: The revision changed ‘detection’ to ‘detector’ to match NFPA 715 language. Fuel gas is one of the many gases that can be detected by gas type detectors. Pointing the reader to the specific standard for fuel gas detection and installation would lead them to a specific standard for fuel gas.

Response Message: SR-5012-NFPA 72-2023

Public Comment No. 4-NFPA 72-2023 [New Section after 17.10.1]

Second Revision No. 5013-NFPA 72-2023 [Section No. 17.10.2.1]

17.10.2.1*

Gas detection equipment shall be listed in accordance with the applicable standard(s) ~~such as UL 1484, *Residential Gas Detectors* , or UL 2075, *Gas and Vapor Detectors and Sensors* ,~~ for the specific gas or vapor it is intended to detect.

A.17.10.2.1

Examples of applicable standards for gas detection equipment are UL 1484, *Residential Gas Detectors* , and UL 2075, *Gas and Vapor Detectors and Sensors* .

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 15:25:23 EDT 2023

Committee Statement

Committee Statement: The manual of style does not permit examples to be contained within the text. This revision moved the examples to Appendix A which avoids changing the mandatory text to limit the standards applicable to gas detection equipment to only UL 1484 or UL 2075.

Response Message: SR-5013-NFPA 72-2023

Public Comment No. 147-NFPA 72-2023 [Section No. 17.10.2.1]

Second Revision No. 5034-NFPA 72-2023 [Section No. 17.11.2.1]

17.11.2.1*

Acoustic leak detectors shall ~~only~~ be ~~used where~~ approved for the ~~leak source to be detected is a single-phase gas flow~~ intended application .

A.17.11.2.1

~~Acoustic leak detectors rely on ultrasonic sound generated when high-pressure gas is released from a choked flow orifice. When liquids are present in the flow, ultrasonic sound waves might not be generated from the release.~~ Selection of acoustic leak detection technology should be based on testing that demonstrates performance is in alignment with the proposed application. As an emerging technology, there are limited industry certification standards for such performance testing, therefore it is up to the AHJ to approve the application. Guidance is provided in EN 50724, *Fixed Ultrasonic Gas Leak Detectors (UGLD) — General requirements and test methods* .

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 17:26:00 EDT 2023

Committee Statement

Committee Statement: Section was revised to account for the various technologies to detect leaks. Primarily it is important that the detector be approved to ensure the claimed performance can be achieved. Currently there are limited industry certification standards. EN50724 is an example of a proposed industry certification standard which could be utilized as a basis for AHJ approval.

Response Message: SR-5034-NFPA 72-2023

Public Comment No. 91-NFPA 72-2023 [Section No. 17.11.2.1]

Public Comment No. 90-NFPA 72-2023 [Section No. A.17.11.2.1]

Second Revision No. 5035-NFPA 72-2023 [Section No. 17.11.2.2]

17.11.2.2*

~~Acoustic~~ The type and quantity of acoustic leak detectors shall ~~only~~ be ~~used when the leak condition results in a choked flow that generates ultrasonic energy.~~ determined based on the performance characteristics of the detector and analysis of the hazard, including the following:

(1) Characteristics of the leak

(2) Material being released

(3) Liquid or gas phase of the release

(4) Environment

(5) Ambient conditions

A.17.11.2.2

Typical spot-type acoustic leak detectors rely on ultrasonic sound generated when pressurized gas is released. When liquids are present in the flow, ultrasonic sound waves might not be generated from the release. Typical line-type acoustic leak detectors rely on induced vibration generated by a material release and therefore might be able to detect single-phase gas or liquid release as well as multi-phase releases.

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 17:29:28 EDT 2023

Committee Statement

Committee Statement: PC 90 and 91 were the referenced duplicate content in PC 92. PC-92 was rejected and revisions were made. The information is no longer redundant, however it does require modification to not prohibit various existing technologies. Proposed revision maintains the intent of the first revision but accounts for various technologies. Additionally, the second revision adds annex material which was the PC 92 mentioned duplicate content from the rejected PC 90.

