National Fire Protection Association
The authority on fire, electrical, and building safety

NFPA 72® *National Fire Alarm and Signaling Code* Overview and 2013 Changes

Fire Alarm Training – Spokane, WA

November 2, 2016 | Richard Roux | Spokane Fire Department

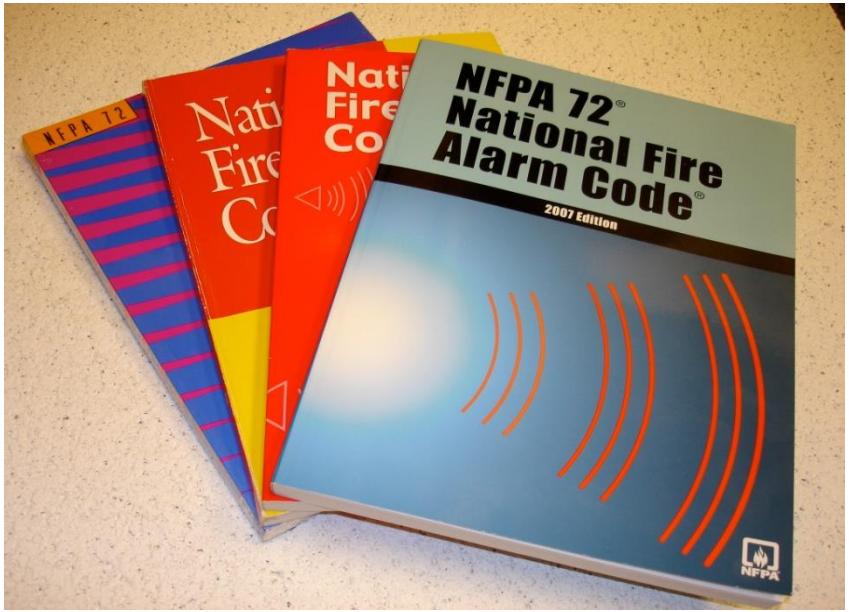
Agenda

Why are we here?

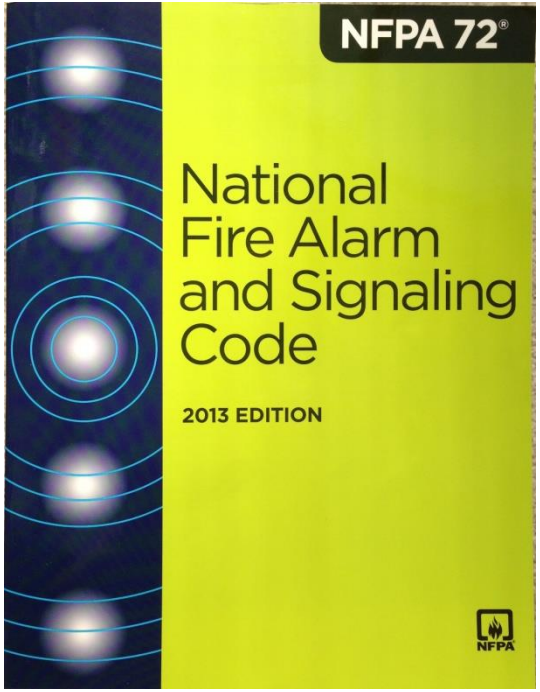
- Washington State code adoption
- State adopted NFPA 72-2013 on July 1, 2016
- Review NFPA 72-2013
- Significant changes from NFPA 72-2010 to 72-2013
- CO and MNS
- O & D/Vertical lines/bullets
- This is your day/opportunity

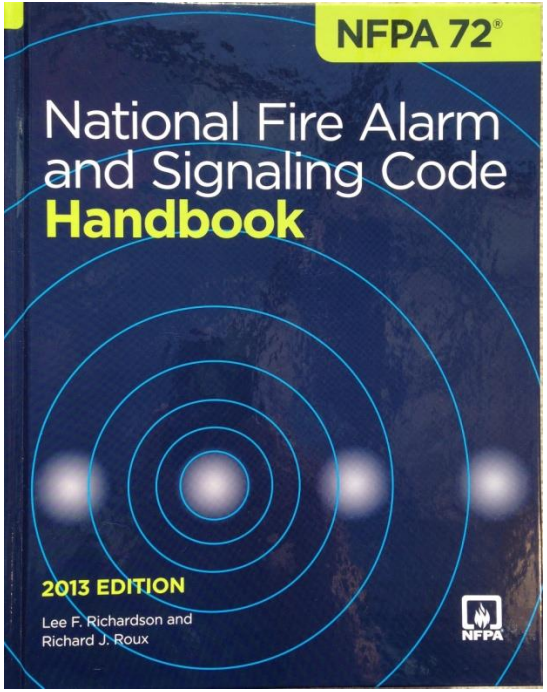
NFPA 72

- 1993 Edition Aug 20, 1993
- 1996 Edition Aug 09, 1996
- 1999 Edition Aug 13, 1999
- 2002 Edition Aug 08, 2002
- 2007 Edition Aug 17, 2006
- 2010 Edition Aug 26, 2009
- 2013 Edition Aug 29, 2012



2013 Changes





NFPA 72-2013

- Report on Proposals (ROP)
  - 379 Pages – 833 Proposals

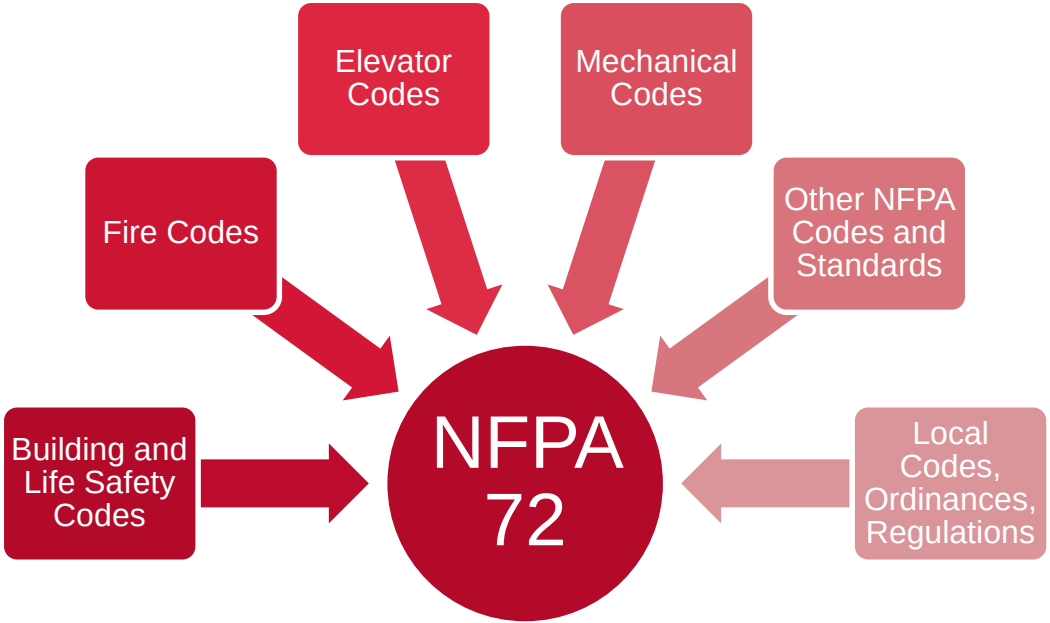
- Report on Comments (ROC)
  - 283 Pages – 525 Comments

NFPA 72-2013

- Red is new/revised
- Black for existing text or comment
- **Bold/Bold for emphasis**

NFPA 72®
National Fire Alarm and Signaling Code

NFPA 72 is the “standard of care” in the industry



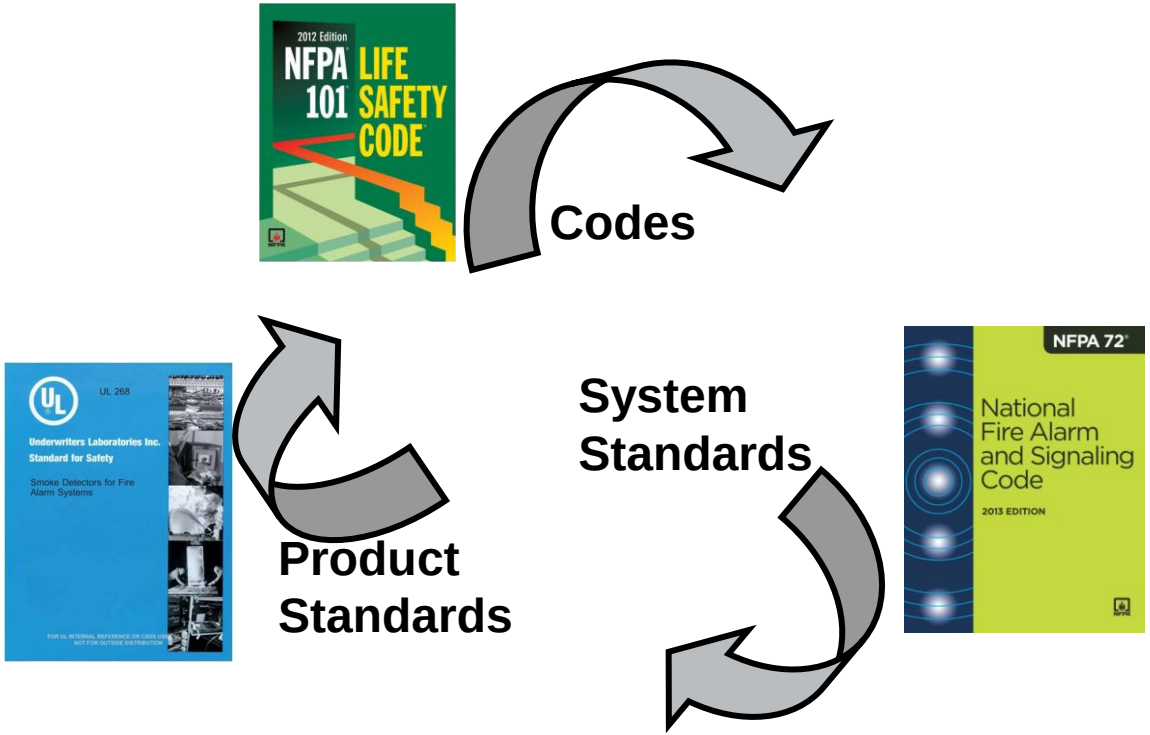
Requirements for Fire Detection, Alarm, and Signaling

- Originate in building, life safety, and fire codes
- Requirements are based on occupancy and use groups
- Requirements may vary depending on:
  - Sprinklers and other suppression systems
  - Building height
  - Occupant load
  - Other special conditions

Requirements for Fire Detection, Alarm, and Signaling

- Protected premises fire alarm systems
  - Manual initiation
  - Automatic initiation
  - Occupant notification
  - Supervision of suppression systems
- Emergency forces notification
- Single- and multiple-station smoke alarms and household fire alarm systems

Interdependency

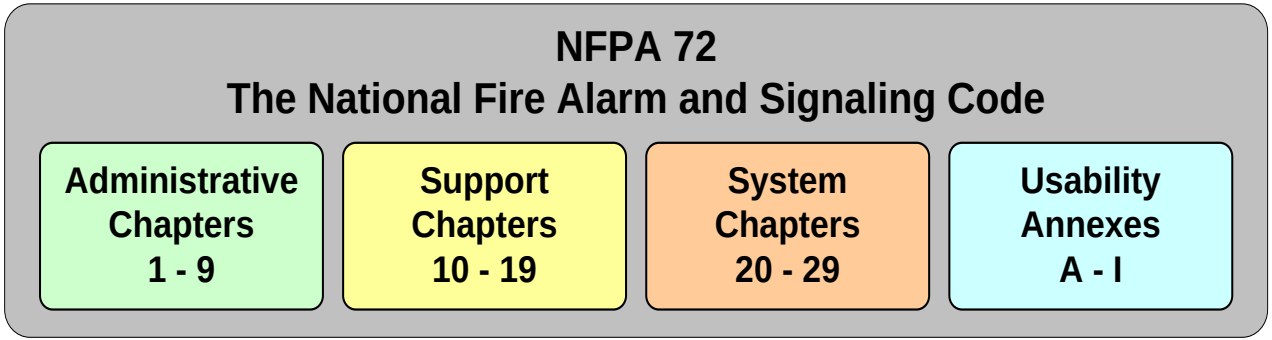


Code Scope and Purpose

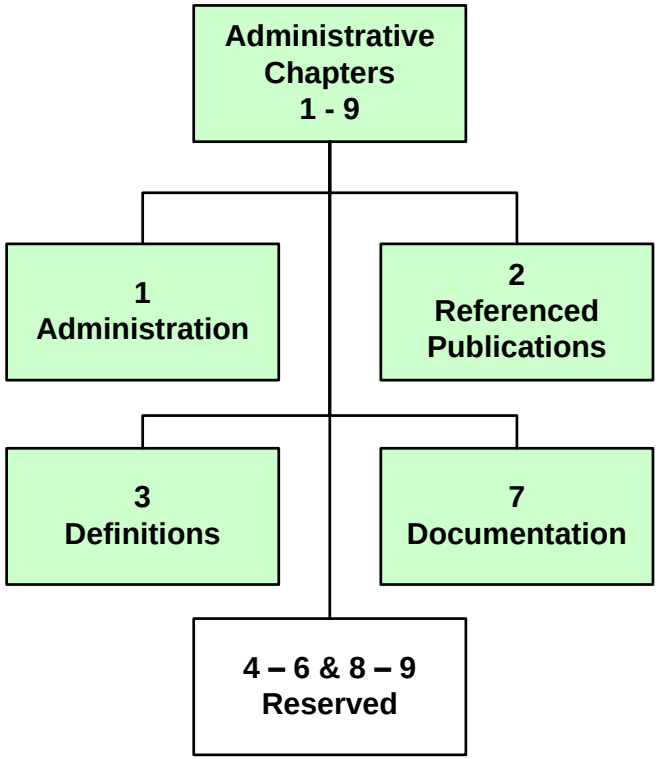
- NFPA 72 provides standards for the application, installation, location, performance, inspection, testing, and maintenance of:
  - Initiating devices
  - Notification appliances
  - Controls, annunciators, transmitters
  - Circuits and pathways
  - Everything that makes the system work

Chapter Organization

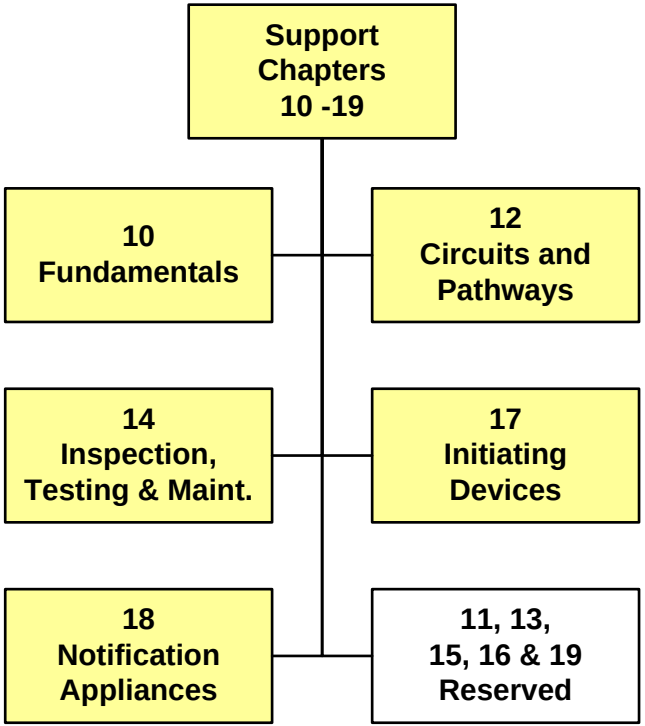
- Better organization
- Easier to locate key requirements
- Future growth



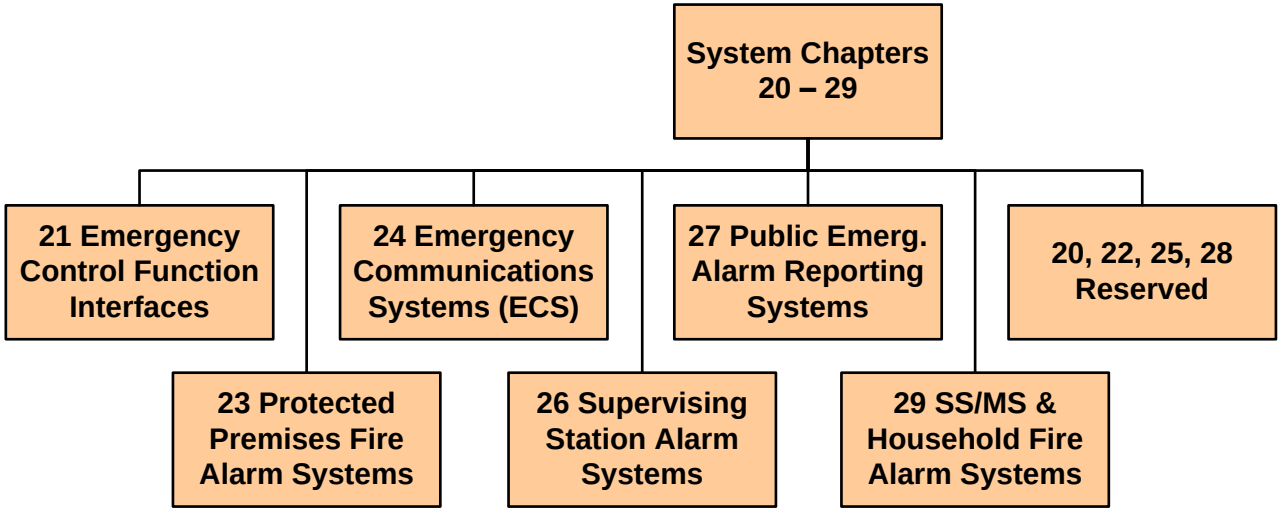
Administrative Chapters



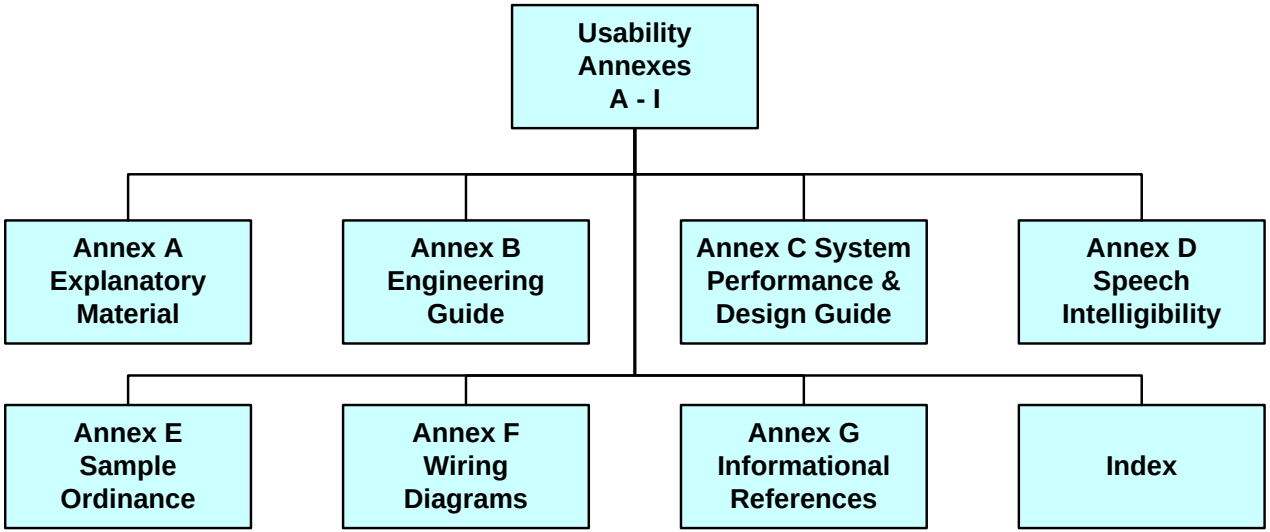
Support Chapters



System Chapters



Usability Annexes

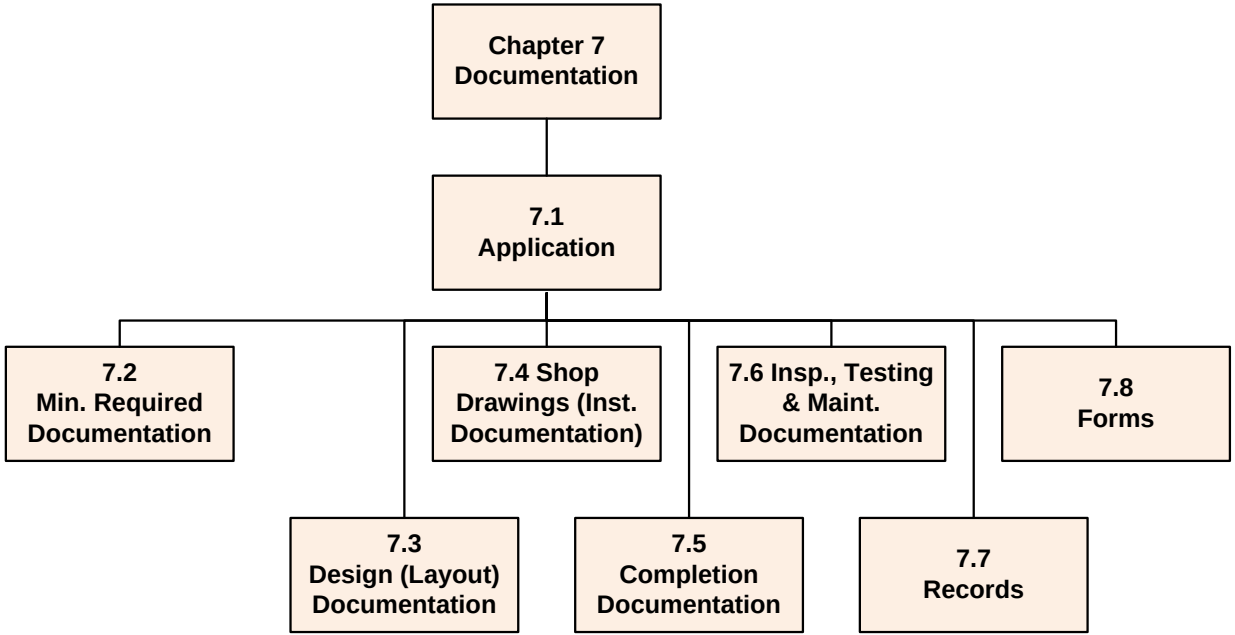


NFPA 72-2013
Chapter 7
Documentation

New for 2013

- New Chapter 7 - Documentation
  - Provides a central location for documentation requirements
  - In previous editions, these were located throughout the Code
  - Where documentation requirements are not located directly in Chapter 7, specific reference is provided to information and requirements still contained in other chapters
  - Unless required by other governing laws, codes, or standards, the documentation requirements of Chapter 7 do not apply to Chapter 29, Single- and Multiple-Station Alarms and Household Fire Alarm Systems

