

# NFPA 72<sup>®</sup>

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## National Fire Alarm and Signaling Code<sup>®</sup>

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2019



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## NFPA 72®

# National Fire Alarm and Signaling Code®

### 2019 Edition

This edition of *NFPA 72, National Fire Alarm and Signaling Code*, was prepared by the Technical Committees on Fundamentals of Fire Alarm and Signaling Systems, Testing and Maintenance of Fire Alarm and Signaling Systems, Initiating Devices for Fire Alarm and Signaling Systems, Notification Appliances for Fire Alarm and Signaling Systems, Protected Premises Fire Alarm and Signaling Systems, Emergency Communication Systems, Supervising Station Fire Alarm and Signaling Systems, Public Emergency Reporting Systems, and Single- and Multiple-Station Alarms and Household Signaling Systems, released by the Correlating Committee on Signaling Systems for the Protection of Life and Property, and acted on by NFPA at its June Association Technical Meeting held June 11–14, 2018, in Las Vegas, NV. It was issued by the Standards Council on August 14, 2018, with an effective date of September 3, 2018, and supersedes all previous editions.

This document has been amended by one or more Tentative Interim Amendments (TIAs) and/or Errata. See "Codes & Standards" at [www.nfpa.org](http://www.nfpa.org) for more information.

This edition of *NFPA 72* was approved as an American National Standard on September 3, 2018.

### Origin and Development of *NFPA 72*

The development of NFPA's signaling standards dates back to 1898 with the appointment of the Committee on Thermo-Electric Fire Alarms. The 1905 edition of NBFU 71A, *Rules and Requirements of the National Board of Fire Underwriters for the Construction, Installation, and Use of Signaling Systems Used for the Transmission of Signals Affecting the Fire Hazard as Recommended by the National Fire Protection Association*, and related documents dating back to 1903 were among the first of numerous signaling standards published in conjunction with the National Fire Protection Association. The descendants of these earlier standards were consolidated into the *National Fire Alarm Code, NFPA 72*.

The first edition of the *National Fire Alarm Code*, published in 1993, was a consolidation of the 1989 edition of NFPA 71, *Standard for the Installation, Maintenance, and Use of Signaling Systems for Central Station Service*; the 1990 edition of NFPA 72, *Standard for the Installation, Maintenance, and Use of Protective Signaling Systems*; the 1990 edition of NFPA 72E, *Standard on Automatic Fire Detectors*; the 1989 edition of NFPA 72G, *Guide for the Installation, Maintenance, and Use of Notification Appliances for Protective Signaling Systems*; the 1988 edition of NFPA 72H, *Guide for Testing Procedures for Local, Auxiliary, Remote Station, and Proprietary Protective Signaling Systems*; and the 1989 edition of NFPA 74, *Standard for the Installation, Maintenance, and Use of Household Fire Warning Equipment*. Many of the requirements of these standards were identical or very similar. The recommendations that were taken from the guides (NFPA 72G and NFPA 72H) were changed to mandatory requirements.

The 1996 edition of *NFPA 72* incorporated many changes of a technical nature. These changes related to the Americans with Disabilities Act, software testing, fire modeling, and communications.

The 1999 edition represented a major change in code content and organization. The chapters were arranged to facilitate user friendliness and provide a logical structure. A new chapter on public fire reporting was added, and many technical revisions were made. Annex B (formerly Appendix B) was streamlined to facilitate ease of use, many unenforceable terms were removed, and Chapter 3 was reorganized to facilitate a more logical approach.

The 2002 edition reflected an extensive editorial revision of the Code to comply with the latest edition of the *Manual of Style for NFPA Technical Committee Documents*. These revisions included the addition of three administrative chapters at the beginning of the Code: Administration, Referenced Publications, and Definitions. Eight technical chapters followed the administrative chapters in the same sequence as in the 1999 edition. Other editorial revisions included the breakout of paragraphs with multiple requirements into individually numbered paragraphs for each requirement, the minimization of use of exceptions, the use of consistent headings for sections and section subdivisions, and reorganization to limit paragraph numbering to six digits.

