Coffee Break Training - Fire Protection Series

Automatic Sprinklers: Air Maintenance Devices

No. FP-2011-40 October 4, 2011

Learning Objective: *The student shall be able to explain the operation of an air maintenance device for a dry-pipe sprinkler system.*

Dry-pipe sprinkler systems contain pressurized air (or nitrogen) on the system side of the dry-pipe valve. When a sprinkler operates, the air is released and the incoming water pressure opens the dry-pipe valve to fill the sprinkler system. In order to maintain a stable air pressure on the dry-pipe system and prevent accidental valve trips, installations are often equipped with an automatic compressor.

This listed assembly is designed to maintain a stable air pressure on the system side of a dry-pipe valve to prevent accidental trips.

In today's illustration, the air is supplied through the galvanized pipe at the left side of the drawing. There is a pressure relief valve installed immediately above the "air line" sign to prevent excess pressure buildup in the line.

The blue-colored assembly of pipe, valves, and a pressure switch is called an air maintenance device. The air maintenance device is designed to automatically feed air into the system piping at the required volume and pressure from an air source. The automatic air supply is directed through a restricted orifice in the air maintenance device so that when a sprinkler operates, the air supply will not interfere with the operation of the dry-pipe valve.

Notice the position of the valve handles: the handles at the left and right of the picture are in line with the pipe which indicates they are open. The handle at the front of the picture is at a right angle to the pipe which indicates it is closed. This is the normal, or standby, position in which the air maintenance device should be when it is in the ready mode. (See Coffee Break 2008-50 for a technique to identify the correct valve position.)

The front handle can be opened when the service technician needs to provide more air to the dry-pipe system such as after repairs or maintenance, a full trip test, or to reset the dry-pipe valve after it operates.

The pressure switch, connected by a copper tube and located behind the air maintenance device, is designed to limit the maximum air pressure from the air source so that excess pressures do not prevent the dry-pipe valve from opening when needed.