Chapter 7 Documentation



Chapter 7 Application

- 7.1.1 **New systems** must comply with the minimum requirements of this chapter
- 7.1.2 **Existing systems** (previously installed) must comply with the minimum requirements of this chapter

- **Chapter 14** - Inspection, Testing, and Maintenance **has parallel provision** in 14.1.4
- 14.1.4 The requirements of this chapter shall apply to both **new and existing systems**

There is Only a Minimum Required Documentation Unless …

- 7.1.3 **Where required** by governing laws, codes, or standards, or other parts of this Code, the requirements of this chapter, or portions thereof, apply

- A.7.1.3 **Unless otherwise identified**, only the minimum documentation requirements of 7.2.1 apply
- Required by
  - Law, code, standard
  - This chapter
  - Other portions of this Code

Minimum Required Documentation

- Where documentation is required by the enforcing authority, **7.2.1** provides the list that **represents the minimum documentation required** for all fire alarm and emergency communications systems, **including new systems and** additions or alterations to **existing systems**

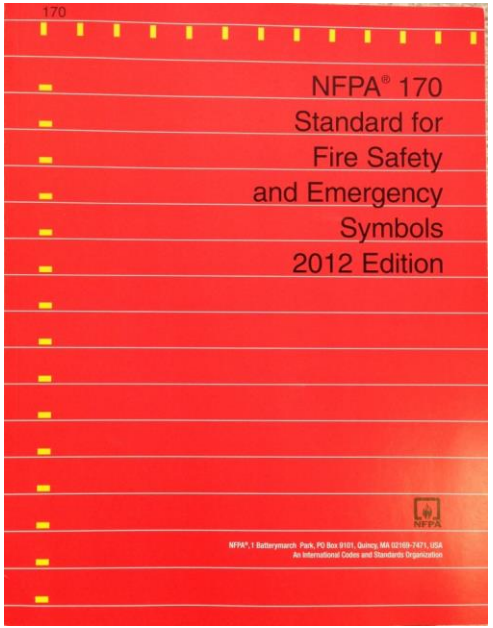
Minimum Required Documentation

7.2.1

1) Written narrative
2) Riser diagram
3) Floor plan
4) Sequence of operation (matrix or narrative)
5) Equipment data sheets
6) Manufacturers published instructions
7) Battery calculations
8) Voltage drop calculations
9) Completed record of inspection and testing
10) Completed record of completion
11) Copy of site-specific software
12) Record (as-built) drawings
13) Periodic inspection, testing, and maintenance documentation per 7.6
14) Records, record retention, and record maintenance per 7.7

Drawing Symbols

- All fire alarm drawings must use symbols described in NFPA 170, *Standard for Fire Safety and Emergency Symbols*, or other symbols acceptable to the AHJ



NFPA 72-2013
Chapter 10
Fundamentals

Fundamentals

2013 (p 72-65)

Manual alarms

- Initiated by
  - Listed manual fire alarm box
  - Means that is key operated
  - Located within a locked cabinet
  - Arranged to provide equivalent protection against unauthorized use
  - To minimize accidental operation that would result in unwanted alarms

Fundamentals

2013 (p 72-65)

Personnel Qualifications

- System Designer – No change
- System Installer – No change
- Inspection, Testing, and Service Personnel
  - Inspection Personnel – by persons who developed competence by training and experience
  - Testing Personnel – by persons with knowledge and experience of the testing requirements
  - Service Personnel – No change
  - Programming Personnel – shall be certified by the system manufacturer

Fundamentals

2013 (p 72-67)

Mechanical Protection and Circuit Breaker Lock

- Mechanical Protection. The branch circuit(s) and connections shall be protected against physical damage
- Circuit Breaker Lock. Where a circuit breaker is the disconnecting means, a listed breaker locking device shall be installed

Fundamentals

2013 (p 72-70)

Distinctive Signals

- Alarm evacuation signals shall be distinctive in sound from other signals, shall comply with the requirements of 18.4.2, and their sound shall not be used for any other purpose
- 18.4.2 Distinctive Evacuation Signal
  - The alarm audible signal pattern used to notify building occupants of the need to evacuate (leave the building) **or relocate (from one area to another)** shall be the standard alarm evacuation signal consisting of a three-pulse temporal pattern

Fundamentals

2013 (p 72-70)

Distinctive Signals

- Signals shall **be distinctive in sound from other signals**, and their sound shall not be used for any other purpose except as permitted in 10.10.4
- 10.10.4 **An audible notification appliance** on a control unit, or on multiple control units that are interconnected to form a system, or at a remote location, **shall be permitted to have the same audible characteristics** for all alerting functions including, but not limited to, alarm, trouble, and supervisory, **provided that the distinction between signals shall be by other appropriate means, such as visible annunciation**

Fundamentals

2013 (p 72-70)

Alarm Signals

- An alarm signal that has been deactivated at the protected premises shall comply with 10.12.6.1 and 10.12.6.2
- 10.12.6.1 The audible and visible alarm signal at the control unit only shall **automatically reactivate every 24 hours** or less until alarm signal conditions are restored to normal
- 10.12.6.2 The audible and visible alarm signal shall operate until it is manually silenced or acknowledged
- NFPA 72-2010 had similar provisions but only for trouble conditions; the 2013 now extends requirements to alarm conditions

Fundamentals

2013 (p 72-70)

Fire Alarm Notification Appliance Deactivation

- When an occupant notification alarm signal deactivation means is actuated, **both audible and visible** notification appliances **shall be simultaneously deactivated**
- When voice instructions are in progress, **visible appliances** in same area where speakers are activated **shall also be activated where required by the emergency response plan**
- The fire alarm notification **deactivation means** shall be key-operated or located within a locked cabinet, or arranged to provide equivalent **protection against unauthorized use**

Fundamentals

2013 (p 72-71)

Supervisory Signal Reactivation

- A supervisory signal that has been deactivated at the protected premises shall comply with 10.14.6.1 and 10.14.6.2
- 10.14.6.1 The audible and visible supervisory signal at the control unit only shall **automatically reactivate every 24 hours** or less until supervisory signal conditions are restored to normal
- 10.14.6.2 The audible and visible supervisory signal shall operate until it is manually silenced or acknowledged
- NFPA 72-2010 had similar provisions but only for trouble conditions; the 2013 now extends requirements to supervisory conditions

Fundamentals

Signals on FACU	Alarm	Supv	Tbl
Audible	Req'd	Req'd	Req'd
Visible	Req'd	Req'd	Req'd
Audible signal deactivation permitted (manual only)	Yes	Yes	Yes
Subsequent actuation operation	Req'd	Req'd	Req'd
Reactivate signal each 24 hours if not restored	Req'd	Req'd	Req'd
Reactivate signal each 24 hours at supervising station if not restored			Req'd unless otherwise permitted by AHJ

Fundamentals

Notification appliances	Alarm	Supv	Tbl
Audible	?	?	?
Visible	?	?	?
Audible/visible signal deactivation permitted (manual only)	Yes	Yes	Yes
Subsequent actuation operation	Req’d	Req’d	Req’d
Key operated, in locked cabinet, or equivalent to protect from unauthorized use	Req’d	Req’d	Req’d

Fundamentals

2013 (p 72-32)

- Unwanted Alarm (new definitions)
- Any alarm that occurs that is not the result of a potentially hazardous condition
  1) Malicious Alarm. An unwanted activation of an alarm initiating device caused by a person acting with malice
  2) Nuisance Alarm. An unwanted activation of a signaling system or an alarm initiating device in response to a stimulus or condition that is not the result of a potentially hazardous condition

Fundamentals

2013 (p 72-32)

- Unwanted Alarm (new definitions)
- Any alarm that occurs that is not the result of a potentially hazardous condition
  3) Unintentional Alarm. An unwanted activation of an alarm initiating device caused by a person acting without malice
  4) Unknown Alarm. An unwanted activation of an alarm initiating device or system output function where the cause has not been identified

Fundamentals

2013 (p 72-73)

Unwanted Alarms

- For the purpose of reporting, alarm signals that are not the result of hazardous conditions to be classified as Unwanted and subclassified as one of the following
  1) Malicious alarm
  2) Nuisance alarm
  3) Unintentional alarm
  4) Unknown alarm

NFPA 72-2013
Chapter 12
Circuits and Pathways

Circuits and Pathways

2013 (p 72-73)

General

- All non-power-limited and power-limited signaling system circuits entering a building shall be provided with transient protection
- On conductive pathways, operational capability shall be maintained during the application of a single ground connection

Transient Protection

- Required on all signaling system circuits entering (and exiting) a building
- See *NEC®*, Article 800 regarding proper
  - Location
  - Installation
  - Grounding
  - Bonding

Circuits and Pathways Class Designations (2010)

Class designation is based on ability to operate during abnormal conditions.

Class A	Class A
Class B	Class B
Class C	Network/Internet
Class D	Failsafe
Class E	Not monitored
Class X	Old Class A Style 7

Circuits and Pathways

Pathway Survivability

- Introduced in 72-2010
- Establish levels of survivability
  - Level 0
  - Level 1
  - Level 2
  - Level 3

Shared Pathway Designations

- New to 72-2013
- Segregate and prioritize life safety vs. non-life safety
  - Level 0 – Common equipment
  - Level 1 – **Prioritized** – Life safety data has higher priority
  - Level 2 – **Segregated** – Data is separate and not intermingled
  - Level 3 – **Dedicated**

NFPA 72-2013
Chapter 14
Inspection, Testing, and Maintenance

Inspection, Testing, and Maintenance

2013 (p 72-75)

Chapter 14

- Extensive chapter structure changes
- Improves user friendliness
- 14.2 Purpose added

Inspection, Testing, and Maintenance

Purpose

- Initial and reacceptance
  - To **ensure** compliance with approved design documents and to **ensure** installation in accordance with this Code and other required installation standards
  - To **ensure** system operation in accordance with the design documents
  - New work or modifications
- Periodic
  - Performed at prescribed intervals (W, M, Q, S, A)
- Periodic inspections
  - To **assure** that obvious **damages** or **changes** (building or environment) that might affect the system operability are **visually** identified
- Periodic testing
  - To statistically **assure** operational reliability

Inspection, Testing, and Maintenance

2013 (p 72-76)

- Test Plan
  - A test plan shall be written to clearly establish the scope of the testing for the fire alarm or signaling system
  - The test plan is intended to clarify exactly what is to be tested and how it is to be tested
  - The test plan and results shall be documented with the testing records (See 7.6, Inspection, Testing, and Maintenance Documentation; 7.6.1 requires a test plan)
  - Also see A.14.2.10

Inspection, Testing, and Maintenance

NFPA 72-2010

- Visual Inspection Frequencies
- Test Methods
- Testing Frequencies

NFPA 72-2013

- Visual Inspection/Method
- Testing/Method

Inspection, Testing, and Maintenance

2013 (p 72-92)

- Single- and multiple-station smoke alarms
- Smoke alarms and all connected appliances shall be inspected and tested in accordance with the manufacturer's published instructions at least **monthly**. The responsibility for maintenance and testing shall be in accordance with 14.2.3
- 14.2.3 Responsibilities
- The property or building or system owner or the owner's designated representative shall be responsible

Inspection, Testing, and Maintenance

2013 (p 72-92)

- Household fire alarm systems shall be **tested** by a qualified service technician at least **annually** according to the methods of Table 14.4.3.2. The installing contractor shall be required to provide this information in writing to the customer upon completion of the system installation. To the extent that the fire alarm system is monitored offsite, the supervising station contractor shall provide notice of this requirement to the customer on a yearly basis

Inspection, Testing, and Maintenance

2013 (p 72-94)

- Maintenance, Inspection and Testing Records
- A record of all inspections, testing, and maintenance shall be provided in accordance with 7.8.2 (See 7.8, Forms for Record of Completion, Record of Inspection and Testing, and Risk Analysis and 7.2, Minimum Required Documentation)

NFPA 72-2013
Chapter 17
Initiating Devices

Initiating Devices

2013 (p 72-94)

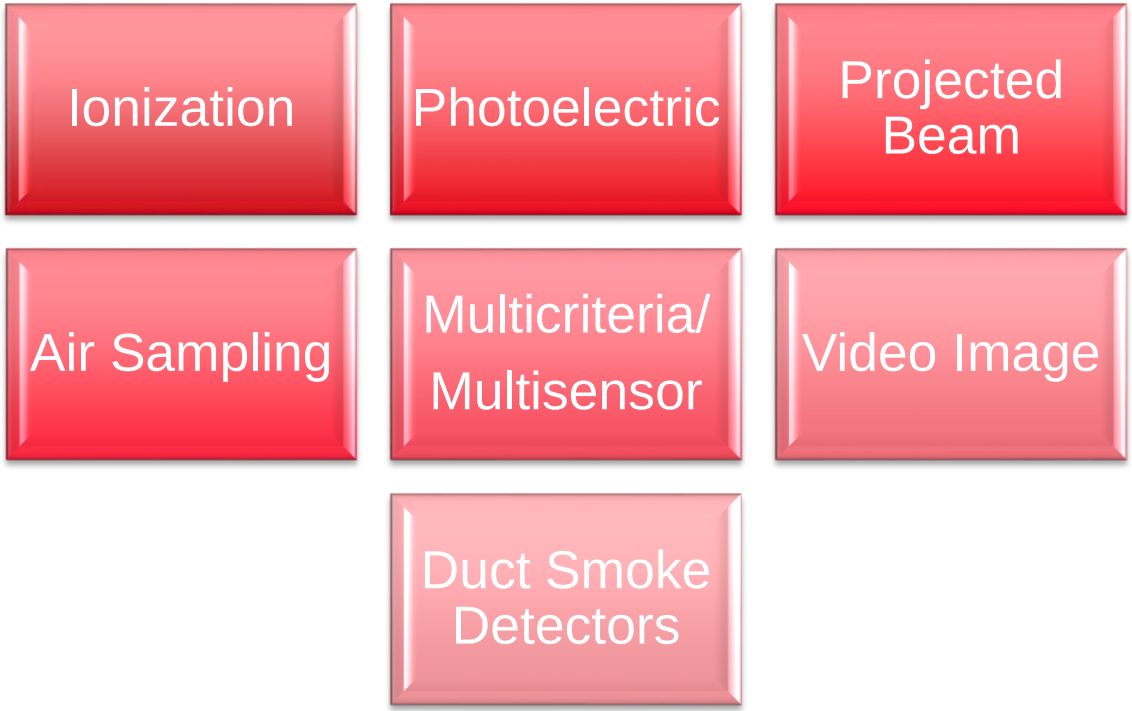
Application

- This chapter establishes the minimum installation criteria for initiating devices required by other governing laws, codes, standards, or section of this document. This chapter **does not**, by itself, require the installation of initiating devices

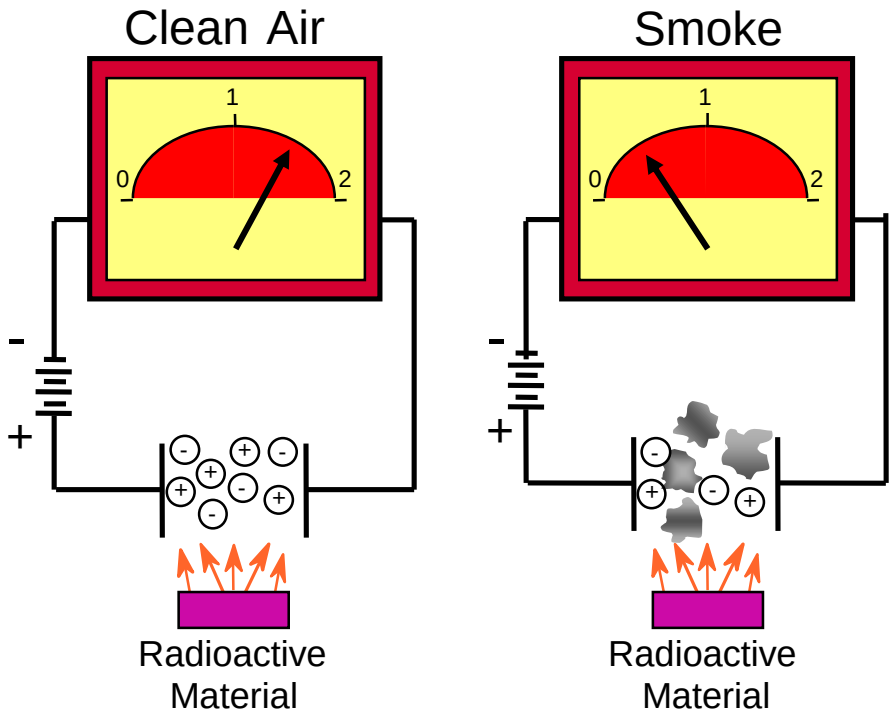
Types of Initiating Devices

- Smoke Detectors
- Heat Detectors
- Manual Fire Alarm Boxes
- Sprinkler Waterflow
- Supervisory
- Others