The 2002 edition contained a number of technical revisions throughout the Code, including the following:

- (1) A major revision of the power supply requirements
- (2) A new requirement addressing impairments to fire alarm systems
- (3) Additional requirements concerning the review and approval of performance-based detection system designs
- (4) Revision of the rules for system survivability from attack by fire
- (5) The introduction of rules for an alternate approach for audible signaling
- (6) The addition of requirements to address performance-based designs for visible signaling
- (7) The relocation of testing and maintenance requirements for single- and multiple-station alarms and household fire alarm systems to the testing and maintenance chapter
- (8) Revisions to re-establish the prescriptive rules for household fire-warning equipment from the 1996 edition of the Code

The 2007 edition contained several technical revisions including many to accommodate new technology and to take advantage of new research. Changes were made to better address the integration of mass notification systems and other systems with fire alarm systems. Revisions were also made in several areas of the Code for clarity and to enhance its usability.

Some of the more significant revisions in the 2007 edition addressed protection of fire alarm control units, personnel qualifications, heat detector response time, smoke detector spacing, smoke detection in ducts, detectors that use multiple sensing inputs, video image smoke and flame detection, synchronization of visible notification appliances, exit marking audible notification appliances, tactile notification appliances, different types of protected premises fire alarm systems, and in-building enhancement systems for fire fighter radio communications. The 2007 edition also included significant changes to the requirements for smoke alarms in residential applications, revisions to require the interconnection of smoke alarms for existing occupancies, revisions to require additional smoke alarms for larger dwelling units, and revisions to allow voice messages to be included as a part of the smoke alarm notification signal.

Revisions in the 2007 edition to enhance and clarify the Code included those that address suppression system inputs to the fire alarm system, emergency/voice alarm communications systems, fire alarm system interface with elevator systems, and the means to indicate central station service. In addition, a complete revision of the Record of Completion Form along with examples of filled-out forms were provided.

The 2007 edition also included the addition of two new annexes — one to provide guidance for the design of mass notification systems and one to replace previous annex material for the design of fire service interfaces with a separate industry standard.

The 2010 edition of the Code presented a major change in the scope and organization of the document. This was reflected in the new title, *National Fire Alarm and Signaling Code*. The broader scope of the Code included emergency communications systems in addition to the traditional scope of fire alarm systems. A new chapter on emergency communications systems (ECS) was added to provide requirements for a variety of systems used for communication of information in various emergency situations. The ECS chapter included new systems such as in-building mass notification systems, wide area mass notification systems, distributed recipient mass notifications systems, two-way radio communications enhancement systems, and area of refuge emergency communications systems. The ECS chapter also included two systems formerly in the chapter on protected premises fire alarm systems: (in-building fire) emergency voice/alarm communications systems and two-way in-building wired (telephone) emergency services communication systems.

Two other new chapters were added in the 2010 edition. The new chapter on circuits and pathways included requirements and information formerly from the chapters on fundamentals of fire alarm systems and from the chapter on protected premises fire alarm systems. This new chapter provided circuit and pathway performance (class) designations and pathway survivability level designations as well as general wiring requirements presented in a format that allowed use by any type of system covered in the Code. The new chapter on emergency control functions and interfaces included requirements and information formerly contained in the chapter of protected premises fire alarm systems. In this chapter the term *fire safety function* generally was replaced with the term *emergency control function* to reflect the potentially broader application beyond just fire alarm systems. This new chapter also included new provisions for first-responder-use elevators and elevators for occupant-controlled evacuation.

The 2010 edition was reorganized substantially to accommodate the new chapters in a logical order with reserved chapter numbers included to minimize the potential for further renumbering in the future. The overall organization included administrative chapters, support chapters, and system chapters as well as numerous annexes for usability.

