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Vane type waterflow switches should be tested using the inspectors test valve to indicate water flow equivalent to that of a single sprinkler.

In some instances the waterflow switch will "cycle" on and off during this test. This is usually an indication of excessive air trapped in the sprinkler system.

This phenomenon has increased with the use of backflow preventors and inspector test valves in close proximity to the flowswitch instead of at hydraulically remote locations.

Without a valve at the far end of the sprinkler system being open when the system is being filled, the air in the piping cannot vent as the water enters. All of this air compresses and can result in sprinkler pipes being partially filled with water.

In addition to excessive amounts of oxygen leading to increased corrosion, it can also cause the waterflow switch to cycle on and off, delayed operation of the flowswitch or false alarms. When the inspectors test valve is opened, the trapped compressed air expands pushing system water out of the test valve. When the system pressure drops enough, the backflow or check valve opens allowing fresh supply water to enter the system. The supply water flows past the waterflow switch, moves the paddle and starts the retard action. The incoming supply water also compresses the air in the system causing pressure to build up. When the system pressure equals the supply pressure the backflow will close and the flowswitch resets. Then the entire cycling process starts all over. While there may be a steady stream of water flowing out of the test valve, there is not a steady stream of water flowing past the flowswitch.

The delayed flowswitch operation occurs because the cycling keeps going until eventually it takes long enough for the backflow to close that the flowswitch finally goes into alarm or in the event of a real fire, another sprinkler opens and now it flows enough water that the backflow stays open.

False alarms can occur because when you open the ITV you bleed of any pressure that may have built up in the system. Now when the city turns on their pumps late at night to build up pressure for the morning water demand of the city, this water flows into the system and trips the flowswitch because the pipes are only partially full and the system pressure is lower than the supply pressure because the system pressure was vented through the ITV the day before.

Potter makes an automatic air vent, model PAAR-B or PAV, that can be used to automatically vent air from the system or remote valves can be installed for venting the system as it is being filled.

Regards,

Mike Henke CET Sprinkler Product Manager