Smoke Detector Types

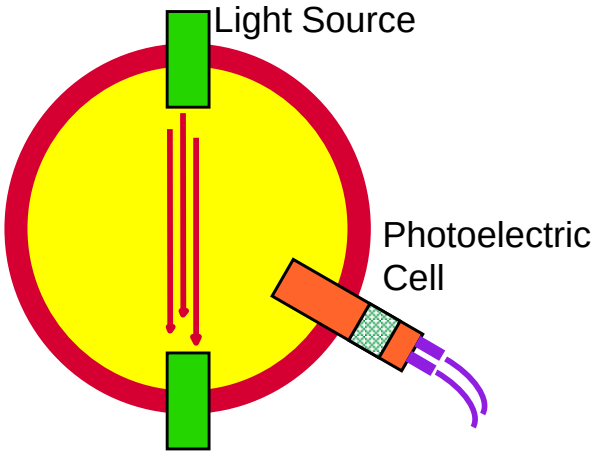


Ionization

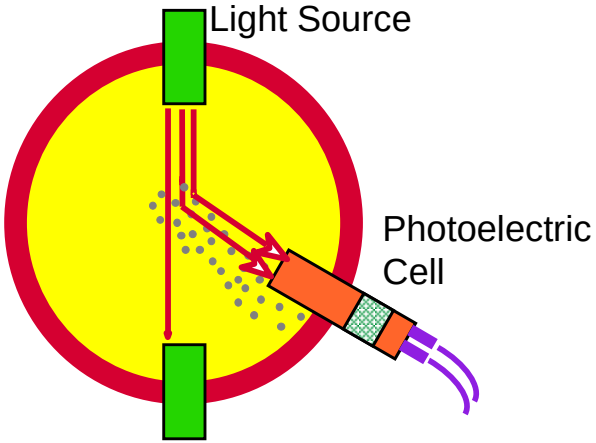

Clean Air
Smoke
1
0
2
-
+
Radioactive Material
Radioactive Material

Photoelectric

Normal State

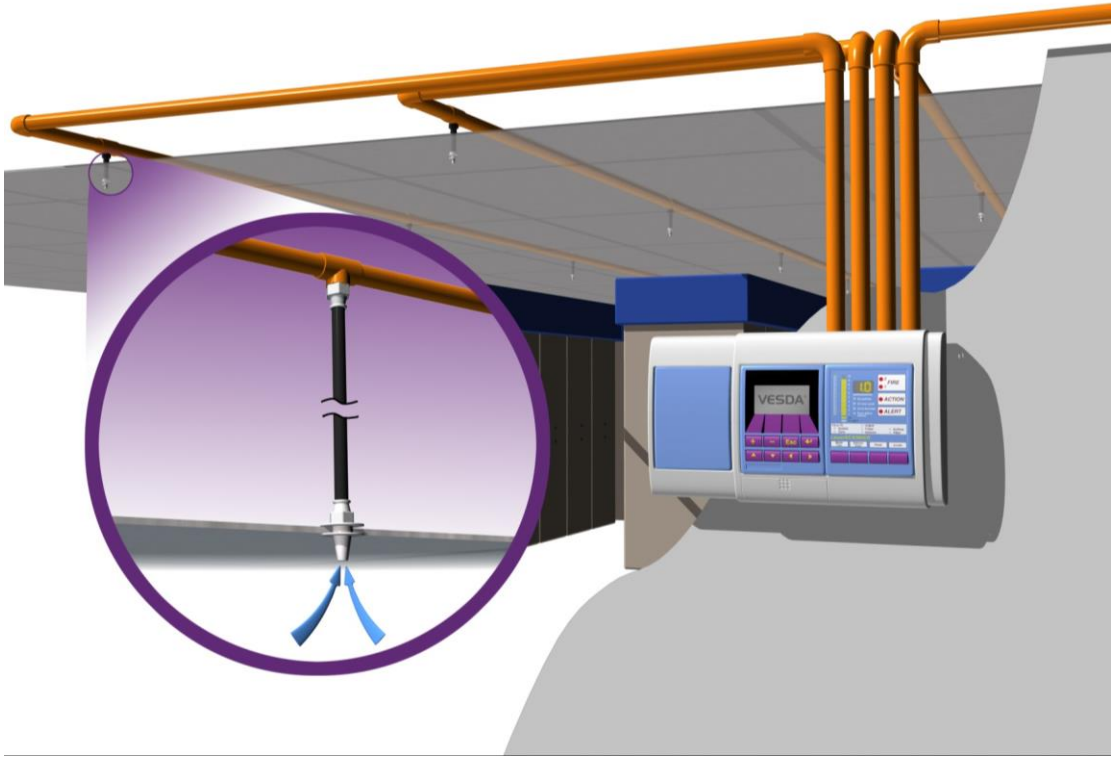


Alarm State

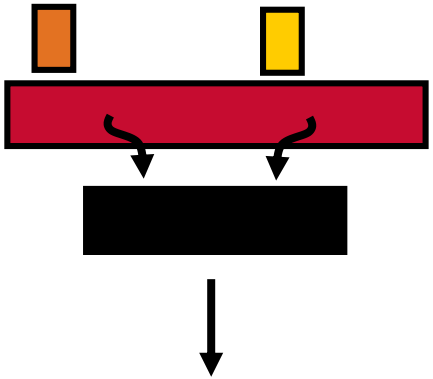


Projected Beam

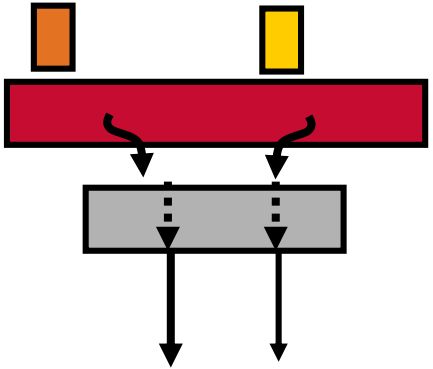
Air Sampling



Multi-criteria and Multi-sensor



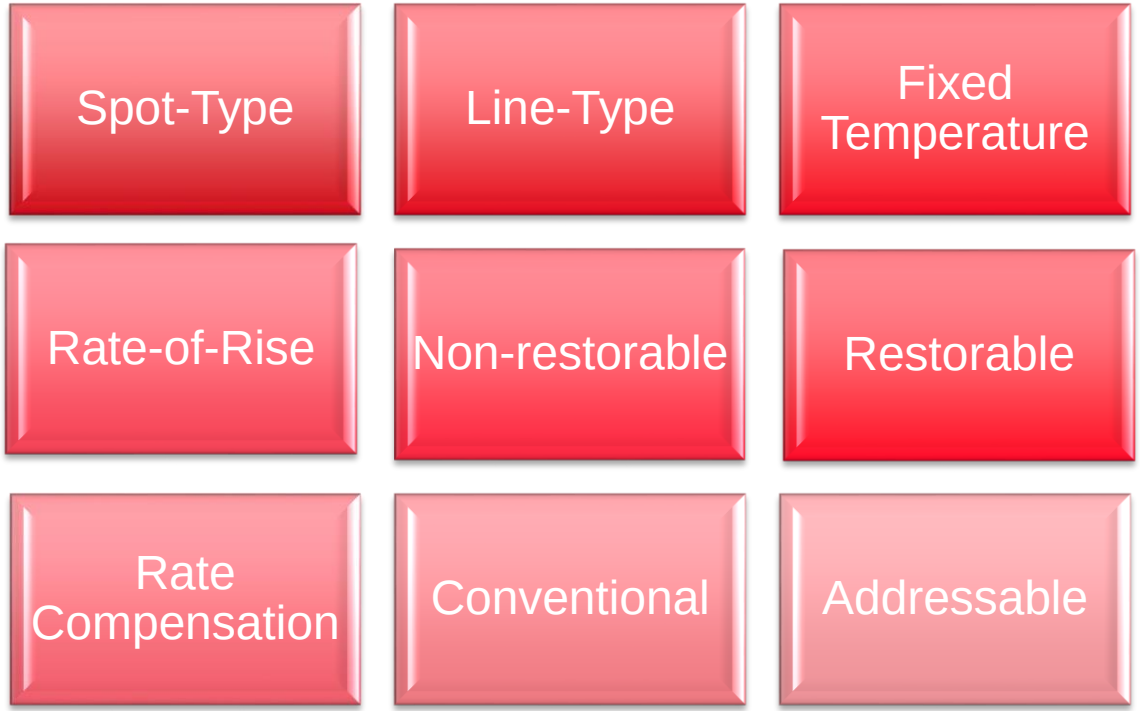
Multi-criteria:
One alarm signal



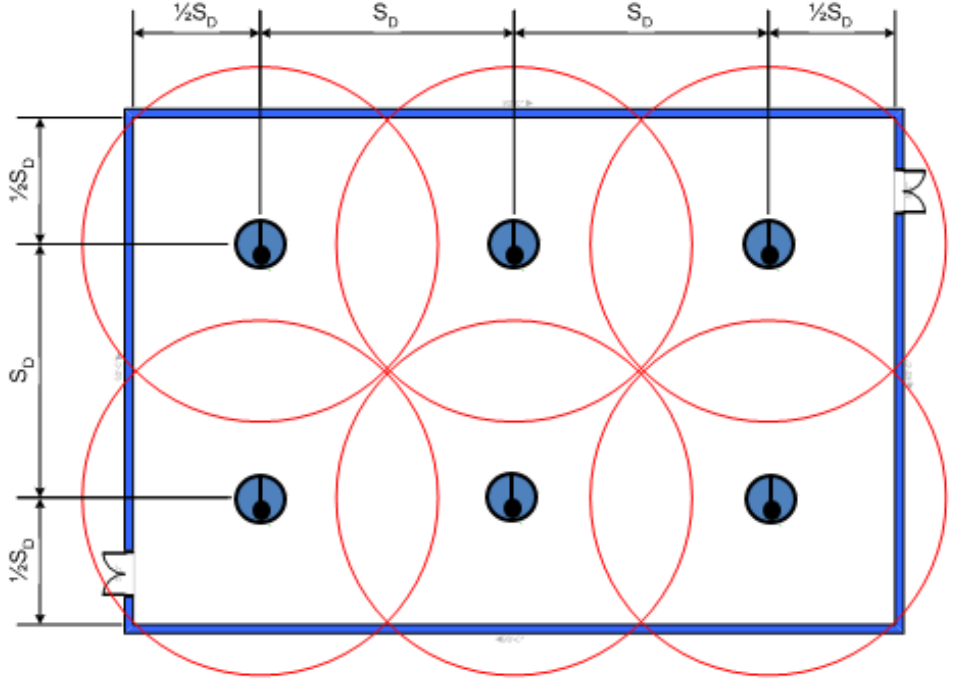
Multi-sensor:
Multiple alarm signals

Duct Detector

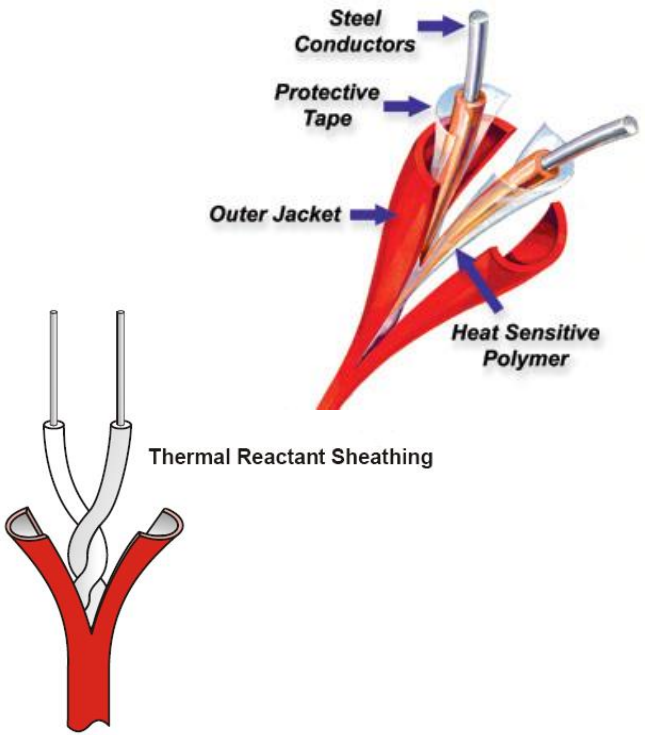
Automatic Initiating Devices



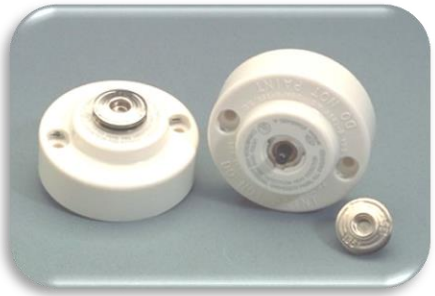
Spot-Type

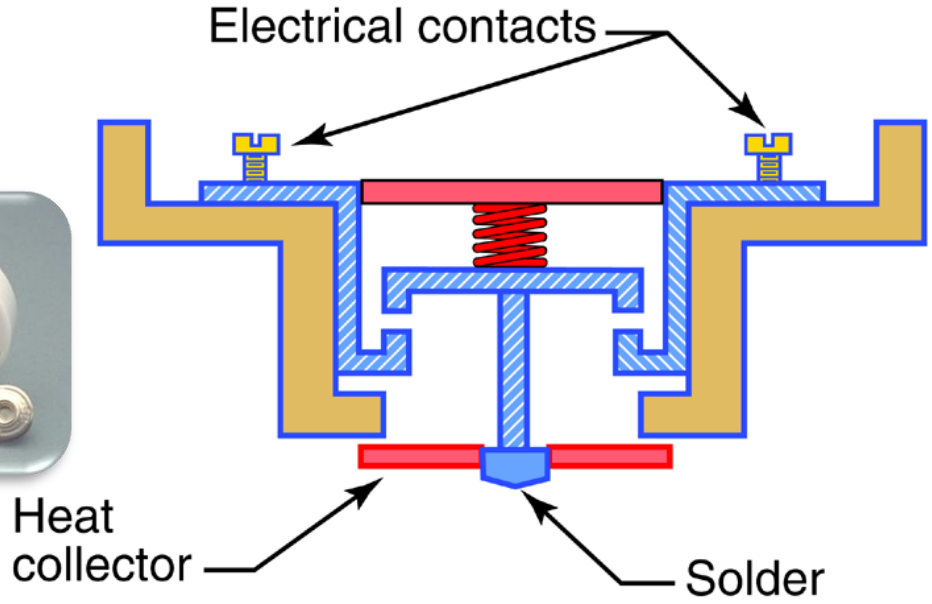


Line-Type


Steel Conductors
Protective Tape
Outer Jacket
Heat Sensitive Polymer
Thermal Reactant Sheathing

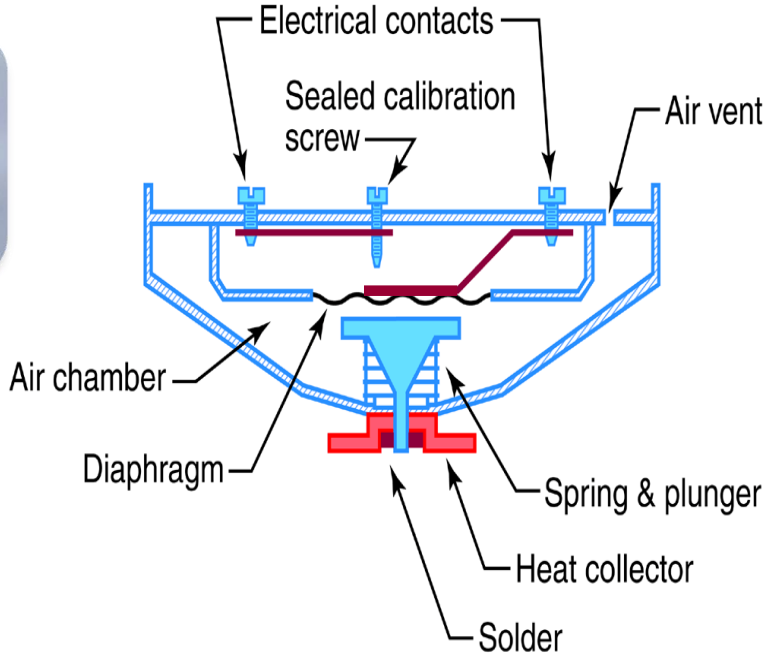
Fixed Temperature



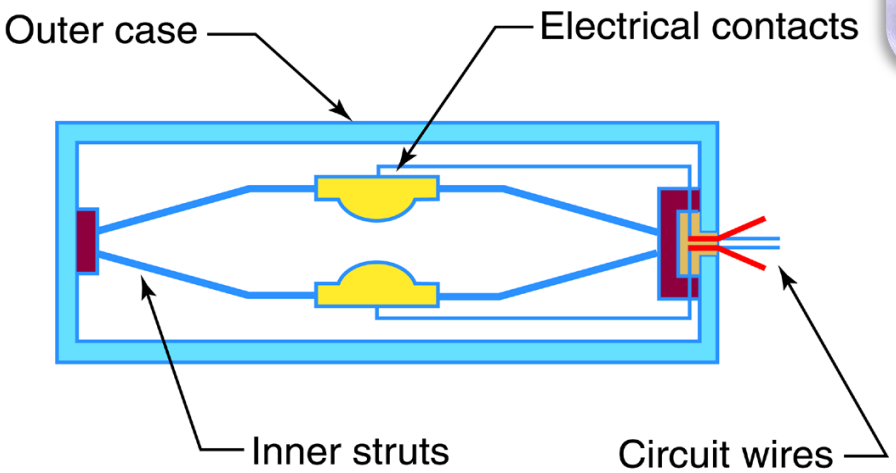


When solder melts, plunger drops and contacts are shorted.

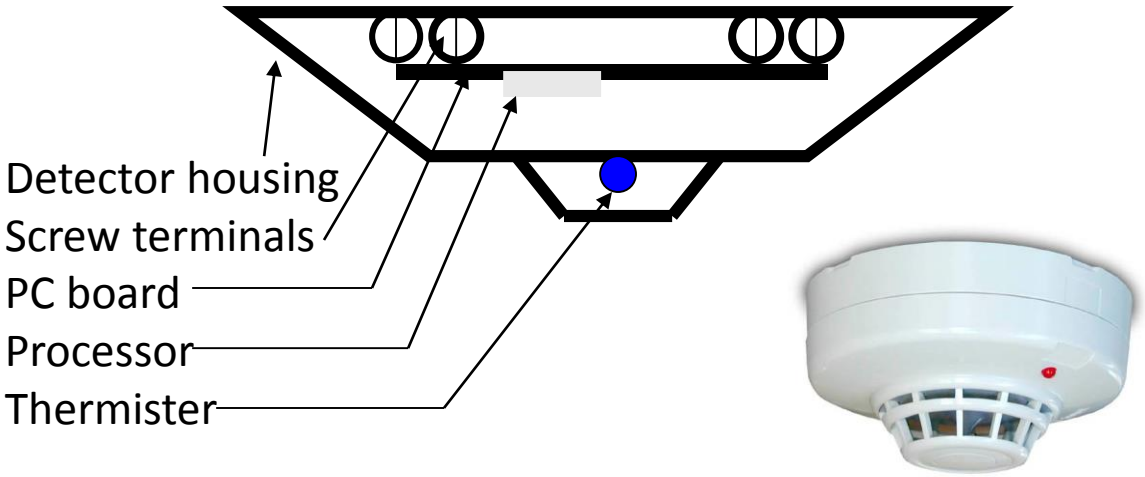
Rate-of-Rise/Fixed Temperature



Rate Compensation



Electronic


Detector housing
Screw terminals
PC board
Processor
Thermister

Electronic

- Conventional
- Addressable
- Analog/Smart/Intelligent

Heat Detector Marking

Temperature Set-Point

Response Time-Index (RTI)

Heat vs Smoke Spacing

- Heat detectors have a *Listed Spacing*, S
- Smoke detectors have a *Nominal Spacing*, S

Heat Detector Spacing

EPB/MPB 501 WPB/MPB 501	EPB/MPB 502 WPB/MPB 502	EPB/MPB 503 WPB/MPB 503	EPB/MPB 503 WPB/MPB 503
No Marking Model WPB/MPB 501 Model EPB/MPB 501 	White Dot Model WPB/MPB 502 Model EPB/MPB 502 	Black Dot Model WPB/MPB 503 Model EPB/MPB 503 	Black Dot on White Model WPB/MPB 504 Model EPB/MPB 504 
Rate-of-Rise and Fixed Temperature, 136°F (58°C)	Rate-of-Rise and Fixed Temperature, 190°F (88°C)	Fixed Temperature only 136°F (58°C)	Fixed Temperature only 190°F (88°C)
Applications: Normal temperature fluctuations and ceiling temperatures not exceeding 100°F (38°C)	Applications: Normal temperature fluctuations and ceiling temperatures exceeding 100°F (38°C) but not 150°F (66°)	Applications: Unusually violent temperature fluctuations and ceiling temperatures not exceeding 100°F (38°C)	Applications: Unusually violent temperature fluctuations and ceiling temperatures exceeding 100°F (38°C) but not 150°F (66°C)
Maximum Spacing Allowance* - 50 x 50 ft. - UL 30 x 30 ft. -FM	Maximum Spacing Allowance* - 50 x 50 ft. – UL 30 x 30 ft. – FM	Maximum Spacing Allowance* - 15 x 15 ft. – UL & FM	Maximum Spacing Allowance* - 15 x 15 ft. – UL & FM

Heat vs Smoke Spacing

- Heat detectors have a *Listed Spacing*, S
- Smoke detectors have a *Nominal Spacing*, S

Spot-Type Smoke Detectors

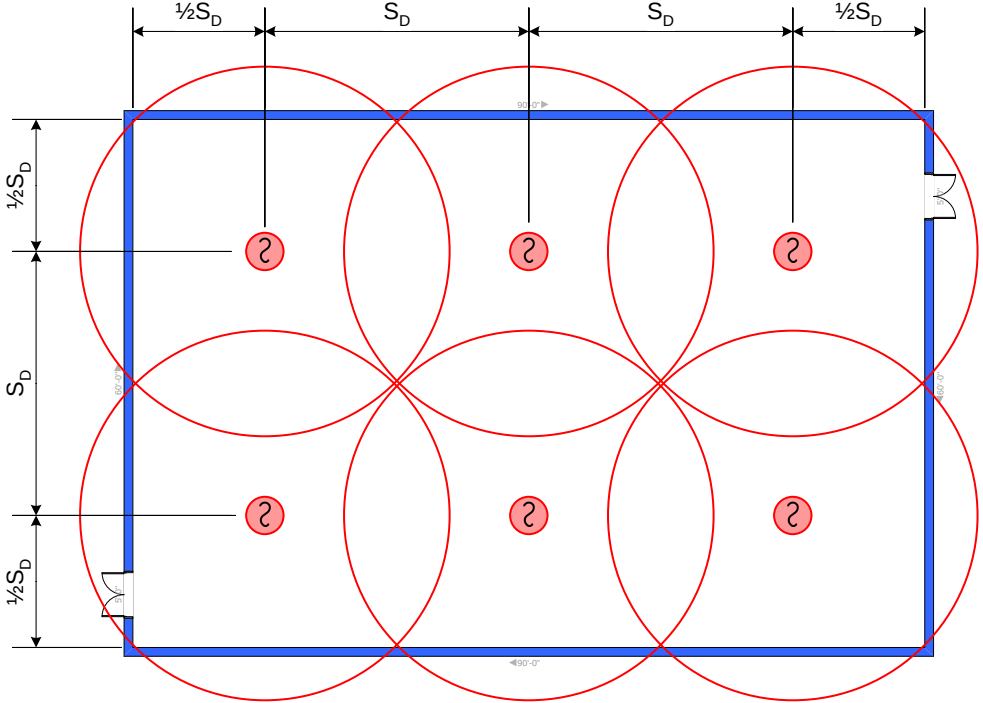
2013 (p 72-98)