Response Message: SR-5035-NFPA 72-2023

Public Comment No. 92-NFPA 72-2023 [Section No. 17.11.2.2]

Second Revision No. 5036-NFPA 72-2023 [Section No. 17.11.3.1]

17.11.3.1

The placement of acoustic leak detectors shall be based on an engineering evaluation~~.~~ that includes the following:

(1)* Size of the leak to be detected

A.17.11.3.1(1)

The engineering evaluation should include the size of the leak in the same terms as the manufacturer's specification. This is typically expressed in terms of mass flow rate [lb/sec (kg/sec)].

(2) Properties of the material to be detected

(3)* Required coverage

A.17.11.3.1(3)

Examples of coverage include area, volume, or object.

(4) Basis of design of the detection system

(5) Response time required

(6) Ambient and environmental conditions

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 17:37:11 EDT 2023

Committee Statement

Committee Statement: This revision provides further clarification on considerations for an engineering evaluation. Associated annex language helps clarify how the size of the leak is typically specified and examples of coverage.

Response Message: SR-5036-NFPA 72-2023

Public Comment No. 93-NFPA 72-2023 [Section No. 17.11.3.1]

Public Comment No. 94-NFPA 72-2023 [New Section after A.17.11.2.1]

Second Revision No. 5037-NFPA 72-2023 [Section No. 17.11.3.4]

17.11.3.4*

The coverage area and spacing of acoustic leak detectors shall be adjusted to account for impact to detection capability due to background ~~noise~~ interference .

A.17.11.3.4

Background noise in some frequencies might be filtered by some acoustic leak detectors. Additionally, some interference might exist beyond audible range. It is important that background noise in ranges that impact detection capability be considered in the spacing of the detectors.

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 17:43:36 EDT 2023

Committee Statement

Committee Statement: This section was revised to account for various technologies to detect leaks. Associated annex material added to provide context as to the intent of the section to account for possible interference.

Response Message: SR-5037-NFPA 72-2023

Public Comment No. 95-NFPA 72-2023 [Section No. 17.11.3.4]

Public Comment No. 96-NFPA 72-2023 [New Section after A.17.11.2.1]

Second Revision No. 5019-NFPA 72-2023 [Section No. 17.14.2]

17.14.2*

Carbon monoxide detectors shall meet the following requirements:

(1) Carbon monoxide detectors shall be listed in accordance with applicable standards~~, such as UL 2075, *Gas and Vapor Detectors and Sensors*~~ .

(2) Carbon monoxide detectors shall be set to respond to the sensitivity limits specified in UL 2034, *Single and Multiple Station Carbon Monoxide Alarms*.

A.17.14.2

Carbon monoxide detectors installed in unconditioned areas should be listed for the environment in accordance with 10.4.3. Unconditioned areas are intended to apply to enclosed areas, rooms, or spaces without continuous climate or HVAC controls. An example of an applicable standard for carbon monoxide detectors is UL 2075, *Gas and Vapor Detectors and Sensors* .

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 15:46:04 EDT 2023

Committee Statement

Committee Statement: The proposed revision is needed to bring the text into accordance with the Manual of Style. A small editorial change was made to the proposed revision to specify Carbon Monoxide Detectors.

Response Message: SR-5019-NFPA 72-2023

Public Comment No. 134-NFPA 72-2023 [Section No. 17.14.2]

Public Comment No. 148-NFPA 72-2023 [Section No. 17.14.2]

Second Revision No. 5020-NFPA 72-2023 [Section No. 17.17.1]

17.17.1*

Manually actuated alarm-initiating devices shall be listed in accordance with their applicable standards ~~such as UL 38, *Manual Signaling Boxes for Fire Alarm Systems*~~ .

A.17.17.1

An example of an applicable standard for manually actuated alarm-initiating devices is UL 38, *Manual Signaling Boxes for Fire Alarm Systems* .

