Look! No Wires!

by Dean K. Wilson, P.E.

Question: **I serve as the fire alarm superintendent for our community. From time to time the fire marshal asks for my help in reviewing the fire alarm plans for new construction. Yesterday he brought plans for a new motel complex. The owner of this 117 guest room building has specified the use of a low power wireless fire alarm system. The fire marshal has concerns about the use of something that we have never has proposed before. I know very little about such systems. What should I look out for as I review these plans?**

Answer: First and foremost, do not have any reluctance to accept the use of wireless technology for fire alarm system use. If the manufacturer of the wireless system has obtained listing by UL or FM Approvals for the proposed system you can rest assured that the system has the capability of providing adequate fire alarm service for the new motel. Always start with that baseline: listed equipment. NFPA 72-2002, *National Fire Alarm Code*, requires it. Any, by insisting on the use of listed equipment, in the case of wireless technology, you limit the number of possible manufacturers. Over the years, while a number of manufacturers have proposed the use of wireless technology, only a very few have successfully obtained listing for their equipment.

You will want to familiarize yourself with section 6.16 of NFPA 72-2002. This section contains the requirements for low-power radio (wireless) fire alarm systems. You will find special requirements for a number of unique portions of these systems.

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After a reminder that the equipment must have obtained listing, the first special requirement relates to the use of a primary battery to power the individual initiating device transmitters. The *Code* offers five specific requirements. As you read through these, you will note that they really represent common sense items. You will also note that these requirements have a similarity to the primary battery requirements that the *Code* provides for battery-powered single station smoke alarms.

The second set of special requirements covers the alarm signal generated by the low-power wireless fire alarm system. Once actuated, each fire alarm initiating device must initiate a fire alarm signal. The fire alarm signal must take precedence over all other types of signals. The wireless receiver/control unit must receive this fire alarm signal and display it within 90 seconds of initiation. The fire alarm signal must repeat every 60 seconds until the initiating device restores to a non-alarm condition. Upon receipt of the fire alarm signal, the wireless receiver/control unit must latch in an alarm condition until manually reset.

The third set of special requirements covers the monitoring of the system for integrity. Since the interconnection of system components has no wiring to monitor, the *Code* requires that the system use a transmission method that will remain "highly resistant to misinterpretation of simultaneous transmission and to interference." Any fault that disables the communication pathway must initiate a trouble signal within 200 seconds at the wireless receiver/control unit. The *Code* does offer some exceptions to this requirement to allow the wireless system to comply with certain rules of the Federal Communications Commission. A single fault must not initiate a fire alarm signal. During the time the wireless fire alarm system transmitter must transmit a trouble signal, it still must have the capability of transmitting a fire alarm signal if the initiating device actuates. Removal of the transmitter from its installed location must initiate a distinctive supervisory signal.

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If the wireless receiver/control unit detects any interference with received signals that lasts longer than 20 seconds, it must initiate an audible and visible trouble signal.

The fourth and last set of special requirements for low-power radio (wireless) fire alarm systems covers the output signals from the wireless receiver/control unit. When the wireless fire alarm system receiver/control unit actuates remotely located appliances—such as fire alarm notification appliances—by wireless means, the following requirements apply: power supplies must comply with section 6.16.2, the arrangement must meet the monitoring for integrity requirements of Chapter 4, Chapter 6, or section 6.16.4, the maximum delay from the actuation of the initiating device until the actuation of the required alarm function must not exceed 90 seconds, each wireless receiver/control unit must repeat alarm signals every 60 seconds, and the remotely located appliances shall continue to operate until manually reset at the wireless receiver/control unit.

In addition to these special requirements, the installer of the low-power radio (wireless) fire alarm system will need to follow all other applicable requirements of NFPA 72-2002, *National Fire Alarm Code.* This means that the installer will need to follow the requirements of Chapter 5 for the location and spacing of fire alarm and supervisory initiating devices. The installer will need to follow the requirements of Chapter 7 for the location and spacing of notification appliances. The installer will need to follow Chapter 8 for the connection of the low-power radio (wireless) fire alarm system to any supervising station fire alarm system, or the requirements of Chapter 9 for the connection of the wireless system to a public fire alarm reporting system. The installer will need to follow Chapter 10 for the testing and maintenance of the low-power radio (wireless) fire alarm system.

By carefully reviewing the requirements of NFPA 72-2002, *National Fire Alarm Code,* and by studying the manufacturer's literature so you become very familiar with the components of the

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proposed system and the way that it will serve this particular building, you should have no difficulty in assisting the fire marshal in reviewing the plans for this system. Just because the system has no interconnecting wires, do not assume that it offers less capable fire alarm protection. Many thousands of properties have learned that low-power radio (wireless) fire alarm systems can offer effective protection. In fact, in certain applications, wireless offers a very cost-effective alternative to a wired system.

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