

What Testing Do I Need To Do? - Part 3

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In the last two issues, we have been answering the following question:

“My supervisor has recently placed me in charge of the fire alarm system maintenance for seven locations of our nursing home chain in the northwest part of the state. I really don’t know where to begin. Exactly what testing do I need to do on these systems?”

You have been given both an enormous challenge and an enormous opportunity. The challenge: to bring yourself up to speed on the requirements for properly testing and maintaining the fire alarm systems under your care. The opportunity: to significantly impact in assuring the long term reliability of these systems that provide such a vital service in protecting the lives of the clients using your facilities.

NFPA 72-1999, *National Fire Alarm Code*, provides numerous requirements relating to this subject in Chapter 7, “Inspection, Testing and Maintenance.” As we continue to consider these requirements, we need to next look at Section 7.1.5. This section contains the following requirements:

7-1.5 Releasing Systems. Requirements pertinent to testing the fire alarm systems initiating fire suppression system releasing functions shall be covered by 7-1.5.

7-1.5.1 Testing personnel shall be qualified and experienced in the specific arrangement and operation of a suppression system(s) and a releasing function(s) and cognizant of the hazards associated with inadvertent system discharge.

7-1.5.2 Occupant notification shall be required whenever a fire alarm system configured for releasing service is being serviced or tested.

7-1.5.3 Discharge testing of suppression systems shall not be required by this code. Suppression systems shall be secured from inadvertent actuation, including disconnection of releasing solenoids or electric actuators, closing of valves, other actions, or combinations thereof, for the specific system, for the duration of the fire alarm system testing.

7-1.5.4 Testing shall include verification that the releasing circuits and components energized or actuated by the fire alarm system are electrically supervised and operate as intended on alarm.

7-1.5.5 Suppression systems and releasing components shall be returned to their functional operating condition upon completion of system testing.

It appears that the *Code* recognizes that the testing of fire alarm systems that initiate the discharge of fire extinguishing or suppression agents requires special knowledge, training, and skills on the part of maintenance personnel (technicians). That is why in Section 7-1.5.1 the *Code* requires that “Testing personnel shall be qualified and experienced in the specific arrangement and operation of a suppression system(s) and a releasing function(s) and cognizant of the hazards associated with inadvertent system discharge.”

Personnel who will maintain and test a fire alarm system that actuates a fire extinguishing or suppression system must have knowledge of the design and installation requirements of the fire extinguishing or suppression system. This means that not only must the technicians have a thorough understanding of the requirements of NFPA 72-1999, *National Fire Alarm Code*, they must also have a thorough knowledge and understanding of the NFPA document that contains the requirements for the particular fire extinguishing or suppression system.

The documents with which the technicians must be familiar include the following:

- *NFPA 11-1998, *Standard for Low-Expansion Foam*
- *NFPA 11A-1999, *Standard for Medium- and High-Expansion Foam Systems*
- NFPA 12-2000, *Standard on Carbon Dioxide Extinguishing Systems*
- NFPA 12A-1997, *Standard on Halon 1301 Fire Extinguishing Systems*
- *NFPA 13-1999, *Standard for the Installation of Sprinkler Systems*
- *NFPA 13D-1999, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*

- *NFPA 13R-1999, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*
- NFPA 15-2001, *Standard for Water Spray Fixed Systems for Fire Protection*
- *NFPA 16-1999, *Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems*
- *NFPA 17-1998, *Standard for Dry Chemical Extinguishing Systems*
- *NFPA 17A-1998, *Standard for Wet Chemical Extinguishing Systems*
- NFPA 2001-2000, *Standard on Clean Agent Fire Extinguishing Systems*

The Standards marked with an asterisk (*) will be available in late September, 2002, as updated documents bearing a 2002 edition date. This is also true for NFPA 72, *National Fire Alarm Code*, as a 2002 edition should be available in late September, 2002.

Of course, no single technician needs to have a thorough knowledge of every one of these Standards. However, to the extent that he or she will work on a particular type of fire extinguishing or suppression system, he or she should have a thorough knowledge of the Standard that provides requirements for that type of system.

