{Property}

Frozen Sprinkler Pipes

water

Introduction

Every winter thousands of sprinkler pipes freeze and burst because of lack heat or inadequate insulation. When a frozen sprinkler pipe bursts, the result is always extensive water damage.

A typical loss for a burst sprinkler pipe can involve two or more units and have an average repair cost exceeding $30,000 after the deductible. Nationwide, these losses account for hundreds of millions of dollars of unnecessary property damage each winter.

This article will discuss how sprinkler piping can freeze and burst resulting in water damage and ways that an association or unit owner can protect their sprinkler system from freezing.

What CAU Recommends:

If your association has experienced water damage because of frozen sprinkler pipes, this is the first indication that you need additional freeze protection to prevent this from happening again. The following points will help reduce the risk of frozen sprinkler pipes.

> Maintain heat in all buildings and units

> Require an annual service and maintenance contract on all fire sprinkler systems

> Provide additional insulation for pipes in unheated areas such as attics

> Install water flow alarms to alert occupants that water is flowing in the sprinkler system

> Install freeze alarms to warn of potential freezing conditions before the pipes freeze

Need More Information?

Additional information on freeze protection is available through the National Fire Protection Association (www.nfpa.org). Associations may also request additional information on this topic by contacting CAU's Loss Control Department.

CAU
Community Association Underwriters of America, Inc.

2 Caufield Place, Newtown, Pennsylvania 18940 | cauinsure.com

Impact of Building Codes

There are approximately 3000 residential fire deaths each year. Statistics compiled by the National Fire Protection Association (NFPA) conclude that the chance of dying in a home fire decreases by 80% when residential sprinklers are present.

Many municipalities already require sprinkler systems in new one and two family homes, townhomes and condominiums. The 2009 edition of the International Residential Code (IRC) requires sprinkler systems in these homes. As more municipalities adopt this edition of the building code, the number of systems will increase and so will the potential for water damage from burst sprinkler pipes.

Building and fire codes are regulatory requirements that establish minimum standards for construction of safe and habitable buildings. The code requirements for residential sprinkler systems seeks to minimize fire deaths by controlling heat, smoke and flames so occupants have time to escape. There is minimal emphasis on preventing frozen pipes and water damage.

While one cannot equate the value of a human life to water damage, you cannot overlook the extensive damage caused by accidental discharges from faulty systems and burst piping, which is often more extensive than fire damage.

When Pipes Freeze

When water freezes at a temperature of 32ºF or below it expands up to 10 percent in volume. Sprinkler pipes tend to freeze before other water pipes because the water is not moving.

Most sprinkler systems are wet systems that contain water all the time. Sprinkler systems include check valves and backflow preventers to separate the sprinkler water from the potable water supply. These valves create a closed system in which the pressure cannot escape.

When water freezes inside a sprinkler pipe, it creates an obstruction that can render the sprinkler system useless in the event of a fire. As the ice expands, it increases the internal water pressure in the pipe and causes the pipe to burst. Interestingly, the burst is often in a section of pipe that did not actually freeze.

Alternatively, the expanding ice can cause a pipe, fitting or sprinkler head to crack but the ice will block the flow of water while it is solid. In this case, the actual water damage will not be apparent until the ice melts and water flows out of the burst section.

Where the pipe bursts and the time it takes to shut off the water will influence the amount of water damage to the unit. Most residential sprinkler systems use 1" pipe, which, at a typical street pressure of 70 pounds per square inch (psi), will flow about 30 gallons per minute (gpm). In as little as fifteen minutes, almost 500 gallons of water will saturate the unit and adjoining units.

Preventing Frozen Pipes

The best way to protect a residential fire sprinkler system from freezing is to provide sufficient insulation and maintain adequate heat during the winter months. The type and amount of insulation must be suitable for the coldest local temperatures. During construction, sprinkler systems are usually in place before the insulation so there is a possibility that the installer could place the insulation on the wrong side of the pipes thus exposing them to freezing temperatures.

Insulation helps block the flow heat or cold from one space to the next. Most sprinkler pipes are within the walls or ceilings of a home. Cold air can enter these concealed spaces through small gaps in the exterior sheathing and insulation and find its way into pipe chases and soffits that focus the air directly onto the sprinkler piping and accelerate freezing.

It is important to verify that sprinkler piping in walls is located between the heated interior space and the insulation. In attics, piping should be as close to the ceiling as possible with insulation placed over the pipe in the shape of a tent to trap heat around the sprinkler pipe.

When sprinklers are required in unheated spaces such as attics or crawl spaces, the use of a dry system, or special dry sprinkler heads are required.

A dry system has no water in the piping. The pipes contain air or nitrogen under pressure and when a sprinkler head activates, the pressurized gas escapes and allows water to flow.

Dry sprinkler heads have a short, length of pipe with a seal mechanism installed to prevent water from entering the unheated space until the sprinkler head activates. The sprinkler piping is in a heated space and the sprinkler heads extend into the unheated space.

As of August 2010, the NFPA has banned the use of antifreeze in all new sprinkler systems. For existing systems, NFPA recommends draining the antifreeze and filling the pipes with water then providing additional insulation along with other measures to prevent the pipes from freezing.

If you have sprinkler systems that contain antifreeze, contact your sprinkler contractor immediately to drain the antifreeze and refill it with water then verify that there is sufficient insulation, installed correctly, to prevent the pipes from freezing. The contractor should also install any additional protection needed to prevent the pipes from freezing.