Frozen Sprinkler Pipes

Fire sprinkler systems are an effective line of defense against structure fires. However, each year thousands of these systems are affected by freezing temperatures. When the water inside pipes freezes, it creates an ice plug that can prevent water from flowing in the event of a fire. The ice can also cause pipes to crack or burst.

Why Do Pipes Freeze?

When the water inside a pipe drops to a temperature of 32 degrees, the water freezes and expands, sometimes as much as 10 percent. Pressure builds within the pipe enough to cause a crack or burst. Often, damage isn't discovered until the ice thaws. When water is allowed to flow through the damaged pipes, sometimes under significant pressure, it leaks through the damaged pipes causing thousands of dollars in damage to property, contents, and equipment.

Types of Sprinkler Systems

It is important to understand that there are two primary sprinkler systems: a **wet system** and a **dry system**. A wet system contains water throughout all the piping. It is the most common type of system and the most likely to sustain damage from frozen pipes. Structures that are heated year-round typically use wet systems. Dry systems use pipes filled with air instead of water. When the sprinkler system is activated, air forces the head to open, allowing the valve to release water throughout the entire system. Dry systems are useful for warehouses, storage buildings, attics, docks, and structures or areas not intentionally heated.

Wet Systems

Wet systems always have water in the pipes, and they are more likely to freeze. So, it is important to take steps that ensure any water in the pipes remains above freezing. The best measure is to keep the building adequately heated:

- Keep temperatures in the building above 55 degrees, allowing an appropriate margin of error for colder areas in the building.
- Keep the furnace on even when no one is in the building.
- Consider installing a backup generator in the event of a power outage.
- Furnaces can fail. Make sure the furnace is routinely maintained.
- Insulate pipes in unheated areas such as attics. Check these regularly to make sure insulation is still in place.
- Check for broken windows, a damaged roof, missing siding, or other property damage that could allow freezing air to enter the building.
- During cold weather, inspect the pipes regularly for signs of damage.

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Dry Systems

Since no water sits within the pipes of a dry system, they are less likely to freeze. However, system pipes not properly drained of moisture may cause problems. Issues also arise if the air compressor fails, causing the check valve to trip. Keep in mind the base of the sprinkler riser is filled with water up to the check valve, so the riser room needs to be heated. Follow these preventative measures for dry systems:

- The air compressor keeps air pressure consistent throughout the piping. It should be routinely maintained and never turned off.
- Heat the riser room, and make sure the heater is regularly maintained.
- Visually inspect the riser and piping for damage.
- Check the pressure gauges on the riser regularly. If gauges read the same pressure, the system might have activated. If the air pressure is too low, it could cause the valve to trip, flooding the system with water.
- Air in the pipe contains moisture. Your fire sprinkler contractor should check and drain all low points before winter.

Monitoring and Sensors

- Install sensor technology that monitors the heating systems and room temperatures. These sensors detect and alert you to interruptions with the heating system that cause the building temperature to fall below a set minimum.
- Tie sprinkler systems to a third-party central station monitoring provider. When a system is electronically monitored, a signal will be sent automatically of a "water flow" condition, notifying the appropriate facility contact.
- Educate responding and/or supervisory staff on how to shut off the sprinkler system risers and open the appropriate drains to begin draining the system to reduce water damage.

How to Prevent Frozen Pipes

No matter what type of system you have, it should be regularly maintained by an experienced fire protection contractor. Your contractor can identify potential issues and help prepare your system against freezing temperatures. An outside service should also monitor the sprinkler system when no one is in the building. A monitoring company can detect if water is flowing and quickly notify you, reducing the risk of sustaining significant water damage. If outside temperatures are unusually cold, consider setting the thermostat higher than usual. Temperature and moisture sensors are a technology integrated with your alarm system that will alert you if areas of the building fall below 55 degrees or if a pipe has burst causing water to expel from the system.

What if My Pipes Freeze?

If you discover cracked or burst pipes, turn the system off to prevent more water from entering the building. Then, immediately contact your fire protection contractor and have them evaluate and repair the system.

Contact your fire protection contractor for more information regarding this and other potential issues. You can also get more information by contacting your local West Bend Loss Control Representative or email losscontrol@wbmi.com for assistance.

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