- In the absence of specific performance-based design criteria, one of the following requirements shall apply:

  (1) The distance between smoke detectors shall not exceed a nominal spacing of 30 ft and 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 spacing (0.7*S*)

Spot-Type



Common Spacing Rules: Spacing vs Radius of Coverage

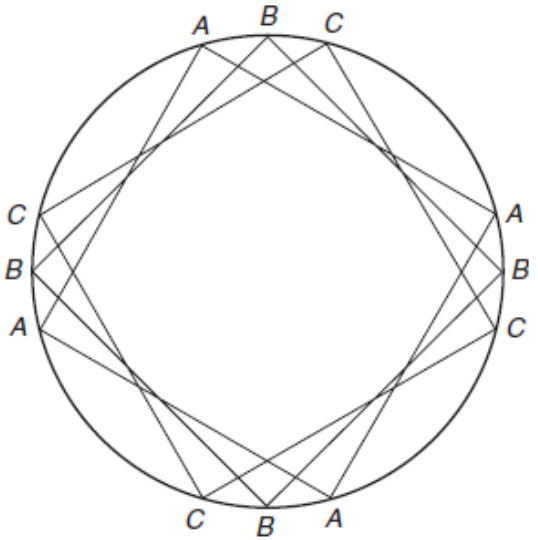
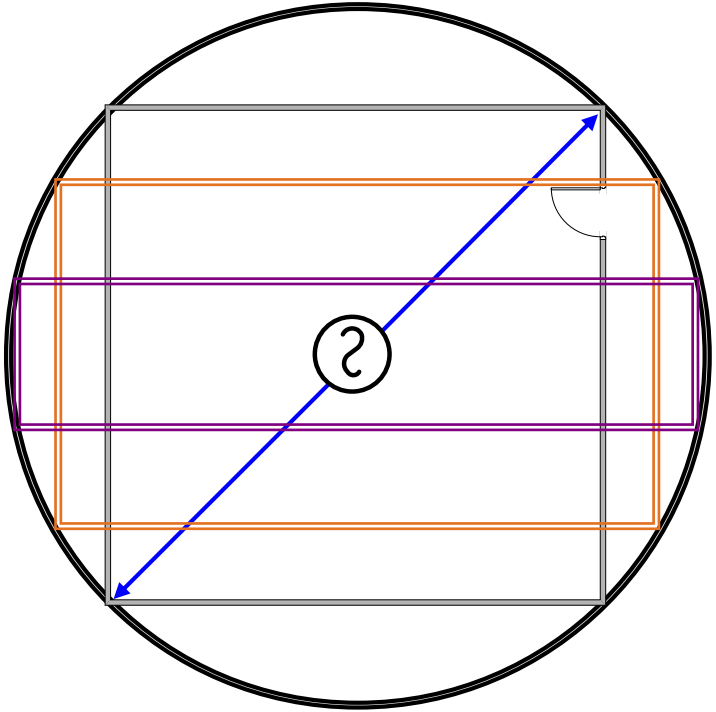
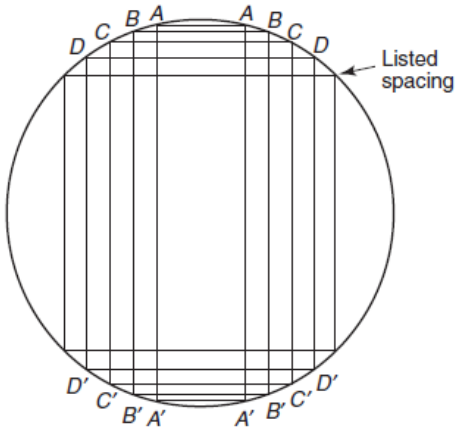


FIGURE A.17.6.3.1.1(d) Detector Covering any Square Laid Out in Confines of Circle in Which Radius Is 0.7 Times Listed Spacing.

Common Spacing Rules: Spacing vs Radius of Coverage



Common Spacing Rules: Spacing vs Radius of Coverage



Rectangles

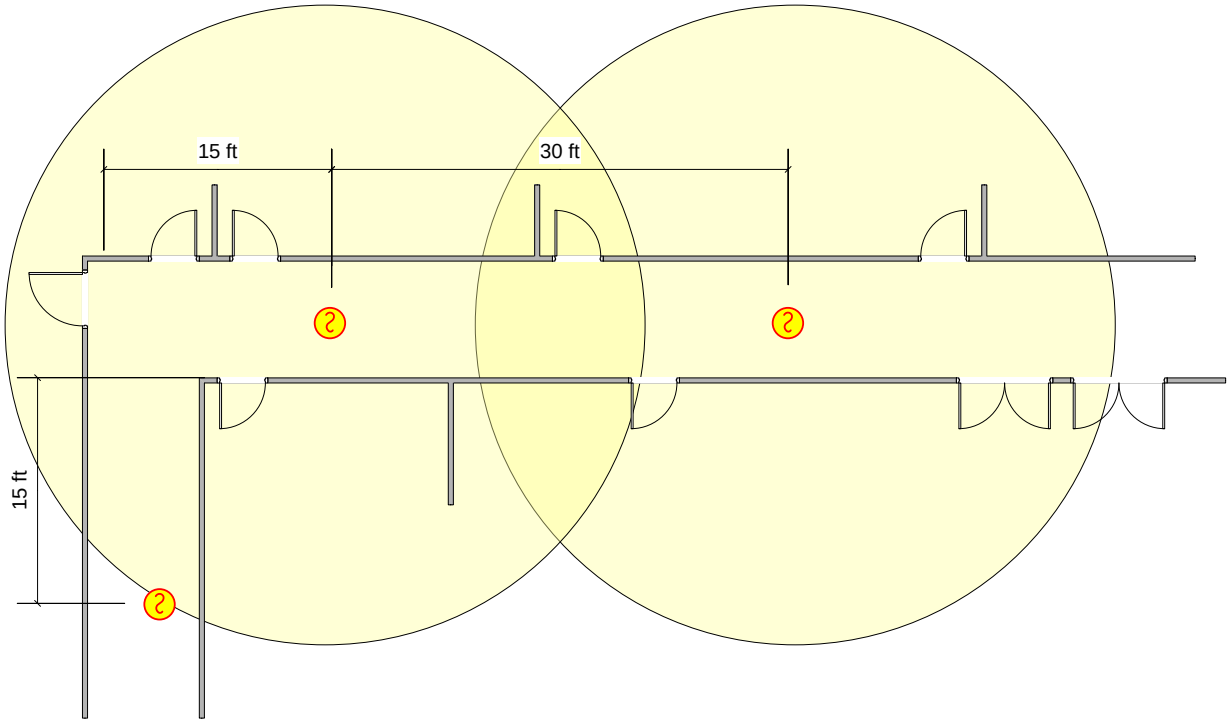
A = 10 ft × 41 ft = 410 ft^2 (3.1 m × 12.5 m = 38 m^2)
B = 15 ft × 39 ft = 585 ft^2 (4.6 m × 11.9 m = 54 m^2)
C = 20 ft × 37 ft = 740 ft^2 (6.1 m × 11.3 m = 69 m^2)
D = 25 ft × 34 ft = 850 ft^2 (7.6 m × 10.4 m = 79 m^2)

Listed spacing for heat detectors only = 30 ft × 30 ft = 900 ft^2 (9.1 m × 9.1 m = 84 m^2)

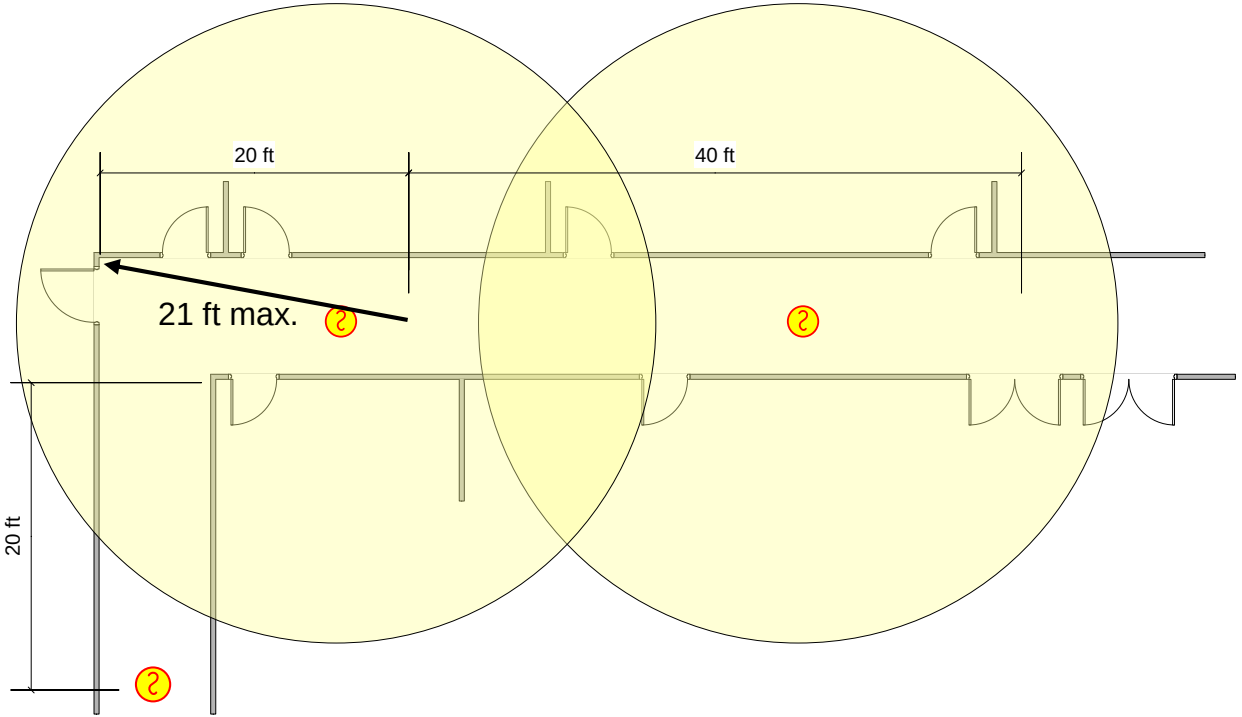
Note: Smoke detectors are not listed for spacing. Use manufacturer's coverage recommendations and this figure.

FIGURE A.17.6.3.1.1(g) Detector Spacing, Rectangular Areas.

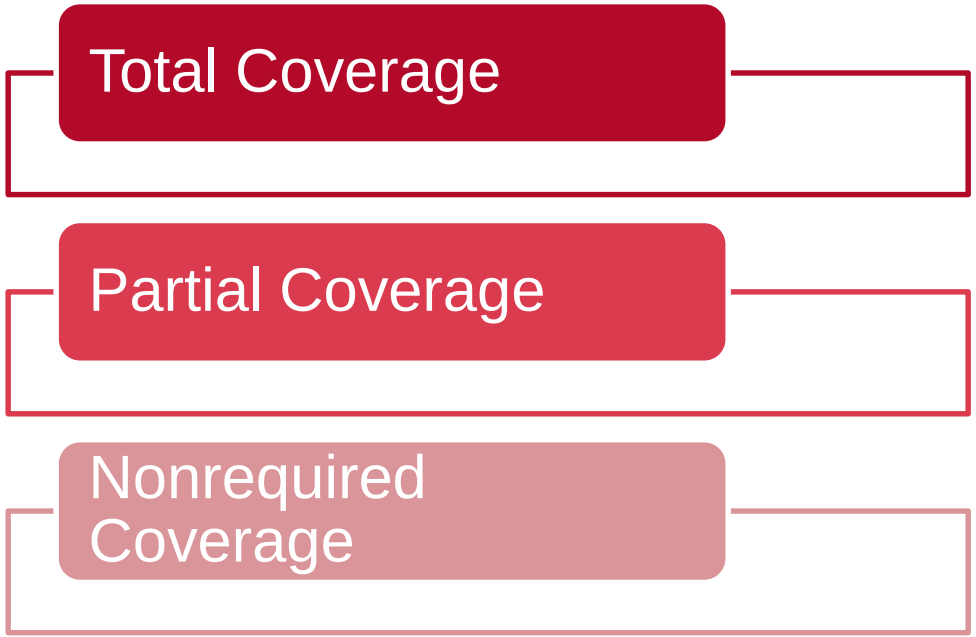
Corridor Spacing



Corridor Spacing



Detector Coverage



Detector Coverage

2013 (p 72-95)

- **17.5.3.1 Total (Complete) Coverage. Where required by other governing laws, codes, or standards**, and unless otherwise modified by 17.5.3.1.1 through 17.5.3.1.5, **total coverage shall include** all rooms, halls, storage areas, basements, attics, lofts, spaces above suspended ceilings, and other subdivisions and accessible spaces, as well as the inside of all closets, elevator shafts, enclosed stairways, dumbwaiter shafts, and chutes.

Detector Coverage

2013 (p 72-95)

- **17.5.3.2* Partial or Selective Coverage. Where other governing laws, codes, or standards** require the protection of selected areas only, the **specified areas shall be protected** in accordance with this Code.

Detector Coverage

2013 (p 72-95)

- **17.5.3.3* Nonrequired Coverage.**
  - **17.5.3.3.1** Detection installed for reasons of achieving specific fire safety objectives, but not required by any laws, codes, or standards, shall meet all of the requirements of this Code, with the exception of the prescriptive spacing criteria of Chapter 17.
  - **17.5.3.3.2** Where nonrequired detectors are installed for achieving specific fire safety objectives, additional detectors not necessary to achieve the objectives shall not be required.

Initiating Devices

2013 (p 72-97)

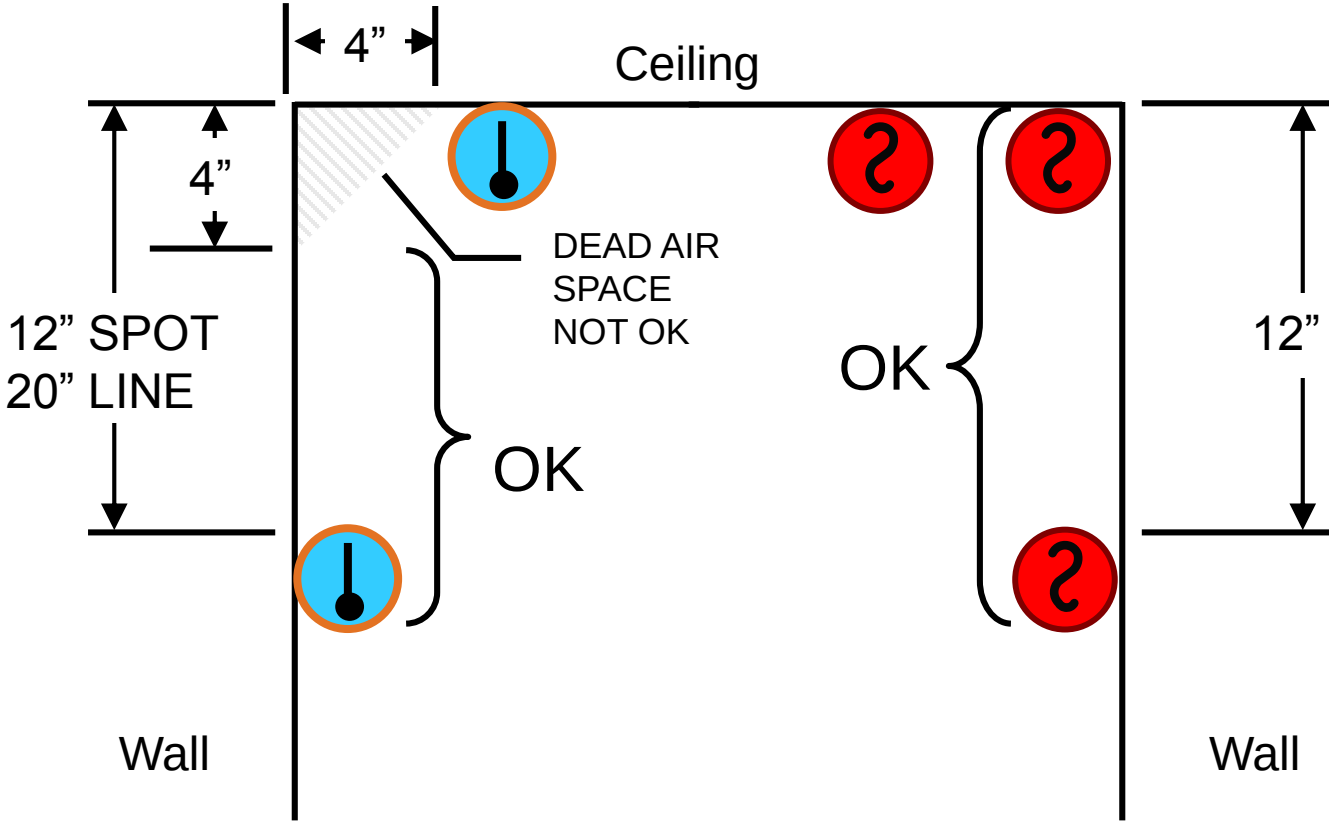
- The selection and placement of smoke detectors shall take into account both the performance characteristics of the detector and the areas into which the detectors are to be installed to prevent nuisance and unintentional alarms or improper operation after installation.