Significant revisions were also made throughout the 2010 edition to reflect the broader application of the Code to emergency communication systems. These included revisions in the chapter on fundamentals to address power supply requirements, signal priorities, signal distinction and documentation requirements; revisions to the protected premises chapter to better accommodate non-fire alarm systems in combination systems; revisions to the supervising station chapter and public emergency reporting system chapter to allow their use for emergency communications systems; and revisions to the testing and maintenance chapter to incorporate requirements for the inspection, testing, and maintenance of mass notification systems and two-way radio communications enhancement systems.

In addition to the content of the new chapters, the 2010 edition included significant technical changes. These included new requirements for signaling to the deaf and hard of hearing, new requirements and guidance for the design, installation, and testing of voice communications systems to ensure voice intelligibility, and extensive revision of requirements for the installation of smoke detectors in both level and sloped joist and beam ceiling applications.

Revisions to the supervising station chapter in the 2010 edition included the retirement of four legacy transmission technologies no longer being installed: active multiplex transmission systems, McCulloh systems, directly connected noncoded systems, and private microwave systems. The subsection on Other Transmission Technologies was relocated to become the default subsection for supervising stations communications methods.

Modifications in the 2010 edition to the chapter on single- and multiple-station alarms and household fire alarms systems included new provisions to address the interconnection of smoke alarms using wireless technology, new provisions for signaling to those with hearing loss, and new requirements and guidance for the placement of smoke alarms and smoke detectors.

The 2010 edition included two new guidance annexes, Annex C on system performance and design and Annex D on speech intelligibility.

The 2013 edition of the Code was built on the organizational changes made in the 2010 edition. A new Chapter 7, Documentation, was added to improve the usability of the document and provided a central location for all the documentation requirements of the Code. In some cases, the documentation provisions were contained directly in the new chapter. In other cases, references were provided to the locations of documentation requirements contained in other chapters. As an example, the new chapter contained the minimum documentation requirements that applied to any system covered by the Code, while additional document requirements that might apply from other parts of the Code or from other governing laws, codes, or standards were listed with an appropriate reference. The Record of Completion and Record of Inspection, Testing, and Maintenance forms were included at the end of the chapter and were completely revised to be easier to use with a basic form for straightforward systems and supplemental forms for more complex systems.

Chapter 10, Fundamentals, was reorganized for the 2013 edition to provide a more user-friendly flow of requirements. In addition, requirements for circuit monitoring found in the previous edition of Chapter 10 were relocated to Chapter 12, Circuits and Pathways, a more logical location.

Extensive usability changes also were made in the inspection and testing tables of Chapter 14, Inspection, Testing, and Maintenance. The visual inspection table was updated, adding new inspection methods for each component along with the inspection frequency. The test methods and test frequency tables were combined into a single table so that the test method appeared along with the test frequency for each component. The component listings in both tables were reorganized and coordinated so that components and equipment were easier to find.

The 2013 edition of the Code also included many technical updates. Among those updates were changes in Chapter 10 requiring supervising station operators and fire alarm system service providers to report to the authority having jurisdiction certain conditions of system impairment. Requirements for inspection, testing, and service personnel qualifications were updated to better reflect the level of qualification needed for each type of activity.

Changes were also made in Chapter 18, Notification Appliances, requiring documentation of the locations that require audible notification appliances as well as documentation of the audibility levels that must be produced. Area of coverage requirements were added for visible notification appliances. Changes were made in Chapter 21, Emergency Control Function Interfaces, to address requirements for elevator recall when sprinklers are installed in elevator pits. The requirements for occupant evacuation elevators were completely revised to coordinate with changes made in ASME A17.1/B44, *Safety Code for Elevators and Escalators*. Changes were made in Chapter 24, Emergency Communications Systems, to address the use of microphones and of textual and graphical visible notification appliances for primary or supplemental notification, and to update the requirements for emergency command centers. Changes were made in Chapter 26, Supervising Station Alarm Systems, to address alarm signal verification, alarm signal content, and restoration of signals. Those changes were made in part to help emergency responders better manage issues related to unwanted alarms. In addition, new definitions for unwanted alarms were added to more precisely identify the sources of those alarms. Changes were also made to update the communications methods addressed in Chapter 26. Among them were changes to the supervision interval requirements for communications paths and changes to the types of transmission means that can be used for the second channel of a digital alarm communicator transmitter (DACT). Changes were made in Chapter 29, Single- and Multiple-Station Alarms and Household Fire Alarm Systems, to address the connection of sprinkler waterflow switches to multiple-station alarms and to add new requirements addressing the smoke alarm resistance to common nuisance sources.

