TRAVELERS Risk Control

Smoke and Heat Detection Systems Inspection, Testing and Maintenance

This document focuses on *inspection, testing and maintenance* (ITM) requirements for smoke and heat detection systems. Fire detection systems can provide early detection and notification of a fire emergency; therefore, it is essential that they be maintained appropriately.

This document also assumes that the smoke and heat detection systems are UL Listed or FM Approved systems and have been properly installed by reputable, certified, alarm system contractors. ITM programs cannot overcome poor system design or installation deficiencies.

The National Fire Protection Association (NFPA), Standard 72, *National Fire Alarm Code*, is the recognized standard for ITM of fire alarm equipment. For complete information on ITM of devices other than smoke and heat detectors covered within this bulletin, refer to NFPA 72, your equipment manufacturers operational/ maintenance manual or your Travelers Risk Control consultant.

This bulletin is intended to familiarize building owners and/or persons responsible for fire detection systems about the necessary ITM of smoke and heat detectors. It is also intended as a guide on how to conduct ITM, ITM frequencies, and potential consequences for not having an ITM program for detection systems.

Smoke and Heat Detector Differences

The choice between smoke or heat detectors should be made based on the occupancy being monitored. Smoke detectors are used in areas where early detection of a fire is desired. Smoke detectors are an important part of a building's life safety program by alerting occupants during the early stages of a fire.

Heat detectors, are best suited for property protection only where an early alarm is not required, or where environmental factors would lead to repeated unnecessary alarms from smoke detectors.

Smoke and heat detectors are just that: detectors. They are designed to detect an abnormal condition and transmit an alarm to provide notification of a fire emergency. This facilitates rapid evacuation of building occupants and signals emergency personnel to respond to a fire. Speed of detection, notification of building occupants and signaling emergency response personnel are the major advantages of detectors. However, smoke and heat detectors do nothing to extinguish a fire.

Inspection, Testing and Maintenance (ITM)

NFPA 72 is the recognized standard for minimal ITM frequencies. It also provides information on the proper qualifications of persons to conduct ITM and who is responsible for ITM of systems. **As with other codes, NFPA 72 provides minimum requirements, not best practices.**

The code clearly states that the building owner or his designated representative is responsible for ITM and that any delegation of responsibility must be in writing. However, it also takes into account the technical nature of these systems and dictates that ITM of detection systems be done by qualified and experienced personnel only. Examples of qualified personnel include: individuals factory trained and certified; National Institute for Certification in Engineering Technologies (NICET) fire alarm certified; and/or individuals certified by state or local authority. While a building owner can have his own staff certified, it is generally more practical to have a reputable fire alarm company that has qualified personnel experienced in this type of work, do the ITM.

While NFPA 72 specifies frequency of visual inspections and testing of detection systems, the following points are important to note on why frequency of ITM may need to be increased beyond minimum code requirements, and who is authorized to do ITM.

- NFPA 72 references the equipment manufacturer's ITM recommendations. This may impose more stringent schedules than NFPA 72.
- Local or state fire codes may also be different from NFPA 72 and impose stricter ITM standards. The building owner or manager must be aware of the local and state fire codes. It is especially important to realize that if local and state codes are stricter than NFPA 72, then the stricter code applies.
- Some organizations may fall under requirements from other Authorities Having Jurisdiction that may call for more frequent testing such as, JCAH for hospitals. Again, NFPA 72 requirements are considered minimum requirements.
- In regard to actual maintenance of smoke and heat detection systems, the code simply says it is required in accordance with the equipment manufacturer's required maintenance procedures.
- The code calls for permanent records regarding acceptance testing, re-acceptance testing, installation drawings, and installation and maintenance manuals. Ongoing ITM records have to be kept until the next test and one year. thereafter

Frequency of ITM

The frequencies specified here for both visual inspection and performance testing are for *every* initiating device. Visual inspection involves a simple inspection to verify that conditions have not changed such that detector performance will be affected (i.e., painted, blocked, damaged, dirty, etc.). Performance testing is more involved and requires activation of the detector as directed by the equipment manufacturer.

For smoke and heat detectors, the minimum acceptable frequencies are *semi-annual* visual inspection and *annual* performance testing. In many cases more frequent inspection and testing would be required based on the equipment manufacturer's ITM requirements, state and local codes, and other authorities having jurisdiction.

There are a few exceptions to testing frequency minimum requirements. Detectors that are inaccessible for safety considerations (e.g., located in high places, near energized electrical equipment, near radiation hazards, or continuous process operations), can have frequencies extended for those devices, but no longer than 18-month intervals. Where alarm systems are specifically designed and listed to automatically test detection devices by a remotely monitored fire alarm control unit at least weekly, the manual tests can be extended to annually.

NFPA 72 also addresses what is referred to as Initial Acceptance Testing and Re-acceptance Testing. Simply stated, all new systems and any existing systems that have been modified must be inspected and tested in accordance with the requirements of NFPA 72.

Only qualified, experienced personnel should do initial Acceptance and Re-acceptance testing of detectors. Thus, the requirements and responsibility for this type of testing generally falls to the qualified contractor. The responsibility of the building owner or manager is to ensure that qualified and experienced personnel do this type of testing, and that records are kept.

Conclusion

It is not enough to have smoke and heat detectors; it is critical they be inspected, tested and maintained. The driving force behind ITM of detection systems is to maximize reliability. **Reliability of early detection and notification-type life safety devices, such as smoke and heat detectors, is critically dependent on a rigorous ITM program.**

ITM of properly installed, UL Listed or FM Approved fire detection systems can help to ensure early detection of a fire emergency and notification of emergency personnel. This, in turn, can aid in prompt evacuation of people and preservation of life, prompt professional firefighter response to aid in fire suppression and reduction in time to resume normal business functions.

References

National fire Protection Association:

- NFPA 72, National Fire Alarm Code
- Fire Protection Handbook

Related Resources

Fire Protection Equipment Test Schedule

Fire Extinguisher Monthly Inspection Tracker

Self-Inspection Report for Fire Protection Equipment and Systems

Fire Safety Plan

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