Initiating Devices

2013 (p 72-100)

- Detectors placed in environmental air ducts or plenums shall be permitted to be either supervisory or alarm initiating devices

Detector Location Requirements



Initiating Devices

2013 (p 72-105)

Manually actuated alarm-initiating devices

AKA - Manual fire alarm boxes/pull stations

- Manually actuated alarm-initiating devices shall be permitted to be single action or double action
- Listed protective covers shall be permitted to be installed over single- or double-action manually actuated alarm initiating devices

Manual Fire Alarm Boxes

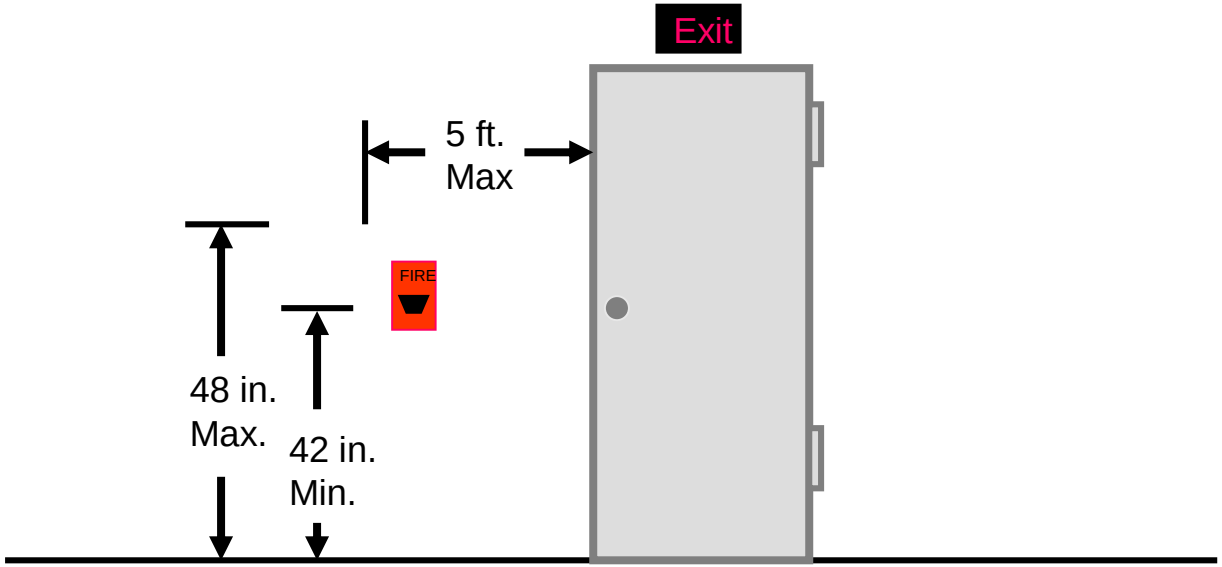
- Single-action
- Double-action
- Break-glass
- Addressable
- Nonaddressable

Protective Cover

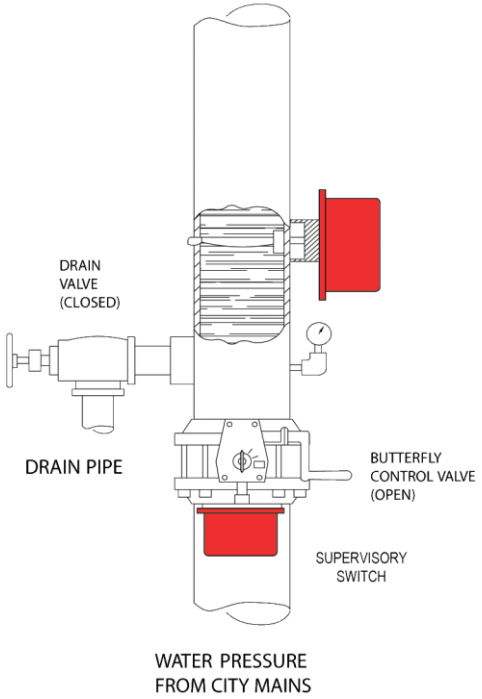
Manual Fire Alarm Boxes

- Manual fire alarm boxes shall be red
- Mount on a contrasting color
- Other boxes must be a different color and labeled

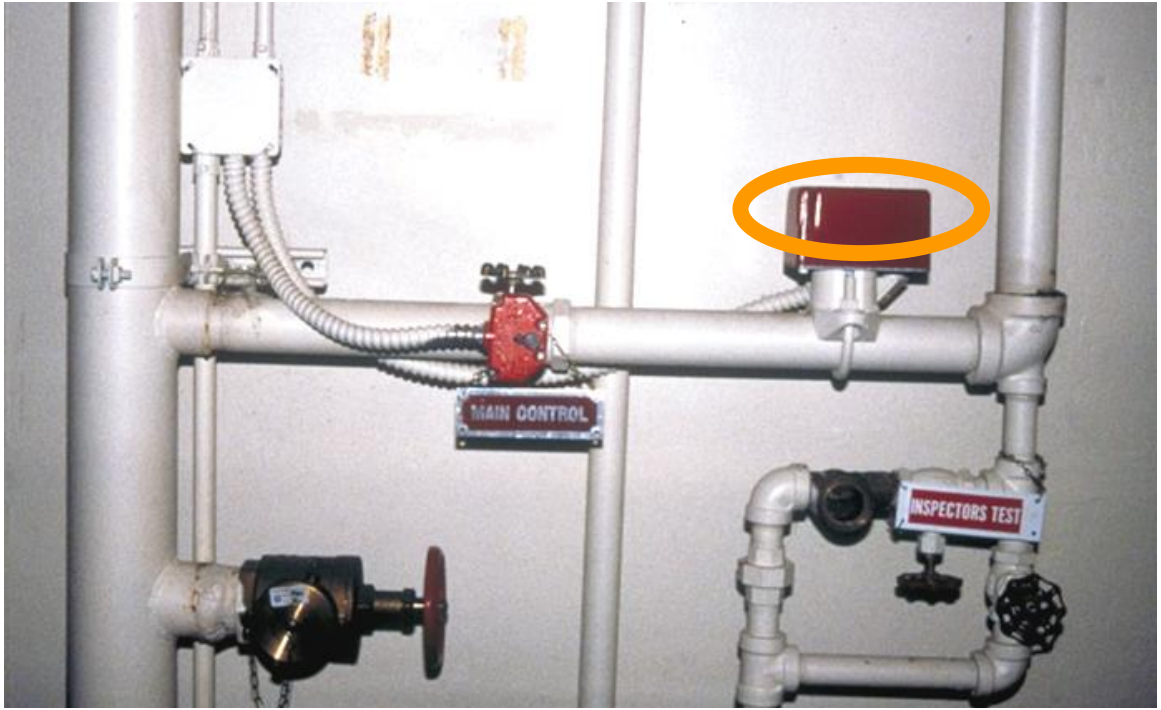
Manual Fire Alarm Boxes



Vane-Type – Wet Pipe



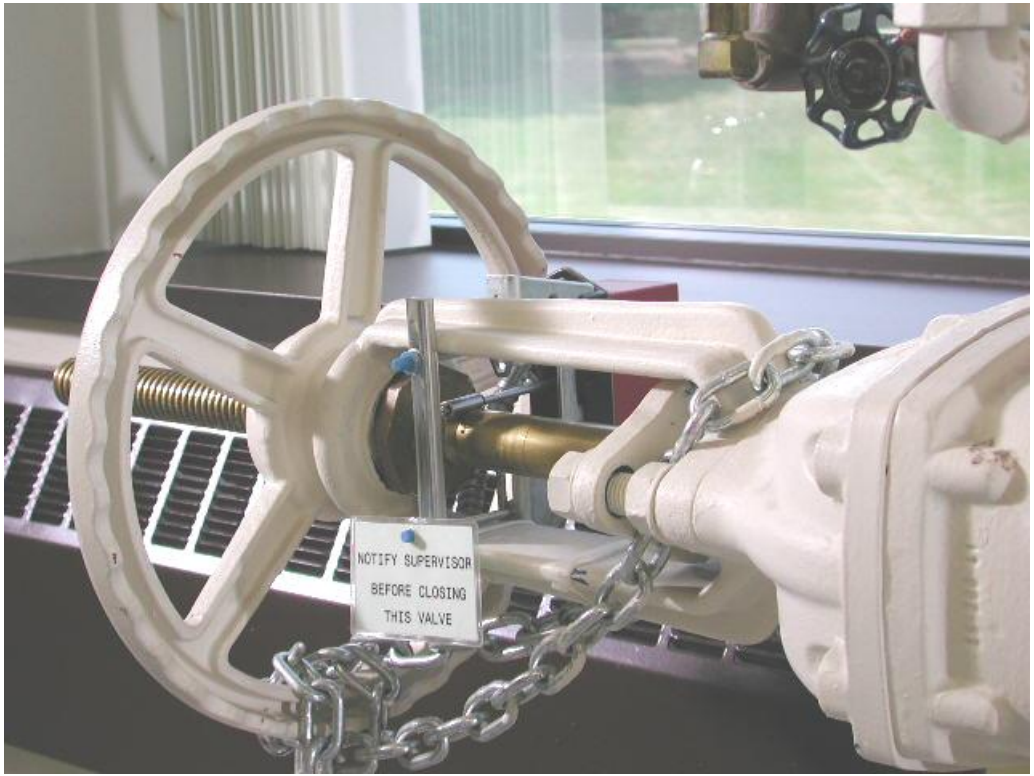
Vane-Type – Wet Pipe



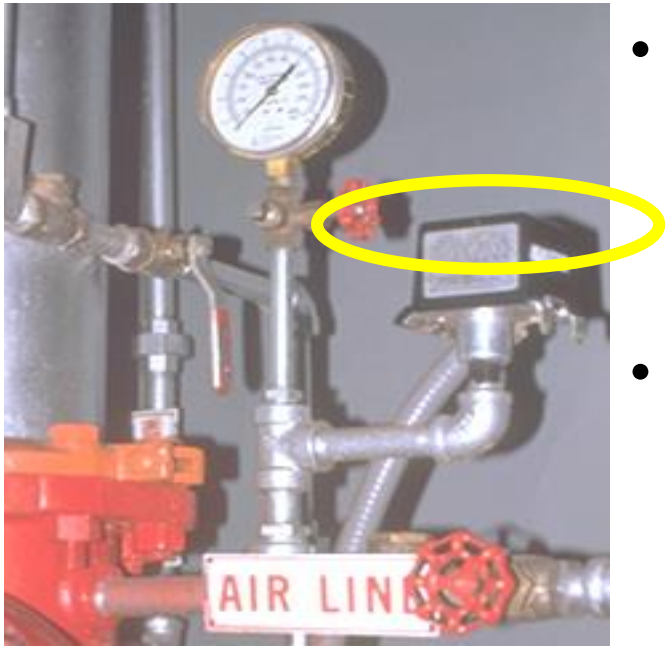
Pressure Switch Type

- Wet
- Dry
- Preaction
- Deluge

Control Valve Supervisory Devices



Pressure Supervisory Devices

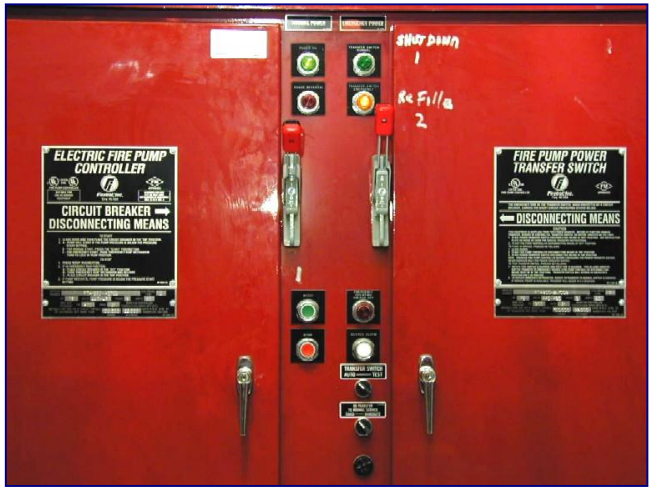


- Pressure switches
  - Low air pressure
  - High air pressure
  - Low water pressure
- Generally provided by sprinkler system contractor

Supervisory Signal – Initiating Devices

- Fire pump
- Valve position
- Pressure
- Water level
- Temperature
  - Water
  - Room air

Fire Pump Supervision – Electric Drive



In accordance with NFPA 20

- Disconnect
- Running
- Loss of phase (power failure)
- Phase reversal
- Controller connected to alternate power (if used)

Fire Pump Supervision – Engine Drive

In accordance with NFPA 20

- Engine running
- Controller main switch in position other than “automatic start”
- Trouble on controller or engine

Water Supply Supervisory Devices

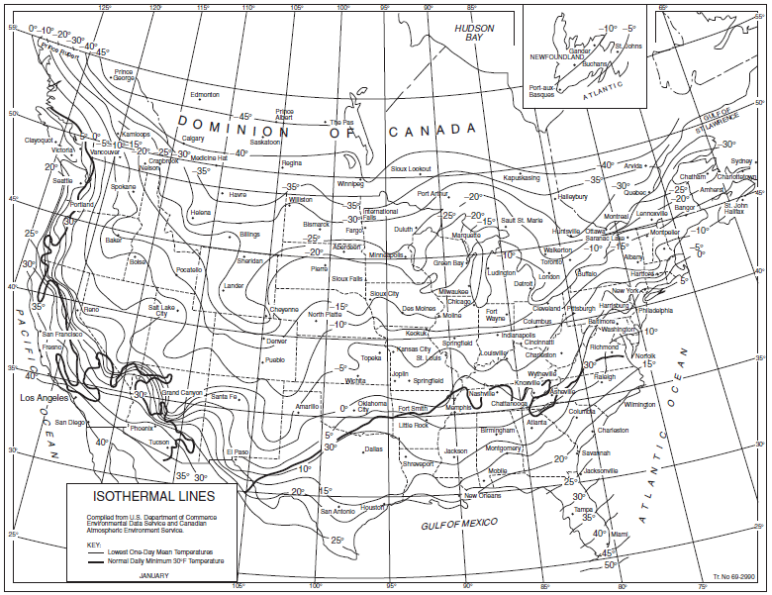
- High and Low
  - Pressure tanks at deviation of 3 in.
  - Gravity tanks at deviation of 12 in.
- Water Temperature
  - Off-normal at ≤ 40°F
  - Restoration to normal at > 40°F

NFPA® 22 Standard for Water Tanks for Private Fire Protection

Water Supply Supervisory Devices

- Water Temperature

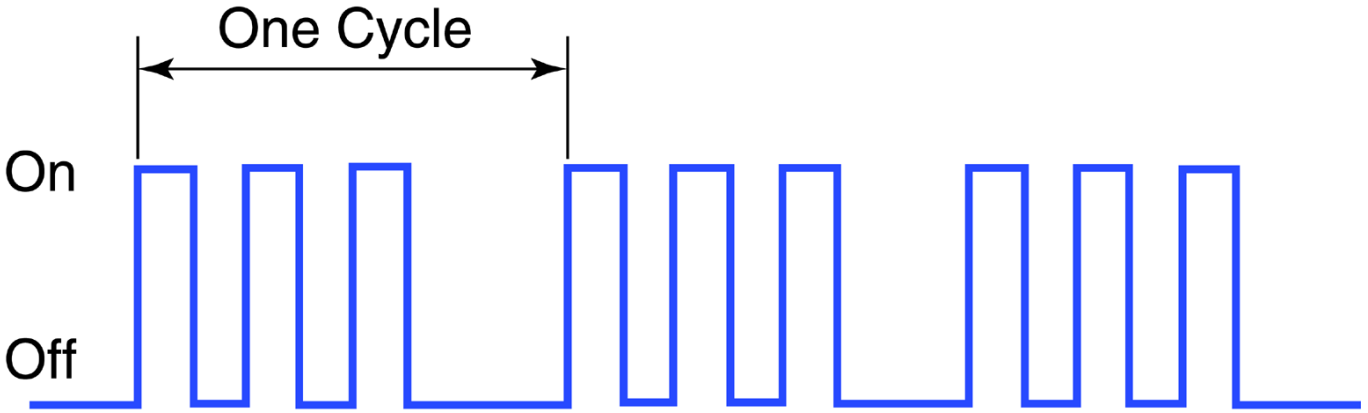
- **16.1.1** Tanks that are subject to freezing shall be heated.
- **16.1.2.2*** A low water temperature alarm, set at 40°F (4.4°C) shall be provided.



NFPA® 22 Standard for Water Tanks for Private Fire Protection

NFPA 72-2013
Chapter 18
Notification Appliances

Distinctive and Descriptive Standard Audible Evacuation Signal



Use for evacuation only

Click to play sound file.

STOP

Notification Appliances

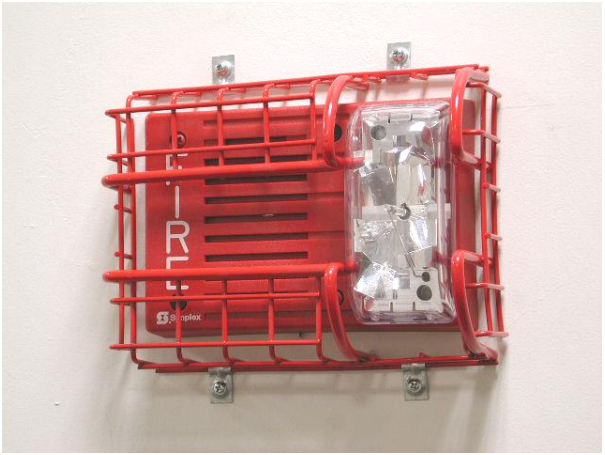
2013 (p 72-107)

Audible characteristics – general requirements

- The designer of the audible notification system shall **identify** the **rooms and spaces** that will have audible notification **and** those where audible notification will **not** be provided
- Required to be documented by 7.3 Design (Layout) Documentation

Mechanical Protection

- Conventional vs addressable
- Mechanical protection



Notification Appliances

2013 (p 72-107)

Audible characteristics – general requirements

- Unless otherwise required by other sections of this Code, the coverage area for audible occupant notification shall be as required by other governing laws, codes, or standards
- Where the other governing laws, codes, or standards require audible occupant notification for all or part of an area or space, coverage shall only be required in occupiable areas as defined in 3.3.178
- 3.3.178 Occupiable Area. An area of a facility occupied by people on a regular basis

Notification Appliances

2013 (p 72-107)

Audible characteristics – general requirements

- The design **sound pressure levels** to be produced by the notification appliances for the various coverage areas shall be **documented** for use during acceptance testing of the system
- Required to be documented by 7.3 Design (Layout) Documentation
- Where required by the AHJ, **documentation** of the design sound pressure levels for the various coverage areas shall be submitted for review and approval
- Required to be documented by 7.3 Design (Layout) Documentation where required by AHJ

Notification Appliances

2013 (p 72-109)

Voice Intelligibility

- Each **ADS** shall be **identified** as **requiring or not requiring** voice **intelligibility**
- Unless specifically required by other governing laws, codes, or standards, or by other parts of this Code, intelligibility shall not be required in all ADSs

Notification Appliances

2013 (p 72-109)

Voice Intelligibility

- Where required by the enforcing authority; governing laws, codes, or standards; or other parts of this Code, ADS assignments shall be submitted for review and approval

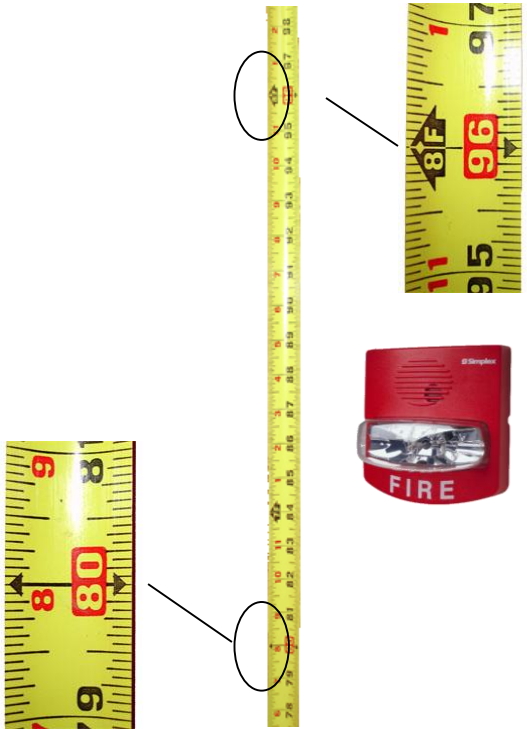
Notification Appliances

2013 (p 72-109)

Voice Intelligibility

- Intelligibility shall not be required to be determined through quantitative measurements
- Quantitative measurements as described in D.2.4 shall be permitted but are not required
- D.2.4 Acceptability Criteria
  - STI of not less than 0.45 (0.65 CIS)
  - Average STI of not less than 0.50 STI (0.70 CIS)

Installation of Wall-Mounted Visible Appliances



80 in (2.03 m) to
96 in (2.44 m)

Notification Appliances

2013 (p 72-109)

Visible signaling

- The coverage area for visible occupant notification shall be as required by other governing laws, codes, or standards
- Where the other governing laws, codes, or standards require visible occupant notification for all or part of an area or space, coverage shall only be required in occupiable areas as defined in 3.3.178
- 3.3.178 Occupiable Area. An area of a facility occupied by people on a regular basis

Notification Appliances

2013 (p 72-109)

Visible signaling – area of coverage

- The designer of the visible notification system shall **document** the **rooms and spaces** that will have visible notification **and** those where visible notification will **not** be provided
- Required to be documented by 7.3 Design (Layout) Documentation

Visible Appliance Synchronization

- Flash rate limited by UL
- If more than two appliances can be viewed – synchronize the appliances
- If more than two synchronized groups can be viewed – synchronize the synchronized groups
- If more than two synchronized systems can be viewed – synchronize the synchronized systems
- Not required for viewing from outside

NFPA 72-2013
Chapter 23
Protected Premises Fire Alarm Systems

Protection of Control Equipment

- Provide smoke detection at control units
- Sprinkler exception removed

Protected Premises

2013 (p 72-117)

- Performance of IDCs
  - No change

- Performance of NACs
  - No change

Protected Premises

2013 (p 72-117)

- Performance of SLCs
- A single fault on a pathway connected to the addressable devices shall not cause the loss of more than 50 addressable devices
  - The intent is to clarify that this requirement applies only to SLCs that connect to addressable devices and not to SLCs that interconnect fire alarm control units

Protected Premises

2013 (p 72-119)

- Protected premises fire alarm systems interconnected with dwelling unit fire warning equipment
- The activation of dwelling unit **smoke alarms** shall **only** be permitted to be displayed at the protected premises control unit and annunciators **as supervisory** signals

Protected Premises

2013 (p 72-119)

- Signals from carbon monoxide detectors and carbon monoxide detection systems transmitted to a fire alarm system **shall** be **indicated as a carbon monoxide alarm signal**
- *Exception: When in accordance with the building's response plan, evacuation plan, fire safety plan, or similar documentation, signals from carbon monoxide detectors and carbon monoxide detection systems transmitted to a fire alarm system shall be permitted to be supervisory signals*

Protected Premises

2013 (p 72-120)

- Signals from carbon monoxide detectors and carbon monoxide detection systems transmitted to a fire alarm system shall be indicated as "**Carbon Monoxide Alarm**" on the fire alarm system control unit or annunciator
- Fire alarm system processing for and occupant response to carbon monoxide alarm signals shall be in accordance with the building's response plan, evacuation plan, fire safety plan, or similar documentation

Protected Premises

2013 (p 72-120)

- Fire Alarm Signal Initiation — Detection Devices
  - **New - Signal Initiation — Duct Smoke Detectors**
- Fire Alarm Signal Initiation — Sprinkler Systems
- Alarm Signal Initiation — Fire Suppression Systems Other Than Sprinklers

Protected Premises

2013 (p 72-120)