In addition to the notification requirements I discussed in the last issue, occupants must also receive notification when a technician will perform maintenance and testing on a fire alarm system that initiates the discharge of a fire extinguishing or suppression agent. This notification should include information on how to manually actuate the affected extinguishing or suppression system.

Please take note that NFPA 72-1999, *National Fire Alarm Code*, does not require the actual discharge of extinguishing agent or suppression agent. Section 7-1.5.3 does require that the suppression systems “be secured from inadvertent actuation, including disconnection of releasing solenoids or electric actuators, closing of valves, other actions, or combinations thereof, for the specific system, for the duration of the fire alarm system testing.”

Technicians should develop a carefully written procedure to explain exactly what steps to take to secure the specific system so that it does not inadvertently discharge during the testing of the fire alarm system. It would seem that an appropriate way of accomplishing this would have the technicians use the disconnect switch required by Section 3-8.4.3.4. This Section states the following:

3-8.4.3.4 Fire alarm systems used for fire suppression releasing service shall be provided with a disconnect switch to allow the system to be tested without activating the fire suppression systems. Operation of the disconnect switch shall cause a trouble signal at the fire alarm control unit.

However, as you will see in a moment, Section 7-1.5.4 requires that the testing actually verify that the releasing circuit and its components function as intended during an alarm. How can a technician verify this operation if he or she has operated a switch that disconnects the releasing components from the releasing circuit?

Notice that Section 7-1.5.3 suggests that possible ways to prevent inadvertent discharge would include “disconnection of releasing solenoids or electric actuators, closing of valves, other actions, or combinations thereof.” These methods imply that the releasing circuit will remain connected, but the technician will disconnect the releasing device, itself, from the fire extinguishing or suppression system.

Whatever method the written procedure specifies that the technician should employ, the technician should provide copies of this written procedure to the building owner and to the Authority Having Jurisdiction. This will make certain that every technician who works on the system will follow a consistent step-by-step process to prevent inadvertent discharge. This procedure will also make certain that once a technician has completed the testing, he or she will

follow a similar step-by-step procedure to place the fire extinguishing or suppression system back into service.

The actual testing must include a means to verify that the fire alarm system monitors the integrity of (electrically supervises) the components that it energizes or de-energizes to release the extinguishing or suppression agent. This verification helps ensure that system design has included the necessary features to satisfy the requirement in Section 3-8.4.3.5, and that these features have continued to function properly. Section 3-8.4.3.5 states the following:

3-8.4.3.2 Each releasing device (for example, solenoid, relay) shall be monitored for integrity (supervised) in accordance with applicable NFPA standards.

To verify this, the technicians should create a second written procedure for each fire extinguishing or suppression system. This second procedure should cover testing.

First of all, this procedure should require the technicians to disconnect one leg of the releasing circuit at the releasing device to make certain that this action initiates a trouble signal at the fire alarm system control panel. Secondly, the procedure should require the technicians to reconnect the disconnected leg of the circuit, and then connect each side of the circuit to ground to make certain that this action initiates a trouble signal at the fire alarm system control panel.

As discussed earlier, technicians should also test to make certain that the releasing circuits and their components operate as intended when the fire alarm system initiates an actuation. The best way to do this will have the technicians follow the first written procedure described above to prevent inadvertent discharge. Then technicians can test whatever fire alarm initiating devices should cause a fire extinguishing or suppression system actuation. The technician should provide a

means to determine that the releasing component has truly actuated. The technician should document the specific testing procedures in this second written procedure.

Proper testing of the fire alarm system and the releasing circuits and components of any connected fire extinguishing or suppression system provides a very important quality assurance function. Such testing makes certain that these important systems will actuate when called upon to extinguish or suppress a fire.

In the next issue, I will continue our discussion of how you should test the fire alarm systems at these seven nursing homes. I am very pleased that you have decided to take this responsibility seriously. And, please remember that NFPA 72-1999, *National Fire Alarm Code*, will serve as your very best ally in discharging your responsibility in a professional manner.

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