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## **When Does the International Fire Code Require Retroactive Installation of Fire Alarms in Existing Apartments? (IFC 2009 Edition, Section 4603.6.6)**

*A Code Interpretation by Jeffrey M. Shapiro, PE, FSFPE*

In the 2009 edition of the International Fire Code (IFC), regulations that apply retroactively to existing buildings were consolidated into a new Chapter 46 (in the 2012 edition, Chapter 46 becomes Chapter 11). These provisions had been scattered among several chapters in the 2000, 2003 and 2006 editions of the IFC, making them hard to find. As a result, they were widely overlooked.

Citing concerns about a lack of compliance, code writers decided that consolidating all retroactive requirements into a separate chapter of the code, where they could be readily identified, was in everyone's best interest. Among the requirements moved to Chapter 46 were provisions that call for some existing apartment buildings to be retrofitted with fire alarm systems. These provisions, which originated in the 2000 edition, were previously located in Section 907.3.1.7.

The increased visibility of the retroactive fire alarm provisions in Chapter 46 has led to many questions by apartment firms and code enforcers about when a retrofit fire alarm system is actually required by the code. Because there are several nuances in the code text that aren't readily apparent, the following code interpretation has been developed for members of the National Multi Housing Council and the National Apartment Association to help clarify how to properly apply this portion of the code. It should be noted that this interpretation is based on the author's knowledge of code history and application, and it is not binding on code enforcers.

### **Question**

Under what circumstances does the International Fire Code require existing garden apartment buildings to be retrofitted with a fire alarm system if one is not already provided?

**Answer:** Requirements for retroactive installation of fire alarm systems in existing apartment buildings are located in Section 4603.6.6 of the 2009 IFC, which reads as follows:

*4603.6.6 Group R-2. An automatic or manual fire alarm system that activates the occupant notification system in accordance with Section 907.6 shall be installed in existing Group R-2 occupancies more than three stories in height or with more than 16 dwelling or sleeping units.*

### *Exceptions:*

1. *Where each living unit is separated from other contiguous living units by fire barriers having a fire-resistance rating of not less than 0.75 hour, and where each living unit has either its own independent exit or its own independent stairway or ramp discharging at grade.*

2. *A separate fire alarm system is not required in buildings that are equipped throughout with an approved supervised automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2 and having a local alarm to notify all occupants.*
3. *A fire alarm system is not required in buildings that do not have interior corridors serving dwelling units and are protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, provided that dwelling units either have a means of egress door opening directly to an exterior exit access that leads directly to the exits or are served by open-ended corridors designed in accordance with Section 1026.6, Exception 4.*

In general, it was the intent of the drafting committee that originally wrote the IFC to not require fire alarm systems in buildings that were not required to have them under the most recent editions of the “legacy” codes that preceded the 2000 IFC. The legacy codes are the 1997 Uniform Fire Code, the 1999 Standard Fire Code and the 1999 BOCA Fire Code, which were previously used in various areas of the country.

From the code text, it is clear that the fire alarm retrofit requirement is not applicable to buildings that are both: (1) three stories or less in height; and (2) contain 16 or fewer units.

To evaluate buildings that have four or more stories or have 17 or more units, further consideration is necessary. First, look at the three exceptions, which are fairly straightforward.

**Exception 1:** Based on this exception, existing apartment buildings do not require a retrofit fire alarm system when every unit has a separate exit to grade and is separated from adjacent units by a minimum 3/4-hour fire-resistive separation. Common apartment styles that might qualify for this exception are: (1) townhouse style units; and (2) two-story buildings with stacked apartments, provided that every second-story apartment has its own stair to grade level (shared stairs and shared exit balconies do not qualify). Because of past code requirements, it is common for existing apartment buildings to already have the required fire separations, but confirming this in an existing structure can be challenging. If construction plans are no longer available, a professional inspector, architect or engineer will likely be needed to make this determination.

**Exception 2:** Based on this exception, apartment buildings that are protected by fire sprinkler systems do not require a separate fire alarm system. Sprinkler systems complying with NFPA 13 (complete commercial systems) and NFPA 13R (multifamily occupancy systems that do not require sprinklers in attics and concealed spaces) both qualify for the exception.