- Signal Initiation — Duct Smoke Detectors
  1) Where duct smoke detectors are required to be monitored and a building fire alarm system is installed, a duct detector activation signal shall meet the requirements of 21.7.4
     - 21.7.4 Smoke detectors mounted in the air ducts of HVAC systems **shall initiate a supervisory signal**
  2) Continued on next slide
  3) Continued on next slide
  4) Continued on next slide

Protected Premises

2013 (p 72-120)

- Signal Initiation — Duct Smoke Detectors
  2) Where duct smoke detectors are **connected to a protected premises fire alarm system**, the operation of the power circuit shall meet the requirements of 23.4.2.2

     23.4.2.2 Continued on next slide

Protected Premises

2013 (p 72-120)

- Signal Initiation — Duct Smoke Detectors

  23.4.2.2 Where the power to a device is supplied over a separate circuit from the signaling line circuit or initiating device circuit, the operation of the power circuit shall meet the performance requirements of the initiating device circuit or signaling line circuit, unless different performance requirements are established in accordance with the evaluation in 23.4.3 and approved by the authority having jurisdiction

  23.4.3.1 The class of pathways shall be determined from an evaluation based on the path performance as required by governing laws, codes, standards, and a site-specific engineering analysis

  3) Continued on next slide

Protected Premises

2013 (p 72-120)

- Signal Initiation — Duct Smoke Detectors
  3) Where duct smoke detectors with separate power and signal wiring are installed and connected to a protected premises fire alarm system, they shall meet the requirements of 23.8.5.3
     – 23.8.5.3 Fire Alarm Signal Initiation—Initiating Devices with Separate Power and Signaling Wiring
  4) Continued on next slide

Protected Premises

2013 (p 72-120)

- Signal Initiation — Duct Smoke Detectors
  4) Where duct smoke detectors are not resettable from the protected premises fire alarm system, a **listed alarm/supervisory indicator with an integral reset switch** shall be provided in an accessible location

Protected Premises

2013 (p 72-122)

- Suppression System Actuation
- Releasing service fire alarm systems used for fire suppression–releasing service shall be provided with a disconnect switch to allow the system to be tested without actuating the fire suppression systems
- The disconnect shall be a physical switch and not be accomplished by using software
- Software disconnects, even if activated by dedicated buttons or key switches, shall not be permitted as a method to secure a suppression system from inadvertent discharge

NFPA 72-2013
Chapter 24
Emergency Communications Systems

Emergency Communications Systems

2013 (p 72-124)

- Microphone Use
- All users of systems that have microphones for live voice announcements shall be provided with posted instructions for using the microphone

Emergency Communications Systems

2013 (p 72-125)

- Listing
- Control units installed as part of a mass notification system shall be in compliance with this Code and applicable standards such as:
  - ANSI/UL 864, *Standard for Control Units and Accessories for Fire Alarm Systems*
  - *ANSI/UL 2017, Standard for General-Purpose Signaling Devices and Systems*
  - ANSI/UL 2572, *Mass Notification Systems*

Emergency Communications Systems

2013 (p 72-125)

- Risk Analysis for Mass Notification Systems
- The risk analysis shall include a review of the extent to which occupants and personnel are notified, based on the anticipated event (potential hazard) – relocated from 24.7.7.5
- The risk analysis shall be used as the basis for development of the ECS provisions of the facility emergency response plan

Emergency Communications Systems

2013 (p 72-126)

- **ALL** One-Way ECS
- **Messages shall be developed for each scenario** developed in the emergency response plan
- A message template shall be developed for each message required
- For an evacuation message, a tone in accordance with 18.4.2 (standard evacuation signal) shall be used with a minimum of two cycles preceding **and following** the voice message – relocated from 24.4.2.17.1
- Test messages shall clearly state the phrase “This is a test” – relocated from 24.4.2.17.2

Emergency Communications Systems

2013 (p 72-126)

- One-Way ECS – new section added in 2013
- 24.4.1 General – new section added in 2013
- Paragraph 24.4.4.1 applies to ALL one-way ECS
- 24.4.4.1 Voice Messages
- From ROP 72-353a
  - "The TC wishes to include information to assist in developing message content for emergency messages"
  - "A General section is added so that the message content information applies to all one-way communications systems"

Emergency Communications Systems

An In-Building MNS includes one or more of the following components:

- Autonomous control unit (ACU) (primary control unit)
- Local operating console (LOC) (“Equipment used by authorized personnel and emergency responders to activate and operate an in-building mass notification system.”)

- Fire alarm control interface
- Notification appliance network
- Initiating devices
- Interface to other systems and alerting sources

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Emergency Communications Systems
In-Building MNS

2013 (p 72-129)

- Autonomous Control Unit (ACU)
- Unless otherwise identified in the emergency response plan, actions taken at the building ACU shall take precedence over actions taken at any remote location, including the LOC, or inputs from a wide-area mass notification system

Emergency Communications Systems
In-Building MNS

2013 (p 72-130)

- Local Operating Console (LOC)
- Upon initiation of an emergency message, a visible indication shall be provided to the user that the LOC is connected to the audio network

Emergency Communications Systems
In-Building MNS

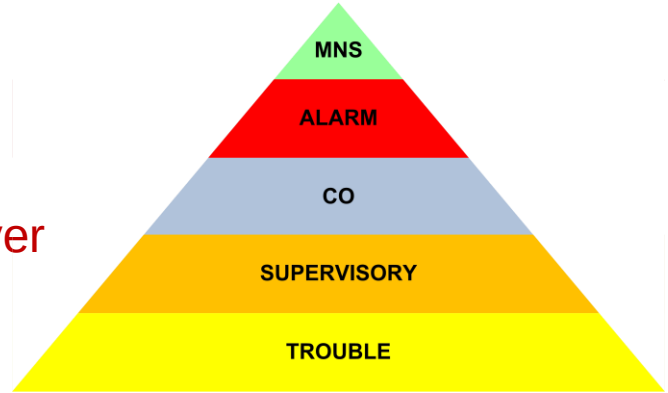
2013 (p 72-130)

- Voice Message Priority
- The priority of mass notification messages shall be established using the emergency response plan
- The local building mass notification system shall have the ability to override the fire alarm system with live voice or manual activation of a higher priority message, but only where that message and operation are approved under the emergency response plan
- All other messages shall also be prioritized by using the emergency response plan

Emergency Communications Systems In-Building MNS

2013 (p 72-130)

- Voice Message Priority
- When identified by the emergency response plan, messages from the mass notification system shall be permitted to take priority over fire alarm messages and signals



Emergency Communications Systems
In-Building MNS

2013 (p 72-130)

- Voice Message Priority
- If the fire alarm system is in the alarm mode and a recorded voice message is playing, or the audible signals are sounding, and then the mass notification system is actuated, it shall cause deactivation of all fire alarm – initiated audible and visible notification

Emergency Communications Systems
In-Building MNS

2013 (p 72-130)

- Volume Control
- Local controls shall be permitted to adjust volume levels of ancillary functions

Emergency Communications Systems
In-Building MNS

2013 (p 72-130)

- Visible Appliances
- The spacing of colored strobes shall be in accordance with public mode spacing requirements of Section 18.5 using the effective intensity as the basis for spacing
- 18.5 Visible Characteristics — Public Mode
- Where strobes are used solely for mass notification, the word “ALERT” shall be stamped or imprinted on the appliance and be visible to the public

Emergency Communications Systems In-Building MNS

2013 (p 72-132)

- Public Address (PA) Systems Used for Emergency Communications
- Evaluation **documentation** in accordance with 7.3.9 shall be provided by the emergency communications system designer attesting to the fact that the public address system has been evaluated and meets the performance requirements of Chapter 24 and the emergency response plan

Emergency Communications Systems
Wide-Area MNS

2013 (p 72-132)

- Voice Messages
- Where required by the emergency response plan, multiple languages shall be permitted to be used

Emergency Communications Systems
Wide-Area MNS

2013 (p 72-132)

- Password Protection
- Wide-area mass notification systems shall have multiple levels of password protection access control, including levels for system administrators, system operators, maintainers, supervisors, and executives, or other means to limit access to system controls shall be provided based on the emergency response plan

Emergency Communications Systems
Wide-Area MNS

2013 (p 72-132)

- External Connections
- Wide-area mass notification systems shall be permitted to connect to regional mass notification systems and public emergency alarm reporting systems as defined in this Code, and public reporting systems as defined in NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*

Emergency Communications Systems
Wide-Area MNS

2013 (p 72-132)

- High Power Speaker Array (HPSA)
- An HPSA shall have the capability to provide voice communications and tones as determined by the emergency response plan

- High Power Speaker Array Enclosures
- HPSA enclosures shall have intrusion detection that signals the emergency command center

Emergency Communications Systems Distributed Recipient (DRMNS)

2013 (p 72-133)

- Targeted Recipients
- DRMNS shall provide means of populating and updating distributed recipients' data

- Backup Distributed Recipient Mass Notification Systems
- DRMNS used to send emergency messages shall be provided with a backup configuration to facilitate distribution of messages

Emergency Communications Systems

2013 (p 72-133)

- Two-Way, In-Building Wired Emergency Services Communications Systems
- Two-way telephone systems with common talk mode (i.e., a conference or party line circuit) shall be permitted

Emergency Communications Systems

2013 (p 72-133)

- Two-Way, In-Building Wired Emergency Services Communications Systems
- Telephone appliances shall be in accordance with EIA Tr 41.3, *Telephones* – relocated from 18.8.2.1
- Wall-mounted telephone appliances or related jacks shall be not less than 36 in. and not more than 66 in. above floor level with clear access to the appliance that is at least 30 in. wide – relocated from 18.8.2.2
- If accessible to the general public, one telephone appliance per location shall be not more than 48 in. above floor level – relocated from 18.8.2.3

Emergency Communications Systems

2013 (p 72-134)

- Two-Way Radio Communications Enhancement Systems
- Critical Areas. Critical areas, such as the fire command center(s), the fire pump room(s), exit stairs, exit passageways, elevator lobbies, standpipe cabinets, sprinkler sectional valve locations, and other areas deemed critical by the authority having jurisdiction, shall be provided with 99 percent floor area radio coverage

Emergency Communications Systems

2013 (p 72-134)

- Two-Way Radio Communications Enhancement Systems
- Component Enclosures. All repeater, transmitter, receiver, signal booster components, and battery system components shall be contained in a NEMA 4- or 4X-type enclosure(s)

Emergency Communications Systems

2013 (p 72-134)

- Two-Way Radio Communications Enhancement Systems
- Power Supplies. At least two independent and reliable power supplies shall be provided for all repeater, transmitter, receiver, and signal booster components, one primary and one secondary
- Primary Power Source. The primary power source shall be supplied from a dedicated branch circuit and comply with 10.6.5.1
- 10.6.5.1 Branch Circuit

Emergency Communications Systems

2013 (p 72-134)

- Two-Way Radio Communications Enhancement Systems
- Secondary Power Source. The secondary power source shall consist of one of the following

1) A storage battery dedicated to the system with at least 12 hours of 100 percent system operation capacity and arranged in accordance with 10.6.10

– 10.6.10 Storage Batteries

2) Continued on next slide

Emergency Communications Systems

2013 (p 72-134)

- Two-Way Radio Communications Enhancement Systems
- Secondary Power Source. The secondary power source shall consist of one of the following
  - 2) An automatic-starting, engine-driven generator serving the dedicated branch circuit or the system with at least 12 hours of 100 percent system operation capacity and storage batteries dedicated to the system with at least 2 hours of 100 percent system operation capacity and arranged in accordance with 10.6.11.3
  - 10.6.11.3 Secondary Power Supplies

Emergency Communications Systems

2013 (p 72-134)

- Two-Way Radio Communications Enhancement Systems
- Monitoring Integrity of Power Supplies. Monitoring the integrity of power supplies shall be in accordance with 10.6.9
- 10.6.9 Monitoring Integrity of Power Supplies

Emergency Communications Systems

2013 (p 72-134)

- Two-Way Radio Communications Enhancement Systems - System Monitoring - Fire Alarm System
  1) No change
  2) System and signal booster supervisory signals shall include the following
     - (a) No change
     - (b) No change
     - (c) Low-battery capacity indication when 70 percent of the 12-hour operating capacity has been depleted.
  3) Power supply signals shall include the following for each signal booster
     - (a) Loss of normal ac power
     - (b) Failure of battery charger

Emergency Communications Systems

2013 (p 72-134)

- Two-Way Radio Communications Enhancement Systems - System Monitoring - Fire Alarm System
- **Dedicated Panel**. A dedicated monitoring panel shall be provided within the fire command center to annunciate the status of all signal booster locations. The monitoring panel shall provide visual and labeled indication of the following for each signal booster
    1) Normal ac power
    2) Signal booster trouble
    3) Loss of normal ac power
    4) Failure of battery charger
    5) Low-battery capacity

Emergency Communications Systems

2013 (p 72-136)

- Emergency Command Center for Emergency Communications Systems
- The location and accessibility of the emergency command center shall be determined by the risk analysis and approved by the emergency management coordinator

Emergency Communications Systems

2013 (p 72-136)

- Emergency Command Center for Emergency Communications Systems
- The emergency command center shall contain the following
  1) The in-building fire emergency voice/alarm communications system equipment including
     a) Fire alarm system controls
     b) Fire alarm system annunciator
     c) In-building fire emergency voice/alarm communications system controls
  2) Area of refuge (area of rescue assistance) emergency communications systems equipment
  3) Continued on next slide

Emergency Communications Systems

2013 (p 72-136)

- Emergency Command Center for Emergency Communications Systems
- The emergency command center shall contain the following
  3) Elevator emergency communications systems
  4) Distributed recipient MNS control stations where provided
  5) Tables and chairs to accommodate emergency management staff
  6) Continued on next slide

Emergency Communications Systems

2013 (p 72-136)

- Emergency Command Center for Emergency Communications Systems
- The emergency command center shall contain the following
  6) Other equipment/information deemed necessary by the facility emergency response plan such as
     a) Displays indicating the location of the elevators and whether they are operational
     b) Status indicators and controls for air-handling systems
     c) Fire fighter's control panel for smoke control systems
     d) Fire department communications unit
     e) Controls for unlocking stairway doors simultaneously
     f) Continued on next slide

Emergency Communications Systems

2013 (p 72-136)

- Emergency Command Center for Emergency Communications Systems
- The emergency command center shall contain the following
  - f) Security systems
  - g) Emergency and standby power status indicators
  - h) Telephone for emergency use with controlled access to the public telephone system
  - i) Schematic building plans indicating the typical floor plan and detailing the building core, means of egress, fire protection systems, security systems, fire-fighting equipment, and fire department access
  - j) Generator supervision devices, manual start, and transfer features
  - k) Other monitoring, control, information display, and management systems associated with operation of the ECC

Emergency Communications Systems

2013 (p 72-136)

- Emergency Command Center for Emergency Communications Systems
- The level of security at the emergency command center shall be defined in the emergency response plan

Emergency Communications Systems

2013 (p 72-136)

- Emergency Command Center for Emergency Communications Systems - Staffing
- Emergency command center personnel requirements shall be defined in the documentation in the emergency response plan
- The emergency command center shall be capable of receiving voice messages by telephone or radio and transmitting via equipment at the emergency command center
- The emergency command center operator shall have the ability to monitor inputs/sensors and control output devices automatically, manually, or automatically with operator override

Emergency Communications Systems

2013 (p 72-136)

- Emergency Communications Control Unit (ECCU)
- An emergency communications control unit (ECCU), where identified by the risk analysis, and defined in the emergency response plan, shall be provided at each emergency command center

Emergency Communications Systems

2013 (p 72-137)

- Risk Analysis
- The design of the mass notification system shall be based upon a risk analysis prepared in accordance with 24.3.11 specific to the nature and anticipated risks of each facility for which it is designed
- 24.3.11 Risk Analysis for Mass Notification Systems

Emergency Communications Systems

2013 (p 72-137)

- Design Brief
- The design of the mass notification system shall include the preparation of a design brief that is prepared utilizing recognized performance-based design practices
- Design specifications and briefs used in the performance-based design shall be clearly stated and shown to be realistic and sustainable
- Specific testing requirements that are necessary to maintain reliable performance shall be stated in the design brief

Emergency Communications Systems

2013 (p 72-137)

- Documentation
- New Systems
- Documentation requirements for new emergency communications systems shall comply with Sections 7.3 through 7.8 in addition to the minimum requirements of Section 7.2
- Existing Systems
- The documentation that shall be provided for all additions or alterations to existing emergency communications systems shall be at the direction of the AHJ

Emergency Communications Systems

2013 (p 72-137)

- Owner's Manual
- For new emergency communications systems, an owner's manual shall be provided and shall contain the following documentation
  1) Detailed narrative description of the system inputs, evacuation signaling, ancillary functions, annunciation, intended sequence of operations, expansion capability, application considerations, and limitations
  2) Written sequence of operation for the system including an operational input/output matrix
  3) Continued on next slide

Emergency Communications Systems

2013 (p 72-137)

- Owner's Manual
  3) Operator instructions for basic system operations, including alarm acknowledgment, system reset, interpretation of system output (LEDs, CRT display, and printout), operation of manual evacuation signaling and ancillary function controls, and change of printer paper
  4) Detailed description of routine maintenance and testing as required and recommended and as would be provided under a maintenance contract, including testing and maintenance instructions for each type of device installed, which includes the following:

Emergency Communications Systems

2013 (p 72-137)

- Owner's Manual
  a) Listing of the individual system components that require periodic testing and maintenance
  b) Step-by-step instructions detailing the requisite testing and maintenance procedures, and the intervals at which these procedures shall be performed, for each type of device installed
  c) Schedule that correlates the testing and maintenance procedures that are required by this section

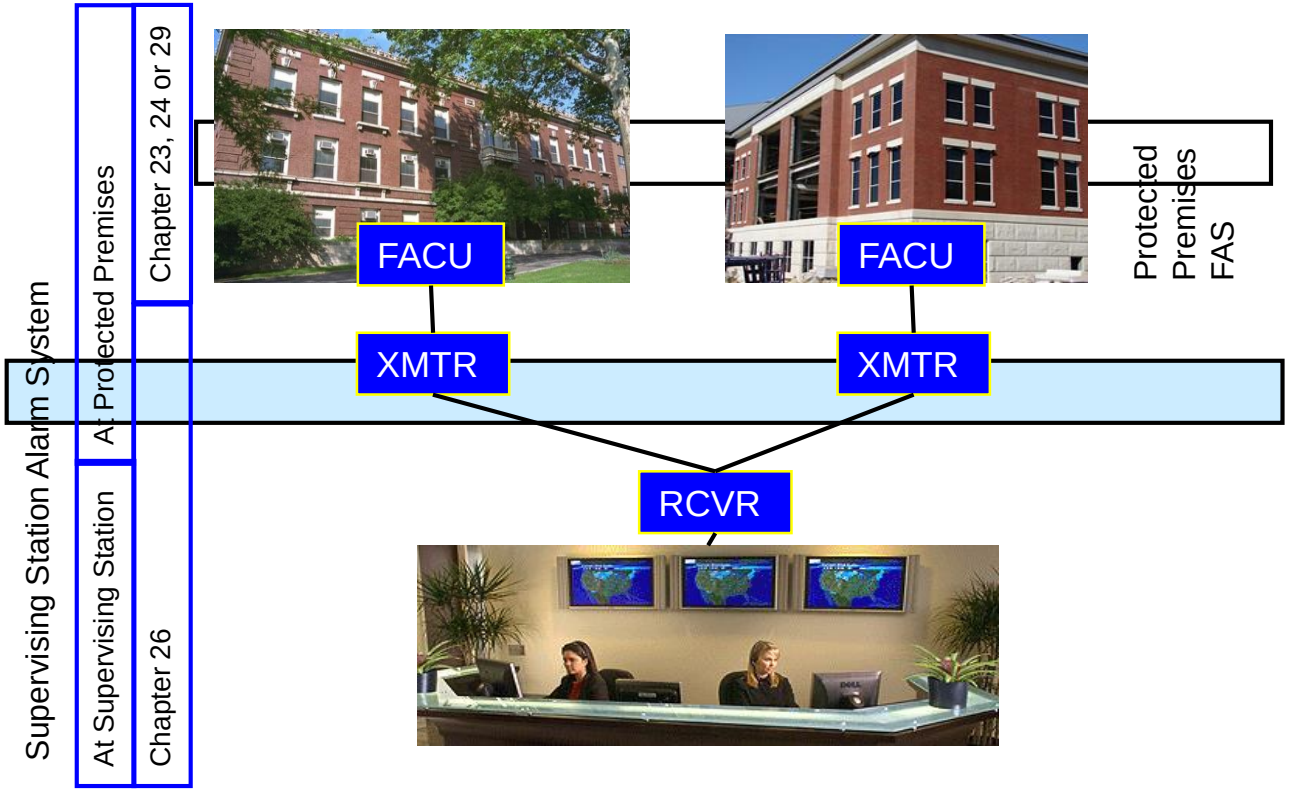
5) Service directory, including a list of names and telephone numbers of those who provide service for the system

