Fire Alarm Installations: A review of Applicable Codes and Standards

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Objectives

• Determine the Applicable Code for Fire Alarm Installations
• Determine the fundamentals of how the National Electrical Code (NEC) works
• Properly prepare documentation for installations that comply with both the electrical and fire alarm codes
NFPA 72 2013 Edition
NFPA 72 Scope

1.1 Scope.

1.1.1 NFPA 72 covers the application, installation, location, performance, inspection, testing, and maintenance of fire alarm systems, supervising station alarm systems, public emergency alarm reporting systems, fire warning equipment and emergency communications systems (ECS), and their components.
NFPA 72 1.1 Scope

• Does NFPA 72 require you to install a Fire Alarm System?

NO It Does NOT
NFPA 72 1.1 Scope

When required by another Code it provides the requirements for the:

• Application
• Installation
• Performance
• Inspection, testing, and maintenance
Codes & Laws

Which Codes REQUIRE Fire Alarm Systems to be installed:

- International Building Code (IBC)
- NFPA 5000 Building Code
- State and Local Building codes and Regulations
Codes with Legal Requirements

Predominant Codes:

- International Building Code (IBC) With State Specific Amendments
Legal Requirement Codes
System Need is Established

NFPA 101 Life Safety Code

9.6.1.3 A fire alarm system required for life safety shall be installed, tested, and maintained in accordance with the applicable requirements of NFPA 70, National Electrical Code, and NFPA 72, National Fire Alarm and Signaling Code, unless it is an approved existing installation, which shall be permitted to be continued in use.
System Need is Established

NFPA 101 Life Safety Code

Chapter 12 New Assembly Occupancies

12.3.4 Detection, Alarm, and Communications Systems.

12.3.4.1 General.

12.3.4.1.1 Assembly occupancies with occupant loads of more than 300 and all theaters with more than one audience viewing room shall be provided with an approved fire alarm system in accordance with 9.6.1 and 12.3.4, unless otherwise permitted by 12.3.4.1.2.
NFPA 101, 9.6.1.7

9.6.1.7 For the purposes of this Code, a complete fire alarm system shall provide functions for initiation, notification, and control, which shall perform as follows:

(1) The initiation function provides the input signal to the system.
(2) The notification function is the means by which the system advises that human action is required in response to a particular condition.
(3) The control function provides outputs to control building equipment to enhance protection of life.
NFPA 101, 12.3.4

12.3.4 Detection, Alarm, and Communications Systems.

12.3.4.1 General.

12.3.4.1.1 Assembly occupancies with occupant loads of more than 300 and all theaters with more than one audience viewing room shall be provided with an approved fire alarm system in accordance with 9.6.1 and 12.3.4, unless otherwise permitted by 12.3.4.1.2.
NFPA 101, 12.3.4

12.3.4 Detection, Alarm, and Communications Systems.

12.3.4.2.3* In assembly occupancies with occupant loads of more than 300, automatic detection shall be provided in all hazardous areas that are not normally occupied, unless such areas are protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.
NFPA 101, 12.3.4

12.3.4 Detection, Alarm, and Communications Systems.

12.3.4.3.3 Occupant notification shall be by means of voice announcements in accordance with 9.6.3.9, initiated by the person in the constantly attended receiving station.
Now These Apply

- National Fire Alarm and Signaling Code
- 2013 Edition

- National Electrical Code
- 2014 Edition
NFPA 72

1.3.4 The intent and meaning of the terms used in this Code shall be, unless otherwise defined herein, the same as those of NFPA 70, National Electrical Code®.

12.2.4 The installation of all pathway wiring, cable, and equipment shall be in accordance with NFPA 70, National Electrical Code, and the applicable requirements of 12.2.4.1 through 12.2.4.4. (SIG-FUN)
How does this book work?
<table>
<thead>
<tr>
<th>Chapter 1- General</th>
<th>Applies generally</th>
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<tbody>
<tr>
<td>Chapter 2- Wiring and Protection</td>
<td>to all electrical installations</td>
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<tr>
<td>Chapter 3- Wiring Methods and Materials</td>
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<td>Chapter 4- Equipment for General Use</td>
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NFPA 70 Chapters 1-4

Applies Generally to ALL electrical installations
<table>
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<tr>
<th>Chapter 5-Special Occupancies</th>
<th>Supplements or modifies Chapters 1 through 4</th>
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<tr>
<td>Chapter 6- Special Equipment</td>
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<td>Chapter 7- Special Conditions</td>
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</table>
Chapter 8 is not subject to the requirements of Chapters 1 through 7 except where the requirements are specifically referenced in Chapter 8.
NFPA 70 Art. 760

ARTICLE 760

Fire Alarm Systems

I. General

760.1 Scope. This article covers the installation of wiring and equipment of fire alarm systems including all circuits controlled and powered by the fire alarm system.
NFPA 70 Art. 760.24
760.24 Mechanical Execution of Work.

