



**Office of Compliance**  
**Safety and Health**  
***FAST FACTS***

## **Smoke Detectors**

Early fire detection can mean the difference between life and death. The fastest way to alert people to the existence of a fire is by means of an automatic detection device such as a smoke detector.

A smoke detector works by detecting tiny smoke particles given off when something burns. When it detects a fire, it sounds an alarm or activates the fire alarm system, signifying the presence of fire, as well as to the need to exit the building. Under limited circumstances, a fire alarm system may be programmed to allow a three-minute delay to investigate an area where a detector has been activated. During this time, the fire alarm system may initiate other actions such as closing fire doors and activating smoke controls. If three minutes pass without an assessment of the potential fire, Life Safety Code requires that the building's fire alarm system be programmed to automatically trigger an evacuation alarm.

### ***REQUIRED SMOKE DETECTORS***

Smoke detectors, such as the standard unit pictured in Figure 1, are not only recommended because of their early-warning capabilities, but also are required by the Life Safety Code and the National Building Code in certain circumstances. For example, smoke detectors must be installed in all sleeping areas, high-rise buildings, day care centers, and underground structures. (See *BOCA Section 920 and Life Safety Code 32.2.3*) While smoke detectors are not required in industrial and business occupancies, they are required if the building's evacuation plan requires that disabled individuals use elevators. In such circumstances, smoke detectors must be located in the elevator shaft, elevator lobby, and elevator machine rooms. Further, though a smoke detector may not always be required by code, if a smoke detector is installed, it must be fully functioning.



***Figure 1: Standard smoke detector***

### ***COVERED AND BLOCKED DETECTORS***

In recent Office of Compliance Safety and Health inspections, inspectors found many covered or blocked smoke detectors that were consequently ineffective. For example, Figure 2 below shows a smoke detector with a plastic cover. New smoke detectors are often boxed with a protective cover that prevents the detector from accumulating dirt and dust during shipping and installation. This cover must be removed immediately after the detector is installed, because it inhibits the device from doing its job. Figure 3 shows a smoke detector that has been covered by blue masking tape. Smoke detectors are sometimes covered with tape when the surrounding ceiling is being painted, but such covering should never be left on after the painting is completed.



*Figure 2: Smoke detector with plastic cover*



*Figure 3: Smoke detector covered with tape*

### ***BROKEN AND ABSENT DETECTORS***

Office of Compliance inspectors also found several damaged smoke detectors, as well as many that were missing batteries or were missing altogether. Figure 4 shows a smoke detector that has been knocked out of position, and therefore may not function properly in an emergency. This same smoke detector may also be knocked out of its mounting if bumped or shaken, leading to a missing smoke detector such as that pictured in Figure 5.



*Figure 4: Loose smoke detector*

### ***PREVENTION AND REPORTING***

Because they serve an effective early warning, it is preferred that offices, closets, and storage areas all have functioning smoke detectors. It is also recommended that all battery-operated smoke detectors be checked at least once each year to ensure that the smoke detector still works.

Broken or missing smoke detectors, such as those pictured in Figures 4 and 5, should be reported as soon as possible to the office responsible for building maintenance so that the units may be repaired or replaced. Without these precautions, a potential fire could quickly grow large enough to prevent employees from safely exiting a building.



***Figure 5: Missing smoke detector***

## ***FAST STATS***

- From 1999 to 2001, an average of 70% of all home fire deaths occurred in homes with either no smoke alarm or a defective unit. (*National Fire Protection Association (NFPA), Fire Analysis and Research Division, November 2004*)
- The NFPA reports that a majority of office fires occur in locations without smoke detectors or other fire-detection devices.
- In 2004, fire, flame, or smoke inhalation caused 2,790 injuries and 90 deaths in the workplace. (*United States Department of Labor, Bureau of Labor Statistics*)
- All employee alarm systems must be maintained in an operable condition. (*20CFR 1910.37(e)*)
- All existing detention and correction facilities, residential board and care facilities, apartment buildings, child day care centers, hotels, and dormitories must have smoke detectors and detector systems. (*NFPA 101, "Life Safety Code"*)
- All high-rise buildings, underground structures, dwelling structures, and all sleeping areas must have smoke detectors. (*1999 Building Officials and Code Administrators International (BOCA) Code*)

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