

Avoiding Corrosion in Dry Pipe and Preaction Sprinkler Systems*

Both dry pipe and preaction sprinkler systems are commonly used for protection of building areas where system components are subject to freezing. Corrosion and its products can limit or prevent adequate water flow to open sprinklers in dry pipe and preaction sprinkler systems causing system failures. To prevent this, these systems must be properly designed and installed in accordance with NFPA 13 *Installation of Sprinkler Systems* and maintained in accordance with NFPA 25 *Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems*.

Corrosion is the destructive attack of a material, usually metal, by chemical or electro-chemical reaction with its environment. There are generally nine forms of corrosion. These main eight forms are uniform corrosion, pitting, galvanic corrosion, crevice corrosion, selective leaching, erosion corrosion, environmental cracking, intergranular corrosion, and MIC or microbiologically influenced corrosion. The most common types of corrosion found in dry pipe and preaction sprinkler systems are crevice corrosion, uniform corrosion, and pitting.

Corrosion can prevent valves from opening, it also can increase the interior surface roughness beyond what is recommended in NFPA 13, it can effectively reduce the hydraulic diameter of the pipe thus restricting water flow and pressure to the sprinklers in the system, and it can cause loose scale that will block the orifice of sprinklers when the system operates. Generally what causes this corrosion is moisture or water trapped within the system. The internal environment is ideal for corrosion since the pipes are normally filled with air - often moist air.

There are several things that can be done to prevent or minimize corrosion which include, specifying schedule 40 black steel or galvanized pipe with cut groove or threaded joints and do not specify the use of rolled grooved joints since the roll grooves can trap water. Specify desiccant air dryers to reduce the amount of moisture introduced into the system. Specify "all" new pipe in the system to be sloped at least to the minimum requirements in NFPA 13, in all situations, not just in cold areas. Minimize the amount of trapped piping, but, where unavoidable, design the systems with auxiliary drains in heated and accessible locations and encourage maintenance personnel to follow NFPA 25 requirements. Also, use dry pendent sprinklers in heated areas when supplied from a dry pipe or preaction sprinkler system.

*For the complete article about Avoiding Corrosion in Dry Pipe and Preaction Sprinkler Systems by Mark Hopkins, PE, consult the Focus on Fire Protection section in the July/August 2006 *Plumbing Systems and Design* magazine.