NFPA 72-2013
Chapter 26
Supervising Station Alarm Systems

Supervising Station Alarm Systems

- Supervising Station Alarm Systems
  1) Central station service alarm system
  2) Proprietary supervising station alarm system
  3) Remote supervising station alarm system

Supervising Station Alarm Systems



Supervising Station Alarm Systems

NFPA 72-2010

- Immediately retransmit alarms
- Immediately contact designated personnel for other (supervisory, trouble or guard tour) signals
- Retain records for at least one year
- Differences for runner service

NFPA 72-2013

- Immediately retransmit alarms **or**
- Alarm signal pre-verification
- Alarm signal verification
- Immediately contact designated personnel for other (supervisory, trouble or guard tour) signals
- Retain records for at least one year
- Differences for runner service

Alarm Signal Disposition

- Supervising stations monitor household systems in accordance with Chapter 29
  - Permitted to verify alarm signals prior to reporting them to the fire service, provided the verification process does **not delay** the reporting **by more than 90 seconds**

Alarm Signal Disposition

- Alarm signal disposition in accordance with Chapter 26 **is permitted** by Preverification and Verification
  - Alarm Signal Preverification
    - **Where required by the fire department**, the supervising station must **immediately notify** the communications center **that** a fire alarm signal has been received and **verification is in process**
    - Alarm Signal Verification is required

Conditions Permitting Alarm Signal Verification (all must be present)

- Alarm signal disposition in accordance with Chapter 26 **is permitted** by Preverification and Verification
  - Alarm Signal Verification
    - Supervising station personnel shall **attempt to verify** alarm signals **prior to reporting them** to the communication center **where all** the following **conditions exist**
    - 8 conditions on next slide

Conditions Permitting Alarm Signal Verification (all must be present)

1) **Required by the fire department for a specific protected premises**
2) **Documentation** of the requirement **is provided by the fire department** to the supervising station and the protected premises
3) If the requirement changes, the **fire department must notify** the supervising station and the protected premises
4) The **verification** process **does not take longer than 90 seconds** from the time the alarm signal is received at the supervising station until the time that retransmission of the verified alarm signal is initiated
5) Continued on next slide

Conditions Permitting Alarm Signal Verification (all must be present)

5) **Verification** of the alarm signal **is received only from authorized personnel** within the protected premises
6) **Verified alarm signals are immediately retransmitted** to the communications center and include information that the signal was verified at the protected premises to be an emergency
7) **Non conclusive alarm signals are immediately retransmitted** to the communications center
8) Alarm signals that are verified as **nuisance alarms are not dispatched but are reported** to the fire department in a manner and at a frequency specified by the fire department

Conditions Permitting Alarm Signal Verification

- Alarm signals not reported to the communications center shall be reported to the responsible fire department in a manner and at a frequency specified by the responsible fire department

Alarm and Restoral Signals

Alarm Signals

- Enforcing authority, governing laws, codes, or standards, **can require alarm signals** transmitted to a supervising station **to be**
  - **By addressable device or**
  - **Zone identification**

Restoral Signals

- All fire alarm systems shall be programmed to report restoral signals
  - Alarm
  - Supervisory
  - Trouble
- Effective January 1, 2014, **signals** received by the supervising station that have **not** been **restored** to normal **within 24 hours** of initial receipt **shall be redisplayed** as a nonrestored signal **and** be **reported to the subscriber**

Multiple Building Monitoring

- Where the system serves more than one building, each building shall be annunciated separately for alarm, supervisory, and trouble signals

Change of Service

- Supervising station customers/clients and the AHJ shall be notified **in writing within 30 days** of any scheduled change in service that results in signals from the client's property being handled by a different supervising station
- The supervising station shall notify the AHJ **prior** to terminating service

Central Station Disposition of Signals

Alarm

1) Retransmit the alarm **immediately or as permitted for alarm signal preverification and verification**
2) Dispatch a runner or technician to arrive within 2 hours after receipt of signal if equipment needs to be manually reset

   Where permitted by the AHJ, the runner or technician can be recalled prior to arrival if a qualified representative of the subscriber can provide the necessary resetting of the equipment and is able to place the system back in operating condition
3) Immediately notify the subscriber
4) Provide notice to the subscriber or AHJ or both, if required

Central Station Disposition of Signals

Supervisory

1) Communicate immediately with the persons designated by the subscriber and notify the fire department or law enforcement agency, or both, when required by the AHJ
2) Dispatch a runner or maintenance person to arrive within 2 hours to investigate unless the signal is cleared in accordance with a procedure determined by 1
3) Notify the AHJ when sprinkler systems or other fire suppression systems or equipment have been wholly or partially out of service for 8 hours
4) When service has been restored, provide notice, if required, to the subscriber or the AHJ, or both, as to the nature of the signal, the time of occurrence, and the restoration of service when equipment has been out of service for 8 hours or more

Central Station Disposition of Signals

Trouble

1) Communicate immediately with persons designated by the subscriber
2) Dispatch personnel to arrive within 4 hours to initiate maintenance, if necessary
3) When the interruption is more than 8 hours, provide notice to the subscriber and the fire department if so required by the AHJ as to the nature of the interruption, the time of occurrence, and the restoration of service

Proprietary Station Disposition of Signals

Alarm

1) Notify the fire department, the emergency response team, and such other parties as the AHJ requires **immediately or as permitted for alarm signal preverification and verification**
2) Dispatch a runner or technician to the alarm location to arrive within 2 hours after receipt of a signal
3) Restore the system as soon as possible after disposition of the cause of the alarm signal

Remote Station Disposition of Signals

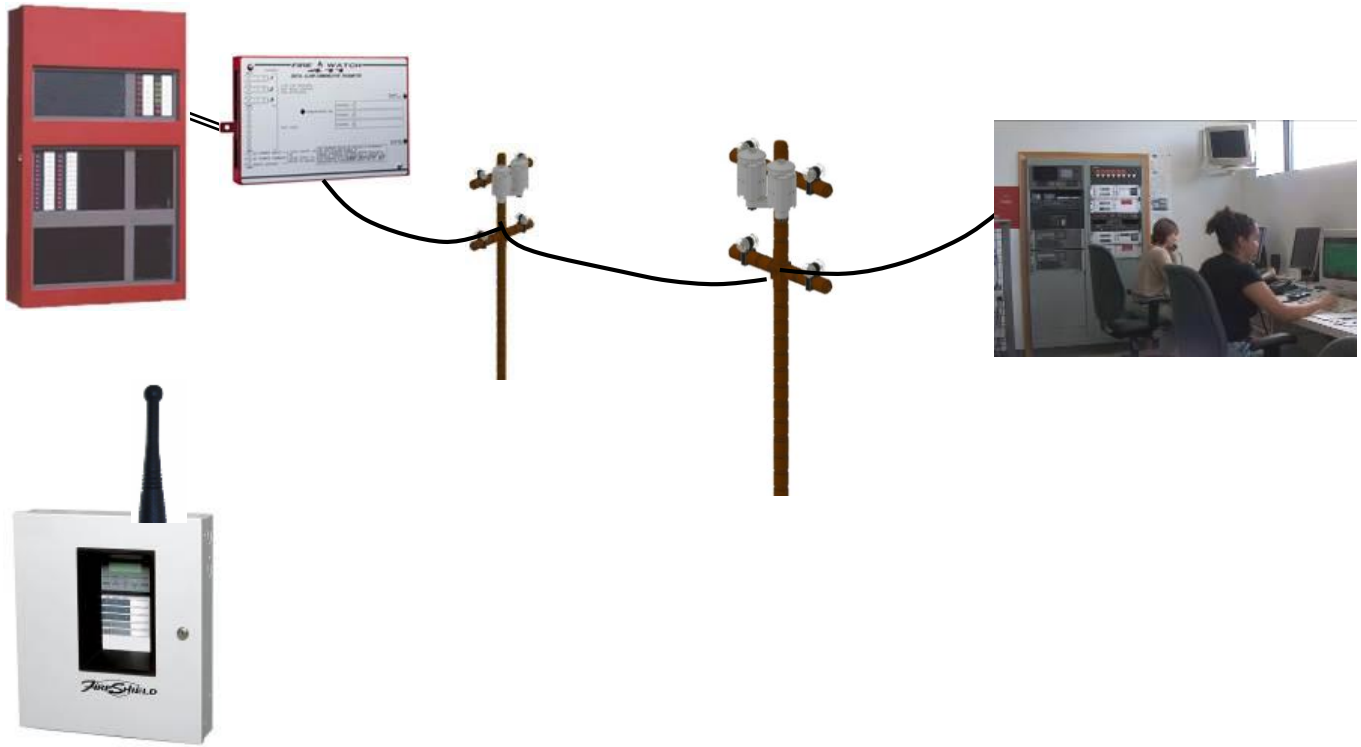
Operations

- If the remote supervising station is at a location other than the communications center, retransmit the alarm **immediately or as permitted for alarm signal preverification and verification**
- Upon receipt of an alarm, supervisory, or trouble signal, the operator on duty shall be responsible for **immediately** notifying the owner or the owner's designated representative, and where required, the AHJ

Remote Station Inspection, Testing and Maintenance Reports

- Where required, inspection, testing, and maintenance reports shall be submitted to the AHJ in a form acceptable to the AHJ

Supervising Station Alarm System Communications Methods



Supervising Station Alarm System Communications Methods

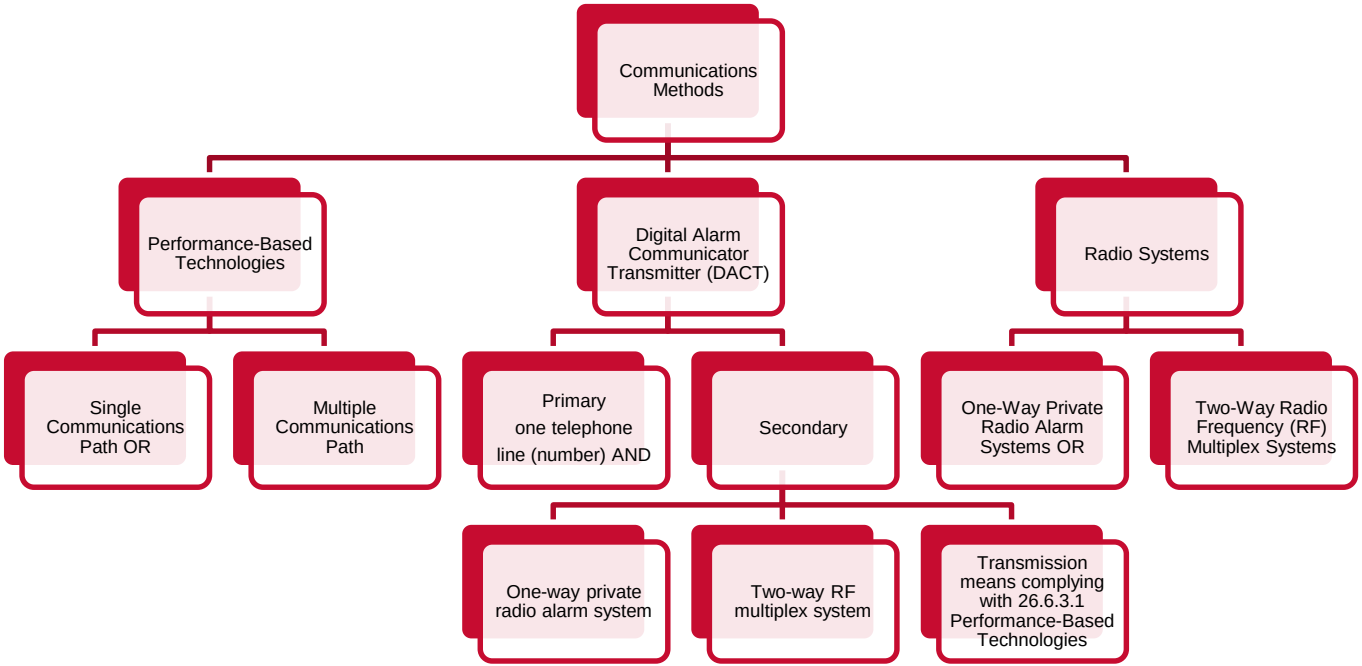
Communications methods

- Performance-Based Technologies (was “General” in 2010; was “Other Transmission Technologies” in 2007)
- Digital Alarm Communicator Systems
- Two-Way Radio Frequency (RF) Multiplex Systems
- One-Way Private Radio Alarm Systems

Legacy communications methods

- Directly Connected Noncoded Systems
- Active Multiplex Transmission Systems
- Private Microwave Radio Systems
- McCulloh Systems

Communications Methods



Supervising Station Alarm Systems Communications Methods

- Performance-Based Technologies
  - Communications methods operating on **principles different from specific methods covered by this chapter shall be permitted** to be installed if they conform to the performance requirements of this section and to all other applicable requirements of this Code

Communications Paths for Performance-Based Technologies

- Single Communications Path
  - **Permitted, unless prohibited** by the enforcing authority, governing laws, codes, or standards
- Multiple Communications Paths

Communications Paths for Performance-Based Technologies

- Single Communications Path
  - **Unless prohibited** by the enforcing authority, governing laws, codes, or standards, a single transmission path **shall be permitted**, and the path shall be **supervised** at an interval of **not more than 60 minutes**
  - A **failure** of the path shall be **annunciated at the supervising station within** not more than **60 minutes**
  - The **failure** to complete a signal transmission shall be **annunciated at the protected premises** in accordance with Section 10.15 (Trouble Signals)

Communications Paths for Performance-Based Technologies

- Multiple Communications Paths
  - If multiple transmission paths are used, the following requirements shall be met
    1) Each path shall be **supervised within not more than 6 hours**
    2) The **failure** of any path of a multipath system shall be **annunciated at the supervising station within** not more than **6 hours**
    3) The **failure** to complete a signal transmission shall be **annunciated at the protected premises** in accordance with Section 10.15 (Trouble Signal)
- Single Technology
  - A **single technology shall be permitted** to be used **to create the multiple paths** provided the requirements of 26.6.3.1.6(1) through 26.6.3.1.6(3) are met

Sharing Equipment On-Premises for Performance-Based Technologies

- Sharing Communications Equipment On-Premises
  - Shared equipment **must be listed** as communications or information technology equipment
- Most communications equipment is not specifically listed for fire alarm applications, but is **listed** in accordance with applicable product standard **for general communications equipment**

Secondary Power for Performance-Based Technologies

- **Secondary power** capacity **for all equipment necessary for the transmission** of alarm, supervisory, trouble, and other signals located at the protected premises shall be as follows

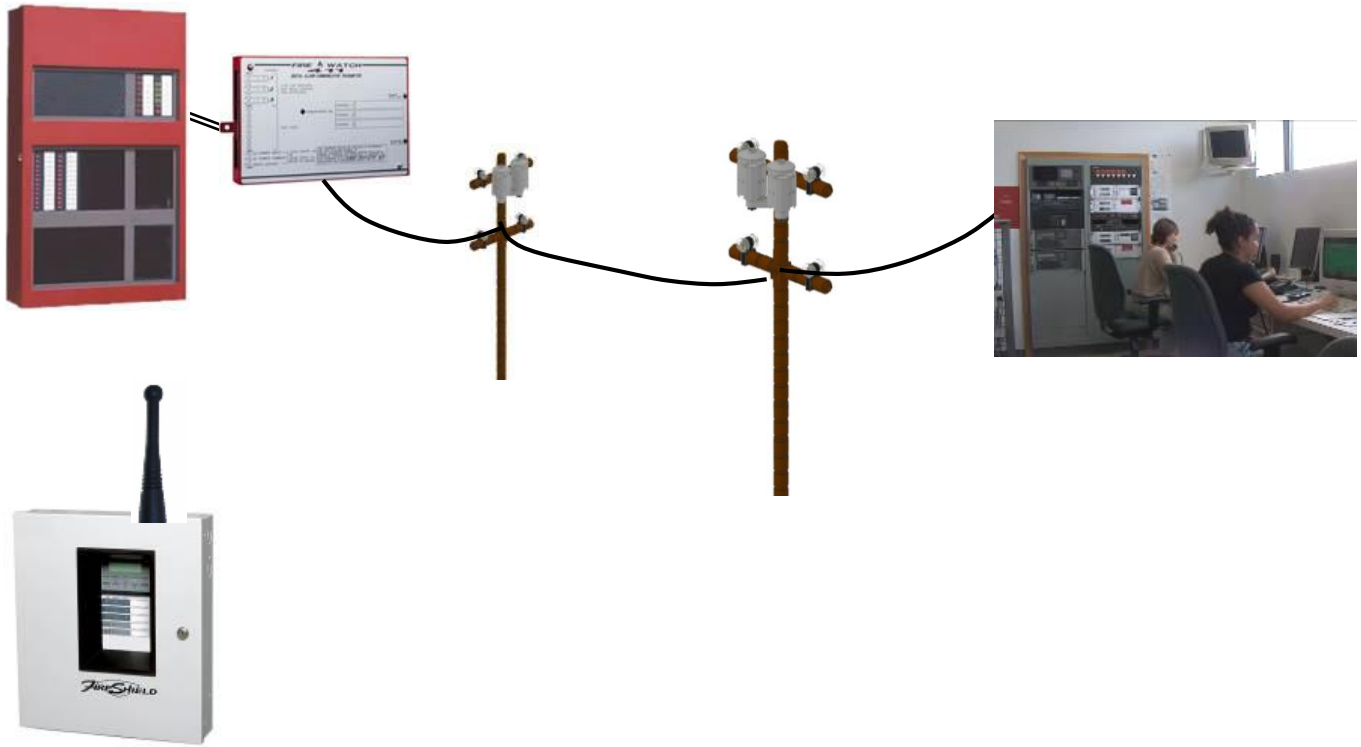
  1) Fire alarm transmitters not requiring **shared on-premises communications equipment** shall comply with 10.6.7

     - 10.6.7 Secondary Power Supply
       - Capacity – 20% safety margin
       - 24 hrs; 5 min or 15 min
       - Dedicated battery

Secondary Power for Performance-Based Technologies

2) If the fire alarm transmitter is **sharing on-premises communications equipment**, the shared equipment shall have a secondary power capacity of **24 hours**
   - *Exception: Secondary power capacity for shared equipment shall be permitted to have a capacity of **8 hours where acceptable to the authority having jurisdiction and where a risk analysis** is performed to ensure acceptable availability is provided*

Supervising Station Alarm System Communications Methods



Digital Alarm Communicator Systems

- 26.6.3.2.1.1 Public Switched Network
  - A DACT shall be connected to the **public switched telephone network** upstream of any private telephone system at the protected premises

- 3.3.290.2 Public Switched Telephone Network
  - An assembly of communications equipment and **telephone service providers that utilize managed facilities-based voice networks** (MFVN) to provide the general public with the ability to establish communications channels via discrete dialing codes

Digital Alarm Communicator Systems Transmission Channels

- (A) A system employing a DACT shall employ one telephone line (number). In addition, one of the following transmission means shall be employed
  1) One-way private radio alarm system
  2) Two-way RF multiplex system
  3) Transmission means complying with 26.6.3.1 (Performance-Based Technologies)
- *Exception* – continued on next slide

Digital Alarm Communicator Systems Transmission Channels

- *Exception: **Where access to two technologies** in the preceding list **is not available** at the protected premises, **with the approval of the AHJ, a telephone line (number) shall be permitted to be used as the second transmission means**. Each DACT shall be programmed to call a second DACR line (number) when the signal transmission sequence to the first called line (number) is unsuccessful. The DACT shall be capable of selecting the operable means of transmission in the event of failure of the other means. Where two telephone lines (numbers) are used, it shall be permitted to **test each** telephone line (number) **at alternating 6-hour intervals**.*

Digital Alarm Communicator Systems Transmission Channels

- (B) The following requirements shall apply to all combinations listed in 26.6.3.2.1.4(A)
  1) The means for supervising each channel shall be in a manner approved for the method means of transmission employed
  2) The interval for testing each channel **shall not exceed 6 hours**
  3) No change
  4) No change
  5) No change
  6) No change
  7) No change
  8) Failure of telephone lines (numbers) ~~or cellular service~~ shall be annunciated locally

Digital Alarm Communicator Systems Transmission Means

- The following requirements shall apply to all digital alarm communications transmitters
  1) No change
  2) No change
  3) No change
  4) No change
  5) Continued on next slide

Digital Alarm Communicator Systems Transmission Means

5) Each DACT shall be programmed to call a second ~~DACR lines (number)~~ receiver when the signal transmission sequence to the first called line (number) is unsuccessful.

