Freeze-Up of Fire Protection Systems

Cold temperatures can cause the freezing of water in sprinkler system piping, which can create a serious impairment to a building's fire protection system. A frozen fire protection system can result in not only fire losses due to the crippled extinguishing system, but also extensive water damage to the building and its contents resulting from burst piping. This handout provides information on methods to prevent the freezing of systems and precautions to reduce the risk of fire if a system freezes.

Preventing Freezing

Impairment of fire protection systems due to freezing pipes can subject a protected property to significant losses. The following, as a minimum, should be considered in order to prevent or reduce the likelihood of a frozen system:

- Provide heat to areas in a facility where there is a water-based fire protection system and in which temperatures may fall below 40°F (4°C).
- If primary heating fails, provide temporary heating in the area; however, do not use portable heating equipment, such as salamanders and other unvented, fuel-burning heaters, since they introduce fire hazards, as well as health hazards.
- Repair broken windows, ill-fitting doors, and other items that allow heat loss.
- Install a dry-pipe sprinkler system in areas where a wet system has a history of freezing.
- Provide heated or adequately insulated enclosures for pipes exposed to low temperatures.
- Ensure that underground pipes are installed below the frost line, and add a greater depth of earth over the pipes, if needed.
- Keep snow, water, and ice away from hydrants, valves, and standpipe connections.
- Repair leaking or damaged hydrants.

Anti-Freeze System

In the preceding decade, a number of losses occurred, where antifreeze-based, residential sprinkler systems were suspected of actually accelerating fires. These incidents resulted in extensive research by several organizations, including the Fire Protection Research Foundation (FPRF). As a result of this research, a Tentative Interim Agreement (TIA) was issued by the National Fire Protection Association (NFPA) Standards Council in August 2012, prohibiting the use of traditional antifreeze solutions and requiring listed non-combustible antifreeze solutions. Key considerations for antifreeze systems include:

- Ensure that systems protected with antifreeze solution have the proper proportions of antifreeze and water.
- Antifreeze solutions may only be used in Early Suppression Fast Response (ESFR) sprinklers that are specifically listed for use with antifreeze solutions.
- Antifreeze solutions must be listed for use with sprinkler systems.

- Placard must be located at the main control valve for systems using antifreeze, which indicates the brand, type, concentrate, and volume of antifreeze used in the system.

- Antifreeze systems require piping and devices to be arranged to prevent antifreeze solutions from flowing back into the water source.

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