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 15:48:34 EDT 2023

Committee Statement

Committee Statement: The manual of style does not permit examples to be contained within the text. This revision moved the example to Appendix A. The revision does not change the mandatory text which would limit the standards applicable to manually actuated alarm-initiating devices to only UL 38.

Response Message: SR-5020-NFPA 72-2023

Public Comment No. 149-NFPA 72-2023 [Section No. 17.17.1]

Second Revision No. 5021-NFPA 72-2023 [New Section after 17.17.2]

17.17.3

Manual stations used to release extinguishing or suppression agents shall be identified in one of the following ways:

(1) On the manual station

(2) By signage within 1 ft (0.3 m) of the manual station

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 15:54:57 EDT 2023

Committee Statement

Committee Statement: Often releasing stations are not identified as being for the purpose of releasing a suppression systems. Many systems are activated inadvertently during testing or other non-required times due to these stations not being identified. This revision requires that these stations be properly identified as to the specific function of the station. This would reduce the number of non-required system operations. The language was clarified for identification and location.

Response Message: SR-5021-NFPA 72-2023

Public Comment No. 210-NFPA 72-2023 [New Section after 17.17.2]

Second Revision No. 5016-NFPA 72-2023 [Section No. 17.19.2.2.2(B)]

(B)

Unless otherwise permitted by the dry pipe or preaction valve manufacturer's published installation instructions, the off-normal signal shall be initiated ~~when the pressure increases or decreases by 10 psi (70 kPa)~~ in accordance with NFPA 13 .

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 15:32:59 EDT 2023

Committee Statement

Committee Statement: The revision adds clarification to the section that the dry pipe or preaction valve manufacturer's instructions should be followed for the off normal signal threshold, and enhances the current section by specifying both dry pipe and preaction valve manufacturer's instructions. In addition pressure settings should be in accordance with NFPA 13.

Response Message: SR-5016-NFPA 72-2023

Public Comment No. 204-NFPA 72-2023 [Section No. 17.19.2.2.2(B)]

Second Revision No. 5022-NFPA 72-2023 [Section No. 17.19.4]

17.19.4 Water Temperature Supervisory-Signal-Initiating Device.

A water temperature supervisory-signal-initiating device for a water storage container exposed to freezing conditions shall initiate two separate and distinctive signals, as ~~specified in 17.19.4.2~~ . follows:

(1) One signal shall indicate a decrease in water temperature to 40°F (4.4°C).

(2) The other signal shall indicate a restoration of the water temperature to above 40°F (4.4°C).

~~**17.19.4.1**~~

~~A temperature supervisory device for a water storage container exposed to freezing conditions shall initiate two separate and distinctive signals, as specified in 17.19.4.2 .~~

~~**17.19.4.2**~~

~~One signal shall indicate a decrease in water temperature to 40°F (4.4°C), and the other indicate its restoration to above 40°F (4.4°C).~~

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 15:58:02 EDT 2023

Committee Statement

Committee Statement: The revision editorially changes the language to combine the sections into a single section for readability. The revision makes slight editorial changes to the proposed wording to be consistent with other language in the document.

Response Message: SR-5022-NFPA 72-2023

Public Comment No. 135-NFPA 72-2023 [Section No. 17.19.4]

Second Revision No. 5026-NFPA 72-2023 [Section No. A.17.7.4.2.3.1]

A.17.7.4.2.3.1

The 30 ft (9.1 m) spacing is a guide for prescriptive designs. The use of such a spacing is based upon customary practice in the fire alarm community.

Where there are explicit performance objectives for the response of the smoke detection system, the performance-based design methods outlined in Annex B should be used.

For the purposes of this section, “nominal 30 ft (9.1 m)” should be determined to be 30 ft (9.1 m) ±5 percent [±18 in. (460 mm)].

This Code does not allow prescriptive design for smoke detectors installed above 40 ft (12.2 m), but Table 17.6.3.5.1 should not be used to adjust the spacing of smoke detectors on high ceilings. NFPA’s Fire Protection Research Foundation sponsored a research project, summarized in the report, *Smoke Detector Spacing for High Ceiling Spaces — Phase II* , to examine how smoke detector spacing might need to change based on ceiling height. Researchers used computational fluid dynamic software (FDS) to simulate smoke development at various ceiling heights, with and without a temperature gradient, to promote smoke stratification. Those considering a performance-based design should review the report.

