

Wet Pipe Sprinkler Antifreeze White paper

Colorado Division of Fire Prevention and Control



In 2010, it was identified that antifreeze solutions within wet pipe fire sprinkler systems can pose a hazard due to the combustibility of the antifreeze solutions used. The National Fire Protection Association (NFPA) instituted interim changes to reduce this hazard, which included maximum percentages of antifreeze to water solutions and that the solution needed to be pre-mixed prior to installation into the fire sprinkler system. The timeframe in which those interim changes were allowed expired on September 30, 2022.

As of September 28, 2022, the following changes have been made to 8 CCR 1507-101:

In the Division's adoption of NFPA 25 (2020 edition) section 5.3.4.4 is deleted in its entirety and replaced with the following:

5.3.4.4 Except as permitted by 5.3.4.4.1 and 5.3.4.4.3, all antifreeze systems shall utilize listed antifreeze solutions.

5.3.4.4.1 For systems installed prior to September 30, 2012, listed antifreeze solutions shall not be required where one of the following conditions is met:

- (1) The concentration of the antifreeze solution shall be limited to 30 percent factory premixed propylene glycol by volume or 38 percent factory premixed glycerine by volume.

(2) Antifreeze systems with concentrations in excess of 30 percent but not more than 40 percent factory premixed propylene glycol by volume and 38 percent but not more than 50 percent factory premixed glycerine by volume shall be permitted based upon an approved deterministic risk assessment prepared by a qualified person approved by the authority having jurisdiction.

5.3.4.4.2 Newly introduced solutions shall be factory premixed antifreeze solutions (chemically pure or United States Pharmacopeia 96.5 percent).

5.3.4.4.3 Premixed antifreeze solutions of propylene glycol exceeding 30 percent concentration by volume shall be permitted for use with ESFR sprinklers where the ESFR sprinklers are listed for such use in a specific application.

If any portion of a system is subject to freezing and the temperature cannot be maintained at or above 40°F (4°C), the pipe shall be protected against freezing by use of one of the following methods:

- Dry pipe system and pre-action systems
- Replace existing non-listed antifreeze with a listed antifreeze solution in accordance with manufacturer's instructions
- Premixed solution of either propylene glycol or glycerine as permitted in the amended 5.3.4.4.1 discussed above
- Listed heat tracing provided that it is installed and maintained in accordance with manufacturer's instructions
- Listed residential dry pendent or dry sidewall sprinklers extended from pipe in heated areas into unheated areas confirm language consistent with 13
- Premixed antifreeze solutions of propylene glycol at a maximum concentration of 38% shall be permitted to be used with ESFR sprinklers where the ESFR sprinklers are listed for such use in a specific application.

With each of the above methods to protect from freezing, comes unique challenges.

DFPC recommends that facility owners with antifreeze solutions consult with their fire suppression professionals to determine the optimal solution.