



Coffee Break Training - Fire Protection Series

Access and Water Supplies: Water Storage Tank Heating

No. FP-2014-15 April 15, 2014

Learning Objective: The student will be able to identify heating and insulation options for aboveground water storage tanks.

The winter of 2013-14 will be remembered by many for the extended range and periods of extremely cold weather. For some people, this is the year the phrase “polar vortex” entered their vocabulary.

While many portions of the world are used to wintertime cold temperatures, there are many that are not, and this may put their fire protection water supplies at risk due to freezing. According to National Fire Protection Association (NFPA) 22, *Standard for Water Tanks for Private Fire Protection*, where tanks are subject to freezing, methods must be used to maintain the water temperature at or above 42 F (5.6 C) during the coldest weather. (See Coffee Break Training 2012-44.)

The tank in the illustration supplies an automatic sprinkler system and is located in a community where the lowest one-day average temperature is between 5 and 10 F (-15 to -12.2 C). Based on the anticipated ambient temperature and tank size, a combination of tank insulation to conserve energy and immersion electric heaters was authorized by the code official in accordance with NFPA 22.

Insulation materials should be listed and should be installed with protection against fire, exposure, corrosion and weather. When insulation is part of the protection plan, heat-loss calculations based on an average water temperature of 55 F (12.8 C) should be provided to the code official. Heating requirements should be based on design information in accordance with the American Society of Heating, Refrigerating and Air-Conditioning Engineers¹ “Handbook of Fundamentals.”

The tank pictured above has two electric immersion heaters installed to maintain the water temperature. Electric heaters and accessories should be of a type listed by a recognized testing laboratory, should have a permanent marking that indicates the kilowatt capacity, and should be installed in accordance with the manufacturers’ recommendations.

The immersion heaters are nearly 100 percent efficient in transferring heat from the device to the water because any heat created is directly absorbed. Immersion heaters should be installed as low as possible in the tank so the warm water will rise for circulation, as well as ensure the heating element remains in direct contact with the water. If exposed to air, the element might overheat and fail.

For additional information on fire protection water supplies, take the NFA Online course “Alternative Water Supply: Planning and Implementing Programs” (Q0217) at <http://www.usfa.fema.gov/nfa/nfaonline/browse/index.shtm>.



This water tank that supplies an automatic sprinkler system is protected from freezing by a combination of spray-on insulation and immersion heaters.

¹ Formed by the merger of American Society of Heating and Air-Conditioning Engineers and The American Society of Refrigerating Engineers.