(A) General. Fire alarm circuits shall be installed in a neat workmanlike manner. Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be supported by straps, staples, cable ties, hangers, or similar fittings designed and installed so as not to damage the cable. The installation shall also comply with 300.4(D).
NFPA 70 and Fire Alarm Systems

Which sections of NFPA 70 (NEC) apply to Fire alarm installations?

- NFPA 70 Chapters 1-4
- NFPA 70 Chapters 5-7
- NFPA 70 Chapter 8
7.1.1 The documentation of the design, acceptance, and completion of new systems required under this Code shall comply with the minimum requirements of this chapter.
System Documentation

7.2* Minimum Required Documentation. (SIG-FUN)
{design Documents}

7.2.1 Where documentation is required by the enforcing authority, the following list shall represent the minimum documentation required for all fire alarm and emergency communications systems, including new systems and additions or alterations to existing systems:
System Documentation

(1) Written narrative providing intent and system description
(2) Riser diagram
(3) Floor plan layout showing location of all devices and control equipment
(4) Sequence of operation in either an input/output matrix or narrative form
(5) Equipment technical data sheets
(6) Manufacturers published instructions, including operation and maintenance instructions
System Documentation

(7) Battery calculations (where batteries are provided)
(8) Voltage drop calculations for notification Appliance circuits
(9)*Completed record of inspection and testing in accordance with 7.6.6 and 7.8.2
(10) Completed record of completion in accordance with 7.5.6 and 7.8.2
(11) Copy of site-specific software, where applicable
System Documentation

(12) Record (as-built) drawings
(13) Periodic inspection, testing, and maintenance documentation in accordance with Section 7.6
(14) Records, record retention, and record maintenance in accordance with Section 7.7
System Documentation

7.2.3 All fire alarm drawings shall use symbols described in NFPA 170, *Standard for Fire Safety and Emergency Symbols*, or other symbols acceptable to the authority having jurisdiction.
Record of Completion

Forms
- System Record of Completion form (7.8.2.a) (DOC, 137 KB)
- Emergency Communications Systems form - supplementary record of completion (7.8.2.b) (DOC, 106 KB)
- Power Systems form - supplementary record of completion (7.8.2c) (DOC, 91 KB)
- Notification Appliance Power Panel form - supplementary record of completion (7.8.2d) (DOC, 73 KB)
- Interconnection Systems form - supplementary record of completion (7.8.2e) (DOC, 57 KB)
- Deviations from Adopted Codes and Standards form - supplementary record of completion (7.8.2f) (DOC, 49 KB)
- System Record of Inspection and Testing form (7.8.2g) (DOC, 163 KB)
- Notification Appliance form - supplementary record of inspection and testing (7.8.2h) (DOC, 129 KB)
- Initiating Device form - supplementary record of inspection and testing (7.8.2i) (DOC, 145 KB)
- Mass Notification System form - supplementary record of inspection and testing (7.8.2j) (DOC, 108 KB)
- Emergency Communication System form - supplementary record of inspection and testing (7.8.2k) (DOC, 220 KB)
- Interface Component form - supplementary record of inspection and testing (7.8.2l) (DOC, 148 KB)

Articles and Reports
- Light Sources Used in Emergency Notification Appliances
- Smoke Alarms in U.S. Home Fires
- Ionization vs. Photoelectric Smoke Alarms
- Unwanted Fire Alarms
7.7.2 Document Accessibility. (SIG-FUN)

7.7.2.1 With every new system, a documentation cabinet shall be installed at the system control unit or at another approved location at the protected premises.

7.7.2.2* All record documentation shall be stored in the documentation cabinet.

7.7.2.3 Where the documentation cabinet is not in the same location as the system control unit, its location shall be identified at the system control unit.
Documentation Storage

FIRE ALARM DOCUMENTS
Records / Programs / Software

[Image of a red box and a filing cabinet]
Legend sheet for storing system information including contacts, signoffs, test maintenance information and alternate locations of additional records.
Summary

• We determined the Applicable Codes for Fire Alarm Installations
• We determined the fundamentals of how the National Electrical Code (NEC) works
• We discussed the proper preparation and documentation for installations in order to comply with both the electrical and fire alarm codes
Additional Training

• Telgian Corporation Training
• NFPA
• AFAA
• ISC West & SIA Education
Questions?

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