The 2016 edition made many changes relative to documentation. Chapter 7 revised and added items to the minimum documentation, documentation for new emergency communications systems, and software documentation requirements; and addressed review of electronic documentation media formats. Requirements for documentation of qualifications for the system designer and personnel who program systems were more clearly addressed while providing for the allowance for system design trainees. New criteria were added for plans examiners and inspectors.

Perhaps the most significant changes to the Code pertained to wiring. The 2016 edition added Class N, which addressed Ethernet infrastructures for alarm and signaling systems, and pathway performance and installation criteria were provided. Class A and Class X pathway separation requirements were revised to address emergency control function interface devices controlled by the fire alarm system on those circuits. Level 2 and Level 3 pathway survivability requirements were revised, which provided flexibility of use and addressed other fire-resistive methods.

The 2016 edition of the Code added language relative to recalled equipment observed during inspection and testing and clarified the intent of periodic visual inspections relative to building or other changes that could affect the performance of the system. With the exception of reference and requirements pertaining to survivability, requirements for the design, installation, testing, and maintenance of in-building emergency radio communications enhancement systems were relocated to NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*.

Chapter 17 revised the requirements for total coverage and expanded its annex language to address general consideration for elevator shafts and enclosed stairways. The requirements for placement of smoke detectors used for door release were also revised to provide additional flexibility in locating detectors.

Chapter 24 was restructured, providing greater user friendliness while expanding the section on risk analysis. Emphasis was placed on the importance of effective message development. Annex G, Guidelines for Emergency Communication Strategies for Buildings and Campuses, based on the National Institute of Standards and Technology and Fire Protection Research Foundation research, was added to the 2016 edition.

Language was changed in Chapter 26 to require that when multiple communication paths are used for performance-based technologies or the two transmission means for a digital alarm communicator transmitter they be arranged to avoid a single point of failure.

Chapter 29 added requirements pertaining to remote resetting and silencing of a fire alarm control unit from other than the protected premises for a minimum of 4 minutes from the initial activation of the fire alarm signal. Smart phones and Internet access to almost any device made remote access to residential equipment possible. The ability to establish remote access to a fire alarm system was addressed. Also, a new requirement established that, where a communication or transmission means other than DACT is used, all equipment necessary to transmit an alarm signal must be provided with a minimum of 24 hours of secondary power capacity.

The 2019 edition reflects a number of changes. The requirements for fire service access elevators and occupant evacuation elevators (OEE) were completely revised to coordinate with changes made in ASME A17.1/CSA B44. The requirements for occupant evacuation operation (OEO) are revised extensively. Annex text is added for clarification, as is Figure A.21.6, Simplified Occupant Evacuation Operation (OEO) (elevator system interface with the building fire alarm system based on ASME A17.1, Section 2.27.11; and NFPA 72, Section 21.6). In addition to the requirements for area of refuge (area of rescue assistance), Chapter 24 is revised to include requirements for stairway communications systems, elevator landing communications systems, and occupant evacuation elevator lobby communications systems. A review was accomplished and revisions made to ensure alignment of NFPA 72 with the *Manual of Style for NFPA Technical Committee Documents*. These editorial revisions include the breakout of paragraphs with multiple requirements into individually numbered paragraphs for each requirement and the minimization of use of exceptions. For many years, when codes required visual (or visible) notification in addition to audible notification, strobe lights meeting the requirements of Chapter 18 were used. With newer LED products that can be used for fire alarm, the terms *strobe*, *light*, and *visible* are essentially changed to *visual notification appliance*. The terms *speaker* and *high power speaker array (HPSA)* are changed to *loudspeaker* and *high power loudspeaker array (HPLA)* for consistency.

