

This issue of TechNotes has been written by Louis Guerrazzi, NFSA's Manager of Product Standards.

Quick-opening devices

The use of dry pipe systems to deal with piping exposed to freezing temperatures has been an option for a long time. There may even be an increase in their use since the publication of the NFPA 13 TIA restricting the use of antifreeze in new systems. When installing a dry pipe system, the concern of water delivery time could be a factor in the system plan. Section 7.2.3.2 of NFPA 13(2013) sets the maximum water delivery time to be no more than 60 seconds to the fully opened inspection test connection, with exceptions for small systems, and with an option of either calculating discharge water times with a listed program or discharging water using the inspection test connection while complying with times noted in **Table 7.2.3.6.1**. To help achieve shorter times, quick-opening devices can be utilized to keep water delivery times to a minimum.

What is a quick-opening device?

A quick-opening device (QOD) is utilized to reduce the activation time of a dry pipe valve, thereby reducing the delay between the activation of a sprinkler and the flow of water into and through the dry pipes. QODs are more sensitive to drops in system air pressure and hasten the operation of dry pipe valves. The two types of QODs are an *accelerator*, which operates by transferring system pressure into an intermediate chamber, reducing the differential ratio of a dry pipe valve, and an *exhauster*, which releases air out of the dry pipe system, both causing the dry pipe valve to operate sooner than without a QOD. Accelerators are the preferred method of activation, with exhausters being rarely used in new installations today.

Applying Quick-Opening Devices to NFPA 13

When installing a dry pipe system, the water delivery time is going to be found under section **7.2 Dry Pipe System** and its accompanying subsections, as well as **Table 7.2.3.6.1 Dry Pipe System Water Delivery** mentioned above. One exception is for a system sized 500 gal or less that it does not have to meet a specific water delivery requirement with or without a quick-opening device. Another exception is a system less than 750 gal but more than 500 gal is not required to meet a specific water delivery requirement with a quick-opening device installed. For larger systems, a quick opening device is permitted to be installed in order to meet the requirements of 7.2.3.2, 7.2.3.5, and 7.2.3.7, which refer back to achieving maximum delivery times found in Table 7.2.3.6.1. It is also permitted that water delivery time "shall be acceptable where listed by internationally recognized testing laboratory", per section 7.2.3.8.



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When a QOD is installed, several requirements for installation are found under 7.2.4 one of which requires all QODs to have anti-flooding devices installed where an anti-flooding device is not already included in the QOD.

Accelerators

Of the 5 sprinkler manufacturers in the United States, Globe, Reliable, Tyco, Victaulic, and Viking, all of them produce a mechanical accelerator which is UL listed and FM approved. Mechanical accelerators have been around longest and are most commonly used. A mechanical accelerator functions through precisely calibrated internal diaphragms, chambers and pistons which send a rush of residual system pressure to the dry pipe valve when it undergoes a system pressure drop, around 2 psi. Due to the carefully tuned components within the mechanical accelerator, proper and frequent maintenance is required to maintain its operation and to prevent false trips.

At this time, Tyco is the only manufacturer currently producing an electrical accelerator. Electrical accelerators operate through pressure transducers and use a solenoid valve to release air pressure into the system, activating the dry pipe valve. The use of a pressure transducer and microcontrollers minimizes the maintenance associated with the QOD. However, a question was recently brought up through *NFSA's Expert of the Day* service on whether or not an electric accelerator requires backup power in case of an emergency. While NFPA 13 (2013) does not require backup power to be provided to the electric accelerator, a battery backup is provided by two BT-120 (12 AH) batteries to ensure proper operation at all times. While the electric accelerator benefits from no mechanical components which reduces its maintenance, but does come with a higher base cost.

Inspection, Testing and Maintenance

The openings in accelerators and exhausters are small. In order to make sure that the QODs operate as intended, they need to be maintained throughout their lifespan. The requirements for inspection, testing and maintenance of quick-opening devices can be found in section 13.4.4 **Dry Pipe Valves/Quick-Opening** devices of NFPA 25 (2014). A summary of inspection, testing, and maintenance frequency is found in Table 13.1.1.2 and requires gauges to be inspected monthly on systems with low air or nitrogen pressure alarms, otherwise monthly and for the enclosures to be inspected weekly when equipped with a low temperature alarm. The interior shall be inspected annually while the exterior is inspected monthly. The testing frequency for priming water, low air pressure alarm and quick-opening devices are required quarterly, while air-leakage and full flow trip test are required every three years. An annual trip test is also required.

When it comes to maintenance, NFPA 25(2014) only requires annually for dry pipe valves and quick-opening devices. However, as stated above, more frequent maintenance may be required when a mechanical accelerator is installed in order ensure proper operation. The manufacturer's installation instructions should also be referenced in case there are additional recommendations for proper maintenance of the product.

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