6) Each transmission means shall automatically initiate and complete a **test signal** transmission sequence to its associated receiver **at least once every 6 hours**. A successful signal transmission sequence of any other type, within the same 6-hour period, shall fulfill the requirement to verify the integrity of the reporting system, provided that signal processing is automated so that 6-hour delinquencies are individually acknowledged by supervising station personnel

7) No change

Digital Alarm Communicator Systems Transmission Channels

A. No change
B. No change
C. No change
D. No change
E. No change
F. A **signal** shall be **received** on each individual incoming DACR line **at least once every 6 hours**
G. No change

Digital Alarm Communicator Systems Transmission Channels

NFPA 72-2010

- One telephone line (number). In addition, one of the following
  1. Second telephone line (number)
  2. Cellular telephone connection
  3. One-way radio system
  4. One-way private radio alarm system
  5. Private microwave radio system
  6. Two-way RF multiplex system
  7. Transmission means complying with 26.6.3.1 (General)
- Interval for testing each channel not to exceed 24 hours

NFPA 72-2013

- One telephone line)(number). In addition, one of the following
  1. One-way private radio alarm system
  2. Two-way RF multiplex system
  3. Transmission means complying with 26.6.3.1 (Performance-Based Technologies)
- Interval for testing each channel not to exceed **6 hours**

Digital Alarm Communicator Systems Transmission Channels

- Primary Channel
  - Requires one telephone line (number)
    - POTS
    - MFVN
    - IP Communicator
- Secondary Channel
  1) One-way private radio alarm system
  2) Two-way RF multiplex system
  3) Transmission means complying with 26.6.3.1 (Performance-Based Technologies)

Digital Alarm Communicator Systems

- Managed Facilities-Based Voice Network (MFVN)
  - A **physical facilities**-based network capable of transmitting real time signals with formats unchanged that is **managed, operated, and maintained by the service provider** to ensure service quality and reliability from the subscriber location to public switched telephone network (PSTN) interconnection points or other MFVN peer networks

- MFVNs **could** include
  - Fiber
  - Cable
  - Co-ax
  - Other service providers
  - Etc.

Digital Alarm Communicator Systems

- Managed Facilities-Based Voice Network (MFVN)
  - Functionally equivalent to traditional PSTN-based services **provided by** authorized **common carriers** (public utility telephone companies) with respect to
    - Dialing
    - Dial plan
    - Call completion
    - Carriage of signals and protocols
    - Loop voltage
  - A.3.3.152
  - Provides **all** of the following features
    - (1) Loop start
    - (2) Pathway reliability that is **assured by proactive management**, operation, and maintenance by the MFVN provider
    - (3) Continued on next slides
    - (4) Continued on next slides
    - (5) Continued on next slides

Digital Alarm Communicator Systems

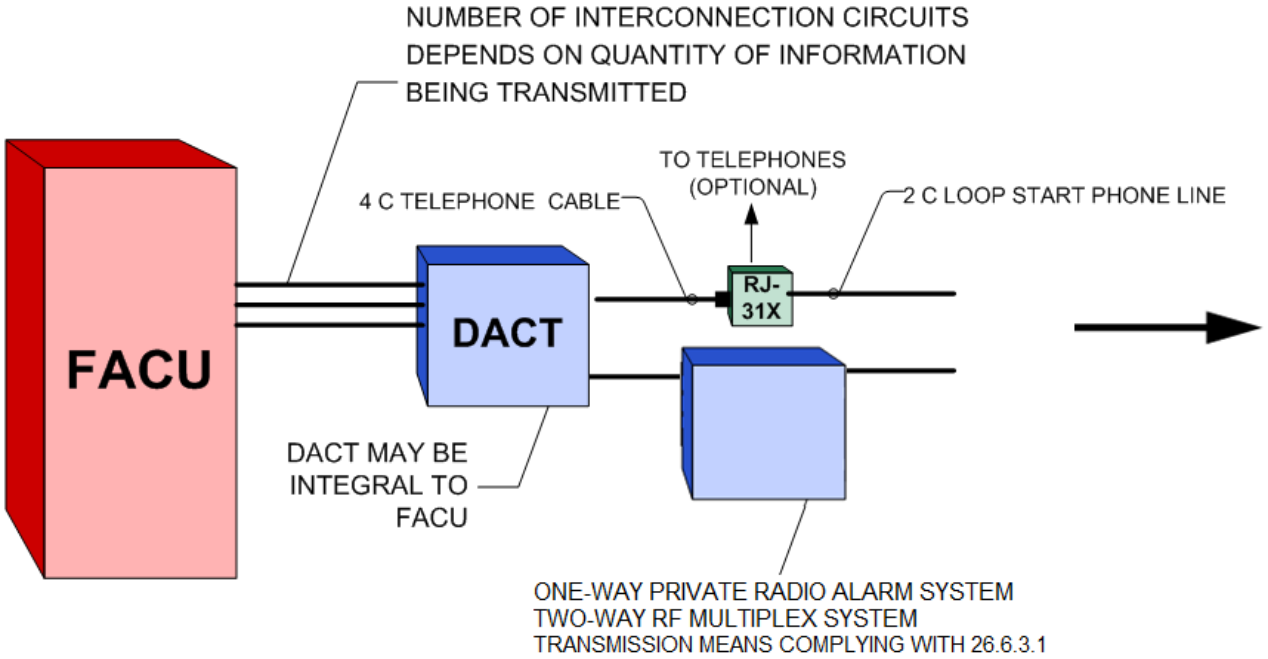
- Managed Facilities-Based Voice Network (MFVN)
  - Provides **all** of the following features
    - (3) **8 hours** of standby power supply capacity for MFVN communications equipment either located at the protected premises or field deployed. MFVN field-deployed equipment typically monitors the condition of the standby battery and signals potential battery failure to permit the communications service provider to take appropriate action
    - (4) Continued on next slide

Digital Alarm Communicator Systems

- Managed Facilities-Based Voice Network (MFVN)
  - Provides **all** of the following features
    - (4) **24 hours** of standby power supply capacity for MFVN communications equipment located at the communication service provider's central office
    - (5) Installation of network equipment at the protected premises with safeguards to prevent unauthorized access to the equipment and its connections

Digital Alarm Communicator Systems

DACTs and POTs or DACTs and MFVNs



Digital Alarm Communicator Systems

- DACTs
  - The DACT is part of the fire alarm system
    - The requirements of 26.6.3.2 apply (as well as the balance of the code – listing, power, etc)
- MFVNs
  - MFVN equipment is not part of the FAS
  - MFVNs must meet the expectations listed in A.3.3.152
    - **Not all cable/fiber/other service providers meet these expectations**

Supervising Station Alarm Systems

- Communication mediums permitted by Chapter 26

1. Performance-Based Technologies (was “General” in 2010; was “Other Transmission Technologies” in 2007)
   - Single Communications Path
   - Multiple Communications Paths
2. Digital Alarm Communicator Systems
   - One telephone line (number)(POTS)(MFVN)(IP Communicator) In addition, one of the following
     - One-way private radio alarm system
     - Two-way RF multiplex system
     - Transmission means complying with 26.6.3.1 (Performance-Based Technologies)
3. Two-Way Radio Frequency (RF) Multiplex Systems
4. One-Way Private Radio Alarm Systems

Supervising Station Alarm Systems

- IP Communicators
  - Transmitter communicates digitally using packet switched networks over the internet (or intranet) using internet protocol (IP)
  - Relatively new technology
  - Part of the fire alarm system
    - The requirements of 26.6.3.1 (Performance-Based Technologies) apply
    - The requirements of Chapters 7, 10, 12, 14, and 23 also apply
  - Requires a compatible receiver at the supervising station

Supervising Station Alarm Systems

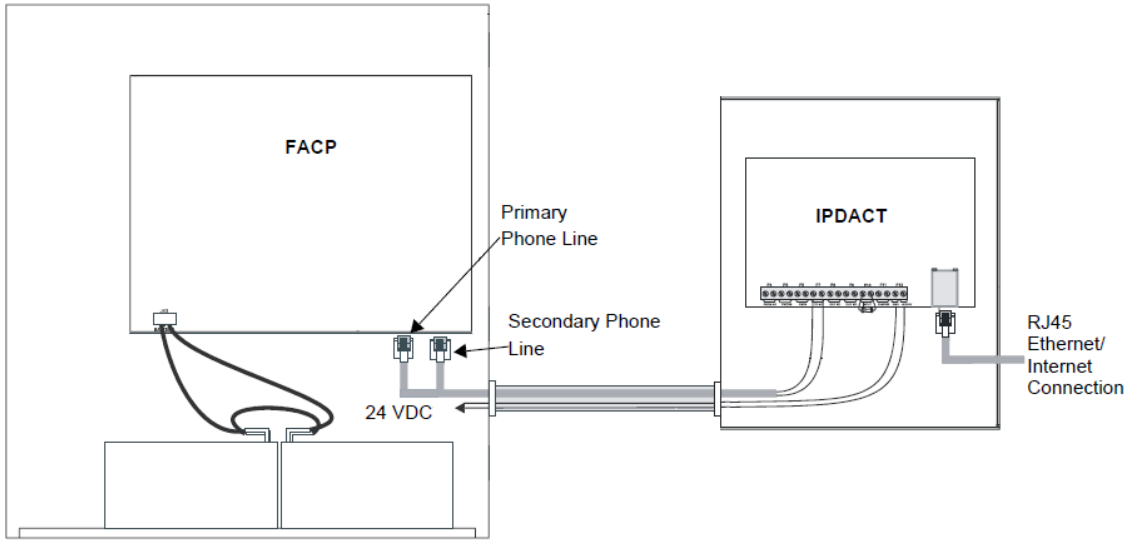
- IP Communicators
  - Comes in at least two forms
    1) Communicates directly with the FACU
    2) Communicates through a traditional DACT
       - Connects to the DACT output and emulates PSTN
       - Converts to IP for internet connection
       - Sometimes called an “IP DACT”
       - Falls under 26.6.3.1 (Performance-Based Technologies)
- Does not fall under 26.6.3.2 (DACS)

Supervising Station Alarm Systems

- IP Communicators
  - Requires connection to the internet
    - Typically via RJ-45 connection
    - Does not require a second channel unless required by
      - 26.6.3.1.5 Single communications path
      - The manufacturer's installation instructions
      - The listing of the IP communicator
    - Sharing on-premises communications equipment 26.6.3.1.14 applies
      - Routers and modems – commercial grade listing

Supervising Station Alarm Systems

- IP Communicator



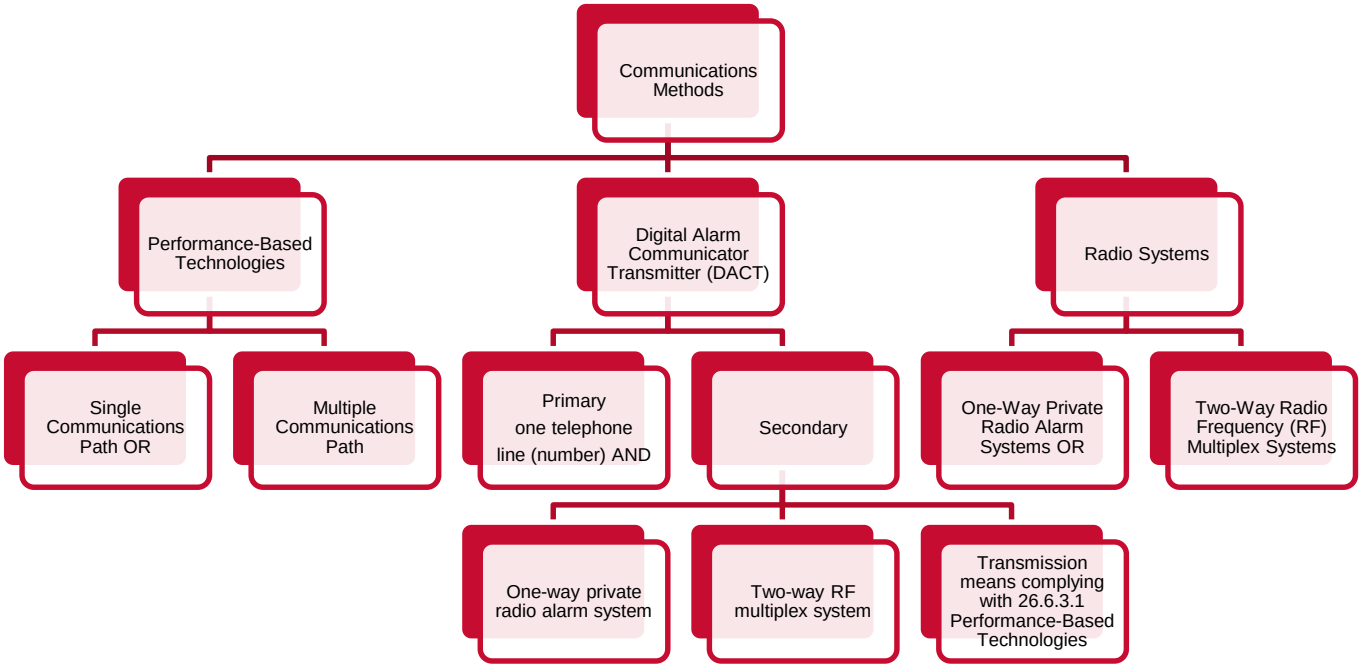
Supervising Station Alarm Systems

- IP Communicators
  - Connection to the internet
    - Requires secondary power per 26.6.3.1.15
  - **Secondary power capacity for all equipment necessary for the transmission** of alarm, supervisory, trouble, and other signals located at the protected premises as follows

1) Fire alarm transmitters not requiring **shared on-premises communications equipment** shall comply with 10.6.7
2) If the fire alarm transmitter is **sharing on-premises communications equipment**, the shared equipment shall have a secondary power capacity of **24 hours**

  - *Exception: Secondary power capacity for shared equipment shall be permitted to have a capacity of **8 hours where acceptable to the AHJ and where a risk analysis** is performed to ensure acceptable availability is provided*

Communications Methods



NFPA 72-2013
Chapter 29
Single- and Multiple-Station Alarms and Household Fire Alarm Systems

Smoke Alarms & Household Systems

- 29.2

Smoke Alarms & Household Systems

2013 (p 72-162)

- Basic Requirements
- All audible fire alarm signals installed shall meet the performance requirements of 18.4.3, 18.4.5.1, 18.4.5.2, and 29.3.8
- 18.4.3 Public Mode Audible Requirements
- 18.4.5 Sleeping Area Requirements
- 29.3.8 Notification appliances in sleeping rooms and guest rooms for those with hearing loss

Smoke Alarms & Household Systems

2013 (p 72-162)

- Basic Requirements
- When visible appliances are provided, they shall meet the requirements of Section 18.5. Since hearing deficits are often not apparent, the responsibility for advising the appropriate person(s) of the existence of this deficit shall be that of the party with hearing loss
- 18.5 Visible Characteristics — Public Mode

Smoke Alarms & Household Systems

2013 (p 72-163)

- Moderately Severe to Profound Hearing Loss
- Visible notification appliances per 18.5.5.7 and tactile notification appliances Section 18.10 shall be required for those with moderately severe to profound hearing loss in the following situations
  1) Where required by governing laws, codes, or standards for people with hearing loss
  2) Where provided voluntarily for those with hearing loss
- 18.5.5.7 Sleeping Areas
- 18.10 Tactile Appliances

Smoke Alarms & Household Systems

2013 (p 72-165)

- Resistance to Nuisance Source
- Effective January 1, 2019, smoke alarms and smoke detectors used in household fire alarm systems shall be listed for resistance to common nuisance sources

Smoke Alarms & Household Systems

2013 (p 72-166)

- Combination System
- Single- or multiple-station smoke alarms shall be permitted to be connected to system control equipment located within the dwelling unit
- When connected, the actuation of a single- or multiple-station smoke alarm shall initiate an alarm signal at the system control equipment located within the dwelling unit
- A sprinkler waterflow alarm initiating device shall be permitted to be connected to the multiple-station alarms or household fire alarm system to activate an alarm signal

Smoke Alarms & Household Systems

2013 (p 72-167)

- Supervising Stations
- Means to transmit alarm signals to a constantly attended, remote monitoring location shall be processed by a household fire alarm system and shall perform as described in Chapter 26, except as modified by 29.7.9.1.1 through 29.7.9.1.6
- 29.7.9.1.1 Where a digital alarm communicator transmitter (DACT) is used, the DACT serving the protected premises shall only require a single telephone line and shall only require a call to a single digital alarm communicator receiver (DACR) number
- 29.7.9.1.2 continued on next slide

Smoke Alarms & Household Systems

2013 (p 72-167)

- Supervising Stations
- 29.7.9.1.2 Where a DACT is used, the DACT test signals shall be transmitted at least monthly
- 29.7.9.1.3 Where a communication or transmission means other than DACT is used, only a single communication technology and path is required to serve the protected premises
- 29.7.9.1.4 Failure of the communication path referenced in 29.7.9.1.3 shall be annunciated at the constantly attended remote monitoring location and at the protected premises within not more than 7 days of the failure
- 29.7.9.1.5 continued on next slide

Smoke Alarms & Household Systems

2013 (p 72-167)

- Supervising Stations
- 29.7.9.1.5 Supervising station systems shall not be required to comply with requirements for indication of central station service in 26.3.4
- 29.7.9.1.6 A dedicated cellular telephone connection shall be permitted to be used as a single means to transmit alarms to a constantly attended remote monitoring location

Smoke Alarms & Household Systems

2013 (p 72-168)

- Specific Location Requirements
- The installation of smoke alarms and smoke detectors shall comply with the following requirements
  1) No change
  2) No change
  3) No change
  4) No change
  5) Continued on next slide

Smoke Alarms & Household Systems

2013 (p 72-168)

- Specific Location Requirements
- The installation of smoke alarms and smoke detectors shall comply with the following requirements
  5) Effective January 1, 2016, smoke alarms and smoke detectors used in household fire alarm systems installed between 6 ft and 20 ft along a horizontal flow path from a stationary or fixed cooking appliance shall be listed for resistance to common nuisance sources from cooking
  6) Continued on next slide

Smoke Alarms & Household Systems

2013 (p 72-168)

- Specific Location Requirements
- The installation of smoke alarms and smoke detectors shall comply with the following requirements
  6) Smoke alarms and smoke detectors shall not be installed within a 36 in. horizontal path from a door to a bathroom containing a shower or tub unless listed for installation in close proximity to such locations
  7) No change
  8) Continued on next slide

Smoke Alarms & Household Systems

2013 (p 72-168)

- Specific Location Requirements
- The installation of smoke alarms and smoke detectors shall comply with the following requirements

8) No change

9) Where stairs lead to other occupiable levels, a smoke alarm or smoke detector shall be located so that smoke rising in the stairway cannot be prevented from reaching the smoke alarm or smoke detector by an intervening door or obstruction

10) Continued on next slide

Smoke Alarms & Household Systems

2013 (p 72-168)

- Specific Location Requirements
- The installation of smoke alarms and smoke detectors shall comply with the following requirements

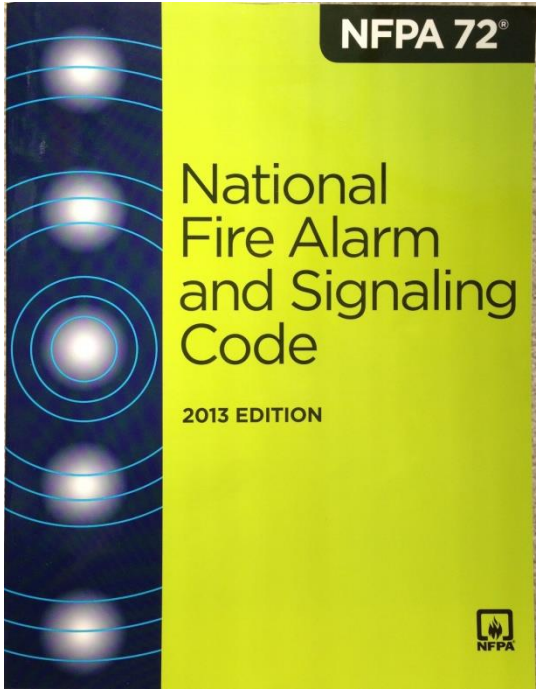
  10) No change

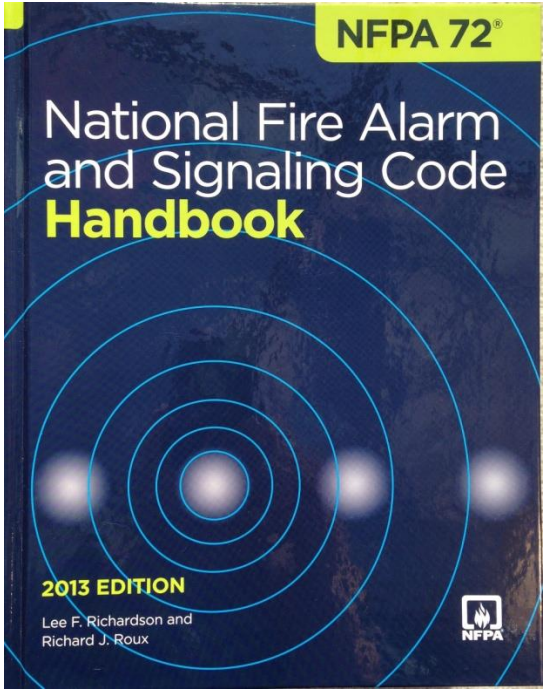
  11) No change

  12) No change

  13) No change

2013 Changes





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Questions

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Thank You