Perhaps the most significant change to the Code pertains to carbon monoxide. In August 2015, the Standards Council voted to relocate material that is in NFPA 720, *Standard for the Installation of Carbon Monoxide (CO) Detection and Warning Equipment*, to various chapters of NFPA 72. These requirements are essentially incorporated into Chapter 17 for carbon monoxide detectors; Chapter 14 for installation, testing, and maintenance; Chapter 29 for carbon monoxide alarms; and new Annex H. Chapter 29 is greatly expanded, and a significant amount of annex text has been added for explanation. NFPA 720 is to be withdrawn as the requirements are moved to NFPA 72.

Chapter 14, Inspection, Testing, and Maintenance, is greatly modified to incorporate valve-regulated lead-acid (VRLA) batteries. The inspection and testing requirements are revised in Tables 14.3.1 and 14.4.3.2. This also expands the annex language to address use and testing of these batteries. Several new terms are introduced, and these are defined in Chapter 3.

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NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

**Committee Scope:** This Committee shall have primary responsibility for documents on the installation, performance, maintenance, testing, and use of signaling components and signaling systems for the protection of life, property and mission continuity.

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(Alt. to Jeffrey A. Scott)  
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(Alt. to Joseph Dafin)  
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(Alt. to Oded Aron)  
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(Alt. to Andrew B. Woodward)  
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(Voting Alternate)  
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(Alt. to Waymon Jackson)  
**Denise L. Pappas**, Valcom, Inc., VA [M]  
(Alt. to Daniel P. Finnegan)

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**Joseph Ripp**, Interface Engineering, OR [M]  
(Alt. to James Mongeau)  
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**Larry D. Watson**, American Professional Services, Inc., OK [IM]  
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**Richard J. Roux**, NFPA Staff Liaison

*This list represents the membership at the time the Committee was balloted on the final text of this edition. Since that time, changes in the membership may have occurred. A key to classifications is found at the back of the document.*

NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

**Committee Scope:** This committee shall have primary responsibility for documents on the risk analysis, design, application, installation, and performance of emergency communications systems and their components. Public emergency services communications systems covered by NFPA 1221 are outside the scope of this committee except where they interface with in-building bi-directional amplifiers and where trouble and supervisory signals are intended to be monitored by the building fire alarm system.

**Technical Committee on Fundamentals of Fire Alarm and Signaling Systems (SIG-FUN)**  
**(Chapters 1, 7, and 10 and Annex E)**

**Manuelita E. David, Chair**  
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**Jeffrey S. Hancock, Secretary**  
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**David W. Frable**, U.S. General Services Administration, IL [U]

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**Richard A. Malady**, Fire Fighter Sales & Service Company, PA [IM]  
 Rep. National Association of Fire Equipment Distributors

**Charlie G. McDaniel**, Global Asset Protection Services, LLC, WV [I]  
 Rep. Global Asset Protection Services, LLC

**Jack McNamara**, Bosch Security Systems, NY [M]

**James M. Mundy, Jr.**, Asset Protection Associates, Ltd., NY [M]  
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**Louis Nash**, U.S. Coast Guard, DC [E]

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 Rep. U.S. Naval Historical Center

**Allan Sanedrin**, UL LLC, IL [RT]

**Emily Troyanski**, Intertek Testing Services, NJ [RT]

**Allyn J. Vaughn**, NV5/JBA Consulting Engineers, NV [SE]

**Todd W. Warner**, Brooks Equipment Company, Inc., NC [M]  
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NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

**Committee Scope:** This Committee shall have primary responsibility for documents on common system fundamentals for fire alarm and signaling systems, requirements for approvals, power supplies, equipment performance, system documentation, and compatibility.