The only subjective aspect of Exception 2 is determining what exactly qualifies as “a local alarm to notify all occupants.” Depending on the individual building, this could be as little as a single exterior water flow alarm bell attached to the fire sprinkler system or as much as a wired system of bells, horns, etc., that are strategically located about the building and are powered by a fire alarm control panel that activates in the event of sprinkler water flow. Determining what constitutes adequate notification will likely involve a discussion and negotiation with local code enforcers. However, the discussion should consider the underlying fact that the intent of this section was to allow continued use of buildings that were compliant with recent legacy codes without requiring a retrofit fire alarm system.

**Exception 3:** This exception was added for new and existing construction in the 2003 edition of the IFC. It recognizes the excellent record of fire sprinkler systems and exterior exits in protecting apartment buildings. Buildings that have both fire sprinkler systems and exterior exits, which include certain open breezeway-style buildings as provided in Section 1026.6 Exception No. 4, are considered to provide adequate fire safety without a general fire alarm or other type of occupant notification system (other than in-unit smoke alarms). Use of Exception 3 is permitted for buildings that are protected by sprinkler systems complying with either NFPA 13 or NFPA 13R.

### **Buildings That Do Not Qualify for Exceptions**

If none of the three exceptions are applicable, further analysis of the base code requirement is necessary to determine whether a retrofit alarm system is required.

**Buildings More Than Three Stories Tall:** The building height trigger text in the code—“Group R-2 occupancies more than three stories in height”—doesn’t clearly address whether basements must be considered in determining building height; i.e., is a building with three above grade stories and one basement story exempt?

To properly answer this question, one must know some code history. When the IFC was originally drafted, the retroactive fire alarm requirement was only intended to apply to buildings that had four or more stories above grade. This was clearly addressed in legacy building codes that did not classify basements as stories. But that intent was lost in 2000 when the International Building Code and IFC defined the term “story” to include basement levels without revising the fire alarm system trigger to correlate.

A subtle change to the 2003 IFC actually fixed this problem, but unfortunately, a casual code user may not notice the fix. In 2003, the code text was changed from “more than three stories” to “more than three stories in height.” That change, which has been maintained in subsequent editions of the code, clarified that fire alarm systems are only required to be retrofitted in buildings that include four or more stories above grade because “building height” is defined in Chapter 2 as “the vertical distance from grade plane to the average height of the highest roof surface.” The phrase “from grade plane” makes it clear that “more than three stories in height” means “more than three stories above grade plane.”

**Buildings with More Than 16 Units:** Additional analysis is also required to determine the applicability of the retrofit fire alarm requirements to properties with more than 16 units. Section 4603.6.6, which addresses “occupancies” with more than 16 units, previously referred to “buildings” with more than 16 units. The term “buildings” was changed to “occupancies” in the 2003 edition of the IFC. What may not be clear to the untrained code user is that a single structure can be considered to have multiple Group R-2 “occupancies” if “fire barriers” are provided to divide the building into multiple “fire areas.” Note that these are all terms that are specifically defined in the IBC.

In addition, a single structure can actually have multiple “buildings” under one roof for the purposes of the IFC if that structure has fire separations that meet the code requirements for “firewalls,” which separate the structure vertically into two or more parts. If the “buildings” divided by firewalls each have 16 or fewer units and are less than four stories in height, a retrofit fire alarm system is not required.

Knowing the locations of firewalls typically reveals a lot about the architect/developer’s original approach to achieving code compliance and determining whether a structure was subdivided by firewalls into multi-

ple buildings may not be very difficult. This is because firewalls have traditionally been required to extend through the attic space to the roof or, in some cases, above the roof.

To qualify as a firewall, a minimum 2-hour fire rating (more under some legacy codes) would have been required, and to achieve that rating, a wall assembly will typically have two layers of 5/8-inch fire-rated drywall on each side of 2x4 studs. By removing a wall plate or using a knife, it's often simple to identify whether two back-to-back layers of drywall are present.

In summary, if each Group R-2 "occupancy" or each "building" has 16 or fewer units, then such occupancy or building is exempt from the retroactive fire alarm requirement (unless the four story height threshold was exceeded), even if the total number of units in the overall structure exceeds 16. To determine whether a Group R-2 occupancy or building actually has more than 16 units, a professional inspector, architect or engineer may be needed to perform an analysis. Such analysis will likely be worth the investment because, prior to 2000, it was very common for buildings to be subdivided by fire separations so as to remain below thresholds that triggered requirements for fire alarm and fire sprinkler systems.