

This edition of TechNotes has been prepared by Vincent Powers, Inspection, Testing & Maintenance Specialist for the National Fire Sprinkler Association.

Please note that this TechNotes was written for informational and guidance purposes only and that any applicable NFPA standards as well as local requirements should be followed to ensure that the fire protection systems are being properly maintained. As always contact your local fire protection contractor for assistance with your fire protection systems.

## Sprinkler System Cold Weather Requirements

Lack of proper maintenance is one of the leading reasons for fire sprinkler system failures. This is one reason why fire sprinkler systems need to be properly inspected, tested, and maintained (ITM) in accordance with NFPA 25. Systems exposed to cold weather are especially vulnerable. In this TechNotes, I hope to lend some understanding on how to ensure these systems are prepared for the upcoming winter and freezing season.

During cold months, Fire sprinkler systems are more susceptible to catastrophic failure. Frozen dry pipe systems are one of the more common service calls throughout winter months. In many cases, after the contractor has completed the annual test of a dry pipe valve and drains the low point drains, they have completed their contractual obligations. After the annual or quarterly inspection and testing, the auxiliary drains are typically not maintained again until the next scheduled inspection or that all too common Sunday call for a frozen or ruptured system. There are other reasons for the freezing of dry pipe systems, such as improper pitch of the sprinkler pipe.

Wet systems typically have fewer freeze ups than dry pipe system but are still an area of concern. A few of these causes can be unheated or unconditioned spaces. The owner should verify that windows, skylights, doors, ventilators, other openings and closures, concealed spaces, unused attics, stair towers, roof houses, and low spaces under buildings do not expose waterfilled piping to temperatures below 40 degrees Fahrenheit This verification should occur prior to cold weather and periodically throughout winter.

Antifreeze systems may freeze due to the solution not being maintained at the proper concentration.

The following are some guidelines that may assist with ensuring your sprinkler systems are prepared to survive the upcoming winter temperatures.

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# AUTOMATIC WELDING

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## Wet Pipe Sprinkler Systems

Wet pipe sprinkler systems shall be maintained at a minimum 40°F or above and checked regularly to verify the temperature is being maintained. In some areas a listed heat trace can be useful.

## Dry Pipe Sprinkler Systems

Dry pipe sprinkler system auxiliary or low point drains shall be drained when the annual ITM is performed. Typically, this maintenance is completed by the contractor at the time of the ITM, but the overall requirements to properly maintain the sprinkler system is the responsibility of the *owner or owner's representative*. After the contractor is completed the ITM, there are requirements to continue to check and drain the low point drains on the sprinkler system as needed. Any wet portions of a dry pipe sprinkler system and the water-filled supply pipes to the dry pipe valve shall be maintained at a minimum of 40°F.

NFPA 25 does not provide specific intervals for maintaining auxiliary drains for dry pipe and pre-action systems. The standard simply states that they shall be drained after each activation of the system before the onset of freezing weather and periodically thereafter as needed. Annex section A.13.4.5.3.2 of NFPA 25, 2020 provides additional information on properly maintaining auxiliary drains.



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## Procedure for Draining a Drum Drip Drain

1. Close upper valve.
2. Open the lower valve and drain the accumulated water.
3. Close the lower valve, open the upper valve, and allow for additional water accumulation.
4. Repeat this procedure until water ceases to Discharge.
5. Replace plug or nipple and cap in lower valve.



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# **AUTOMATIC AUXILIARY DRAINS**

## **Antifreeze Systems**

Some wet pipe sprinkler systems may have a portion or all of the system that has an antifreeze solution added to protect the sprinkler system from freezing.

NFPA 25, 2020, Section 5.3.4 states that the antifreeze solution shall be tested annually before the onset of freezing weather. This section then explains the procedures for properly testing existing antifreeze systems.

There are two different types of antifreeze for fire sprinkler systems, Glycerin and propylene glycol. Care should be taken to ensure the correct antifreeze solution is present. Glycerin can be used in both CPVC (plastic) and steel sprinkler systems while propylene glycol is not listed for CPVC. The next concern is to determine the required percentage of mixture based on current NFPA standards. For existing antifreeze systems, the specific gravity reading of the sample shall be at a maximum concentration of 50% by volume for glycerin or 40% for propylene glycol to remain in service without replacing the solution. If these conditions are not met, the solution must be replaced with a premixed commercially available solution. The concentration of antifreeze solutions shall be limited to the minimum necessary for the anticipated minimum temperature. Among other places the lowest one-day mean temperature can be found in the 2020 edition of NFPA 25 table A.5.3.4.

Also note that existing antifreeze system solutions are required to be replaced with a listed antifreeze solution by September 30, 2022 or the system needs to be replaced with an alternative system.

A commonly overlooked system when it comes to freeze protection ITM is water storage tanks. The heating system as well as water level alarms need to be tested prior to the onset of freezing weather and periodically throughout the heating system.

Cold weather causes issues in all industries. In the fire protection industry, it can wreak havoc and leave a building without important life and property protection. When not properly maintained fire protection systems can freeze, burst, and fail to function entirely when needed. It is extremely important to ensure that these systems are properly maintained to ensure they are ready to operate in the event of an emergency.

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## Join the NFSA Team

We are searching for a Fire Protection Engineer and a Manager of Training and Education to join Team NFSA!

### Fire Protection Engineer

This position supports the mission by providing technical services including representation on committees, research of sprinkler system performance, preparing written reports and developing and teaching seminars. Please view the entire position description and apply here: [Fire Protection Engineer Position](#)



### Manager of Training and Education

This positions supports the mission by providing direction for the development and delivery of all Association education and training programs. These programs should be available for a broad delivery system of on-line and in-classroom training. This position must provide a high level of coordination between multiple departments of the processes for the development and delivery of technical seminars within the subject expertise of NFSA. Please view the entire position description and apply here: [Manager of Training and Education](#).

## New EOD Process

Starting on July 15, 2020, the NFSA has a new EOD process where members can submit questions, track the progress, and view their EOD cases. The step by step process is detailed in [TechNotes #442](#).

**National Fire Sprinkler Association**

514 Progress Dr, Ste A,

Linthicum Heights, MD 21090  
1-800-683-NFSA (6372)



**Contact  
Us**