

## **Dry Pipe System**

When sprinkler systems are required in buildings, or areas of buildings, where the ambient temperature will not be maintained above 40°F (4°C) dry pipe systems are an option. The dry pipe system is more expensive than the wet pipe system; requires more maintenance and testing (weekly, monthly, annually, and over its lifetime); and has additional design requirements beyond those of the basic wet pipe system.

A dry pipe system is similar to a wet system in that it consists of valves, pipes, fittings, alarm initiating devices, and automatic sprinklers; but the main difference is that the pipes are filled with compressed air or nitrogen, not water, and that the water is held back by a dry pipe valve. When the heat from a fire operates the heat responsive element of an automatic sprinkler, the air in the system must be evacuated through the sprinkler opening to reduce the air pressure in the system holding the clapper of the dry pipe valve in the closed position. When enough air has escaped through the sprinkler, through additional sprinkler actuation as the fire grows, or through quick opening devices that are installed on larger systems, then the water fills the piping, eventually reaching open sprinklers and the fire. This delay of water application allows the fire to grow, creating more fire damage; that needs to be a consideration for both the designer and the owner. The dry pipe system is a fire control system only, but may eventually be appropriate for life safety or residential systems

Following are some new or recent features that contribute to the effectiveness of dry pipe systems:

- Low differential valves that require less air pressure to keep them closed.
- Dry pipe valves that can be reset without removing the cover plate (external reset).
- Packaged dry pipe valves that are trimmed and ready to set in place.
- Dry pipe valves with solenoid valves that hold the clapper of the dry pipe valve closed (instead of air pressure).
- Calculation programs that more accurately determine the delay in operation of the dry valve from the time the first automatic sprinkler operates until water reaches the open sprinkler or sprinklers.

Design issues relative to the dry pipe system would include the following:

- Can the system be designed without trapping piping or will auxiliary drains be required?
- Is there room to pitch the piping so it drains properly?
- Are the pipe type, the fittings, the pipe joining methods, and the appropriate gaskets determined?
- Will there be an adequately heated room for the water supply the dry pipe valve assembly?
- Will compressed air or nitrogen be used, and how much moisture will there be in the air or the system piping?
- What is the appropriate make and model of the dry pipe valve for the installation?
- Will the system design deliver water to the open or operating sprinklers in accordance with NFPA requirements?

