

HOW DOES A DRY PIPE FIRE SPRINKLER FREEZE?

ALLIANZ RISK CONSULTING



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INTRODUCTION:

There's no doubt that fire sprinklers save lives. However, an improperly maintained fire sprinkler can cause significant water damage during freezing weather conditions. "Dry pipe" fire sprinklers are typically found in unheated attic spaces or warehouses in cold climates. These systems are designed to be "dry," that is, the sprinkler pipe contains compressed air until a fire occurs, then the piping fills rapidly with water to help fight the fire. However, water can infiltrate the system in a few other ways including the air compressor introducing humidity from the air, water left in the system either during an inspection from improper drainage, a valve tripped and improperly set, as well as the aforementioned leaking valve. Without proper inspection and maintenance, a dry pipe control valve

can leak at the riser and fill the sprinkler piping with water. Now the pipe is "wet," and in an unheated space, it can freeze and burst, potentially causing significant property damage and business interruption.

LESSONS LEARNED

Improper maintenance and a lack of inspection led to a dry pipe fire sprinkler freezing and bursting in the attic of a three-story apartment building, causing a loss of approximately \$500,000. In this case, residents of the apartment complex reported hearing the air compressor "run all night," which is an indication that the dry pipe valve was leaking and flooding the sprinkler piping with water.

To avoid this type of loss:

- Properly maintain and inspect all fire sprinkler systems
- Conduct additional inspection and testing of dry pipe fire sprinkler systems prior to winter each year
- Ensure dry pipe valves are protected against freezing
- Validate that the valve enclosures are insulated
- Drain all low points in the system and check for the accumulation of condensation
- Connect an air dryer to the air compressor to limit moisture in the air from getting in.
- Check the air source for the compressor – cool, dry air is best to reduce condensation within the pipe
- Inspect dry pipe systems at least once a day during periods of freezing weather
- Validate the automatic sprinkler system has a central station alarm for water flow



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