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 16:22:19 EDT 2023

Committee Statement

Committee Statement: The additional annex information provides guidance as to the use of smoke detectors at ceiling heights over 10-feet. Unlike almost all other fire alarm installation standards worldwide, NFPA 72 does not provide any prescriptive guidance for smoke detector spacing based on ceiling height. NFPA 72 essentially says that there are many factors that should be considered when spacing detectors on high ceilings. One of the questions asked most frequently, is around how to space detectors on high ceilings. Using a height of 40 feet, below which standard spacings apply, is a conservative approach based on what other countries and regions have decided to do. Much of Europe is currently at 12 meters (39.4 feet). It is important to keep in mind that current smoke detector thresholds are based on enabling individuals to escape an occupancy with a 10-foot ceiling prior to the visibility being reduced to less than 0.25 OD/m at the five foot level. Once the ceiling height becomes higher than ten feet, there is even more time to escape based on a standard size fire based on the time it takes for the smoke layer to descend. Data from the Fire Protection Research Foundation project, Smoke Detector Spacing in High Ceiling Spaces, and research that was identified in Part 1 of the FPRF project was used as the basis for this revision.

Response Message: SR-5026-NFPA 72-2023

Public Comment No. 203-NFPA 72-2023 [Section No. A.17.7.4.2.3.1]

Second Revision No. 5032-NFPA 72-2023 [Section No. A.17.8.3.1.1]

A.17.8.3.1.1

All optical detectors respond according to the following theoretical equation:

$$S = \frac{kPe^{-\zeta d}}{d^2} \qquad \text{[A.17.8.3.1.1]}$$

where:

S = radiant power reaching the detector

k = proportionality constant for the detector

P = radiant power emitted by the fire

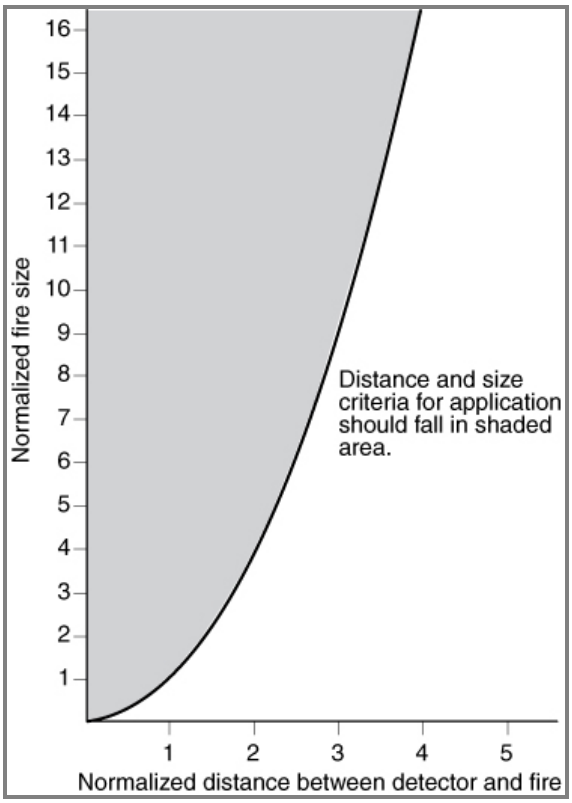
e = Naperian logarithm base (2.7183)

ζ = extinction coefficient of air

d = distance between the fire and the detector

The sensitivity (S) typically is measured in nanowatts. This equation yields a family of curves similar to the one shown in Figure A.17.8.3.1.1.

Figure A.17.8.3.1.1 Normalized Fire Size vs. Distance.



The curve defines the maximum distance at which the detector consistently detects a fire of defined size and fuel. Detectors should be employed only in the shaded area above the curve.

