

# Minnesota Department of Public Safety State Fire Marshal Division

## Fire Alarm Systems

This document outlines changes to the 2016 edition of National Fire Protection Association (NFPA) 72, the National Fire Alarm and Signaling Code.

### Adoption of 2016 Edition of NFPA 72

The 2016 edition of NFPA 72 was formally adopted March 31, 2020, in Minnesota and replaced the 2010 edition.

### Retroactivity of NFPA 72

Like most installation standards, NFPA 72 is not intended to be enforced retroactively on existing buildings except where an existing situation is deemed by the Authority Having Jurisdiction (AHJ) an immediate hazard to life or property (see NFPA 72 Section (§) 1.4). The State Fire Marshal Division (SFMD) routinely receives questions regarding new fire alarm systems in existing buildings. The Minnesota State Fire Code (MSFC) and NFPA 72 do not specifically address this issue. It is ultimately up to the AHJ to determine when a fire alarm system must be brought into compliance with the 2016 edition (preferably by written policy).

Requiring that a fire alarm system in an existing building meet the requirements that NFPA 72 intends for new systems can be difficult, particularly when dealing with notification appliances and minimum sound pressure levels. The need for occupant evacuation, the evacuation capabilities of the occupants, and the cost of the upgrades should be considered when applying the requirements of NFPA 72 to a fire alarm system in an existing building.

### Documentation

One of the more significant changes that now appear in the 2016 edition of NFPA 72 is the addition of chapter seven titled Documentation. This chapter provides a central location for the documentation required in NFPA 72. In some cases, there are still documents found in specific chapters throughout the code, and in these instances, chapter seven provides references to them.

### System Impairments

There are a number of reasons for a fire alarm system to be taken out of service. A system is considered impaired when the entire system or substantial portion is out of service. Some impairments are scheduled due to work or maintenance and some are considered unplanned. When a fire protection system is out of service the 2020 MSFC requires that the fire department or AHJ be notified immediately (See MSFC § 901.7). Additionally, NFPA 72 requires that the system's owner be notified and that the system's owner or a designated representative keep a record of the impairment for one year after it has been corrected (See NFPA 72 § 10.20.1). If central station monitoring is terminated then it is a requirement for the service provider to notify the AHJ.



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## Equipment Recalls

Previous editions of NFPA 72 have not discussed the protocol for recalled equipment. Provisions to address a recall event have now been added to the 2016 edition of NFPA 72. If a recall program is initiated by a Manufacturer written notification must be sent to the system's owner or the owner's designated representative (see NFPA 72 § 14.2.2.2.4).

## Unwanted or Nuisance Alarms

Smoke detectors are made up of sensitive electronics. Many standard devices are not constructed and tested to operate in adverse or harsh conditions such as extreme heat or high velocity air movement. Unless the device is specifically designed and tested for the use in adverse or harsh conditions, NFPA 72 § 17.7.1.8 only allows the use of standard smoke detectors in areas that are between 32° and 100° F, has a relative humidity of less than 93 percent and an air velocity under 300 feet per minute which is similar to the air coming out of a standard HVAC vent. Every manufacturer has different perimeters for their detectors, which is located in the product documentation or on the back of the detector itself.

## Low Frequency Alarm Signals in Sleeping Areas

NFPA 72, § 18.4.5.3 contains new language requiring low-frequency sounding devices in rooms used for sleeping to be listed for producing a low frequency wave form. Listed low-frequency devices are designed and constructed to produce a square wave signal that meets a frequency of 520 Hz ± 10 percent (NFPA 72 § 18.4.5.3). Studies show that occupants with mild to severe hearing loss are not able to hear and wake up to the traditional 3150 Hz fire alarm or smoke alarm sound. However, research studies have shown that when occupants were tested at the 520 Hz level, a sound similar to a modern alarm clock the occupants awoke 100 percent of the time. This language applies to new hotel/motels, apartments, and assisted living facilities. It is not intended to apply to hospitals, nursing homes, or childcare centers where the staff is available to assist with evacuation. See our [low frequency alarm interpretation](#) for information on how sleeping areas are defined.

## Low Frequency Smoke Alarms

NFPA 72 § 29.3.8 contains language on smoke alarm notification for persons with hearing loss. § 29.3.8.1 and § 29.3.8.2 require low frequency for persons with mild to moderate hearing loss where there are governing laws (statute), codes, (rule), etc. At this time there are no legal requirements for smoke alarms that produce a low frequency sound to be installed in Group R residential occupancies. Low frequency smoke alarms can be installed voluntarily by the owner, but the SFMD is not currently aware of any manufactures that produce a low frequency smoke alarm.

## Pathway Circuits

Signaling line circuits now include a Class N pathway designation. Class N circuits are used by a digital network to communicate between the fire alarm panel and the initiating notification devices (see NFPA 72 § 23.6.2). Much like class A or B circuits, class N circuits must be supervised end-to-end for line integrity and alert occupants of conditions where the pathway is interrupted. Redundancy is required where the pathway serves more than a single point. This change may allow some building owners the ability to use their computer network to perform fire alarm functions.



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## Mass Notification Systems

Users will now find the use of non-listed notification appliances is allowed where listed devices cannot pass an intelligibility test due to acoustics of the space or ambient noise levels (See NFPA 72 § 24.3.1.2). Every effort should be made to use listed equipment and the use of non-listed high-performance speakers should be limited only to the area where listed devices are incapable of meeting intelligibility requirements.

Questions about NFPA 72 can be directed to the SFMD's Fire Code Team at 651-201-7221 or via email at [fire.code@state.mn.us](mailto:fire.code@state.mn.us).



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