



Coffee Break Training - Fire Protection Series

Inspection Techniques: Fire Detection Device Placement Beneath Ceilings

No. FP-2009-24 June 16, 2009

Learning Objective: The student shall be able to identify the limits on sprinkler and smoke detector placement beneath smooth, flat ceilings.

The proper placement of fire protection equipment is essential in increasing the likelihood they will operate during an emergency.

The sprinkler and smoke detector in the photograph were installed in accordance with the prescriptive requirements of their respective installation standards: NFPA[®] 13, *Standard for the Installation of Sprinkler Systems*, and NFPA[®] 72, *National Fire Alarm Code*.

Notice that neither of the devices is immediately below the ceiling plane where one might expect heat and smoke to collect in the early stages of a fire. However, research has shown that at the intersection of the wall and ceiling there may be a “dead zone” caused by smoke stratification where combustion products cannot reach the fire protection devices. Therefore, they must be located a specific distance down from the ceiling when they are installed on a wall like these.

The sidewall sprinkler must be installed between 4 and 12 inches (102 and 305 mm) below the ceiling, depending upon the listing of the individual sprinkler. It is important that the inspector check the manufacturer’s documents to verify the maximum distance a sidewall sprinkler may be located beneath a ceiling. For some sprinklers, especially in residential occupancies, the installation range beneath the ceiling may be as little as 4 to 6 inches (102 to 152 mm). This narrow installation range does not leave a lot of room for errors.

Likewise, the smoke detector should be installed in accordance specific listing or manufacturers’ criteria. If none exists, you should refer to NFPA[®] 72, *National Fire Alarm Code* for guidance that states wall-mounted smoke detectors must be installed between 4 and 12 inches (102 and 305 mm) below the ceiling, measured to the top of the detection device.

For additional information and installation recommendations, refer to NFPA[®] 13, *Standard for the Installation of Sprinkler Systems*, Chapter 8, and NFPA[®] 72, *National Fire Alarm Code*, Chapter 5.



The sprinkler and smoke detector must be located below the ceiling in accordance with listing and code requirements.



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