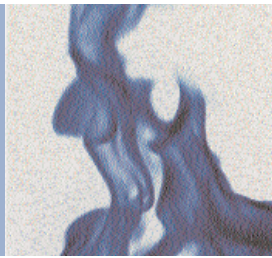


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S p o t s

A F i r e P r o t e c t i o n N e w s l e t t e r

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Passive Smoke Control Systems

In a fire, the products of combustion are considered to be flames, heat, smoke and gases. Smoke and gases include such compounds as carbon monoxide, hydrogen cyanide and hydrogen chloride, which can be fatal to humans. In fact, far more fatalities occur from inhalation of smoke and gases than from direct exposure to flames and heat.

Smoke control systems are utilized by building designers in response to this hazard. In general terms, two approaches can be taken to smoke control systems: active and passive. Passive smoke control systems are examined in this article, and active smoke control systems will be addressed in the next edition of "Hot Spots".

Passive smoke control systems consist primarily of building features (such as walls, doors, etc) designed to restrict the passage of smoke from one smoke "zone" to another.

The International Building Code (IBC), for example, requires smoke zones for the following:

- Stair enclosures and exit passageways
- Stair entrance vestibules
- Vertical Shafts
- Floor levels (code allows a maximum of two floors to be interconnected without separation, reference IBC 707.2, 2003 Edition)
- Horizontal Exits (reference IBC 1002.1, definitions, 2003 Edition)
- Stages (reference IBC 410.3.5, 2003 Edition)
- Rated corridors
- Health Care and Detention Occupancies (reference IBC 407.4, 408.6, 2003 Edition)

The smoke zones required in code are intended to protect areas used for exiting (such as stairwells and horizontal

exits) and areas that are difficult to exit (such as stages, hospitals, or facilities where occupants may be restrained) from smoke for a period of time to allow for safe egress.

Proper use of fire/smoke dampers and rated doors is critical to maintaining the integrity of smoke zones. Rated dampers and doors are necessary to protect penetrations in the rated walls. Combination fire/smoke dampers are activated by either heat or smoke, with smoke detection required within 5 feet of the smoke damper or located in the smoke zone (reference IBC 716.3.2, 2003 Edition). Automatic closing doors, as noted in IBC 715.3.7.3, require smoke detectors to actuate the closing of the doors. **Even if your facility is not required to have a fire alarm and detection system, smoke detection may be required to operate doors and dampers as noted above.**

Rated dampers and doors are critical to passive smoke control systems, and proper testing of these devices should not be ignored. Failure of even a single door or damper may introduce smoke into critical egress paths. Our experience in commissioning these devices reveals that approximately 15-20% of these devices do not function properly. Installation and testing requirements are outlined in NFPA 80 "Fire Doors", Section 1-12, NFPA 105 "Smoke Door Assemblies", Chapter 4, and NFPA 90 "Installation of Air Conditioning and Ventilation Systems" Section 7.2. In general, testing is required upon installation and before building occupancy at a minimum.

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