



BUILDING AND INSPECTING SMOKE BARRIERS

(GA-618-04)

Introduction. The building and fire codes throughout the United States and Canada are primarily concerned with the life safety of building occupants. Most modern residential and commercial buildings are designed and built to exacting code provisions that are observed by architects and builders and enforced by building officials. An important focus of the codes is on fire-resistive materials and construction techniques to protect people from the effects of unwanted fires, but smoke and its related toxic components can also be deadly stalkers. By expanding the use of effective smoke barriers in all types of structures, building officials, architects, contractors, and owners can add an extra margin of safety when they design, construct, maintain, and inspect buildings.

The most common routes for smoke migration in most buildings are corridors and penetrations in walls, partitions, ceilings, or floors, such as door openings, vents, shafts, chutes, mechanical air-handling systems, expansion joints, and service penetrations (i.e., plumbing, telephone, and electrical lines). Officials responsible for developing building and fire codes have realized for many years that specially designed, carefully constructed, correctly sealed, and properly maintained wall and ceiling systems built of gypsum board serve as highly effective smoke barriers. This knowledge has been translated into "real-world" practice where gypsum board fire- and

sound-control systems frequently serve as smoke barriers. (The International Building Code (IBC) typically requires a one-hour fire-resistance rating for smoke barriers.) This practice may be based on common sense and intuition gained through experience by fire protection professionals, but it is also grounded in the technically sound proposition that systems designed and constructed to achieve a significant degree of fire resistance, sound isolation, and reduction of air leakage have characteristics that are also conducive to reducing the spread of smoke.

Creating Smoke Barriers. Owners, designers, builders, and inspectors should work together and carefully adhere to the recommendations below to improve the effectiveness of smoke barriers and to increase the life-safety features of new and renovated buildings.

- Walls, partitions, and other systems serving as smoke barriers must form a barrier to smoke movement, including at the perimeter and any penetrations.
- The membrane must also be continuous through all concealed spaces.
- Each fire-resistance rated gypsum board system must be installed as it was tested.
- Perimeters, intersections of dissimilar materials, and areas extending above ceilings, must be tightly sealed.

- Recessed cabinets, outlet boxes, and other penetrations should be located in separate framing cavities and between partition faces.
- The openings around penetrations should be sealed.
- Transfer grilles, louvers, and similar openings should not be placed in membranes that serve as smoke barriers unless the devices close automatically upon detection of smoke.
- All exposed joints, angles, and abutments in the system, including those above a ceiling and at the floor, must be taped and finished with a minimum Level One finish as described in the Gypsum Association's publication GA-214, *Recommended Levels of Gypsum Board Finish*.
- The interface between the partitions and door jams or sidelight frames should be sealed.

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