Under the best of conditions, with no atmospheric absorption, the radiant power reaching the detector is reduced by a factor of 4 if the distance between the detector and the fire is doubled. For the consumption of the atmospheric extinction, the exponential term zeta (ζ) is added to the equation. Zeta is a measure of the clarity of the air at the wavelength under consideration. Zeta is affected by humidity, dust, and any other contaminants in the air that are absorbent at the wavelength in question. Zeta generally has values between –0.001 and –0.1 for normal ambient air.

Supplemental Information

File Name	Description	Approved
Annex_A_A_17_8_3_1_1_SR-5032.docx	Annex_A_A_17_8_3_1_1_SR-5032	

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 17:17:28 EDT 2023

Committee Statement

Committee Statement: The formula does not match formula B.5.1.6, which is correct. The exponent in the annex A formula should match the exponent in annex B for the same formula on radiant power reaching the detector.

Response Message: SR-5032-NFPA 72-2023

Public Comment No. 163-NFPA 72-2023 [Section No. A.17.8.3.1.1]

Second Revision No. 5017-NFPA 72-2023 [Section No. A.17.19.2.2.2]

A.17.19.2.2.2

~~Some~~ Many current manufactured dry pipe and preaction ~~sprinkler systems use~~ valves are mechanical valves that allow lower air pressures ~~in the range of 8 psi to 15 psi (0.5 bar to 1.0 bar), instead of the traditional 40 psi (2.7 bar). A plus or minus value of 10 psi (0.7 bar) is not appropriate for these systems and could result in dry pipe valve actuation prior to transmission of a low air pressure supervisory signal~~ than differential valves. Manufacturers suggest that the air pressure signals on these valves activate between a 2 psi to 5 psi (0.14 bar to 0.34 bar) increase or decrease. In some cases, setting the low air signal at 5 psi (0.34 bar) might be too late of a notification and cause the valve to operate before maintenance personnel can address the situation. For example, if a dry pipe valve has a normal air pressure of 15 psi (1.0 bar) and the system operates at 8 psi (0.55 bar), this will only leave a 2 psi (0.14 bar) safety factor if the low air is set to operate at a 5 psi (0.34 bar) loss. Such a system would be better served with a low air signal of operation of 2 psi to 4 psi (0.14 bar to 0.28 bar) below normal air pressure .

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 15:35:05 EDT 2023

Committee Statement

Committee Statement: The revision adds clarification to the section that the dry pipe or preaction valve manufacturer's instructions should be followed for the off normal signal threshold. The annex material relates more towards common installations the industry currently sees.

Response Message: SR-5017-NFPA 72-2023

Public Comment No. 206-NFPA 72-2023 [Section No. A.17.19.2.2.2]

Second Revision No. 5033-NFPA 72-2023 [Section No. B.5.1.6]

B.5.1.6 Detector Response Model.

The response of radiant energy–sensing detectors is modeled with a modified inverse square relationship as shown in the following equation [5]:

$$S = \frac{kPe^{-\zeta d}}{d^2} \qquad \textbf{[B.5.1.6]}$$

where:

S = radiant power reaching the detector (W or Btu/sec) sufficient to produce alarm response

k = proportionality constant for the detector

P = radiant power emitted by the fire (W or Btu/sec)

e = Naperian logarithm base (2.7183)

ζ = extinction coefficient of air at detector operating wavelengths

d = distance between the fire and the detector (m or ft)

This relationship models the fire as a point source radiator, of uniform radiant output per steradian, some distance (d) from the detector. This relationship also models the effect of absorbance by the air between the fire and the detector as being a uniform extinction function. The designer must verify that these modeling assumptions are valid for the application in question.

Submitter Information Verification

Committee: SIG-IDS

Submittal Date: Thu Jul 13 17:21:13 EDT 2023

Committee Statement

Committee Statement: The definition of e is missing from Annex B.

Response Message: SR-5033-NFPA 72-2023

Public Comment No. 167-NFPA 72-2023 [Section No. B.5.1.6]