Is Your Safety Shower Ready for the Cold?

Don't forget to winterize.
Do it now-before the weather interferes.

by Nick Tallos

Keeping your safety shower working at optimuin performance is important, no matter what time of year. However, cold winter temperatures can make this especially difficult. Water can freeze in supply lines, clogging the system and shutting off flow. And because water expands as it freezes, internal pressure in the line can increase enough to break steel pipes and their associated valves and fittings. The result can be costly replacement parts, increased labor costs, and a shower that's out of commission while it's being repaired.

Cold weather can bring other problems, too. Water that's too cold can discourage workers from using the showers for the full 15 minutes as recommended by ANSI and OSHA standards, thereby contributing to worker injury. Although federal regulations such as OSHA's 29 CFR 1910 do not mandate every detail of safety shower systems, they do specifically require safe workplace conditions. Unless you provide comfortable water for safety showers, these regulations can be easily interpreted to result in safety violations.

There are a number of steps you can take to prevent cold weather from interfering with safety shower performance. Many are relatively simple to implement and can be readily put in place before cold weather begins.

Techniques for Freeze Prevention

Two basic techniques are used to keep water pipes from freezing: tracing (electrical or steam) and bleed/drain.

In electrical tracing, an electrical heating cable is fastened to the underside of the pipe, beneath the insulation. The heat generated by the cable offsets the heat loss of the pipe so the pipe and the water it contains are kept above freezing. "Tracing is particularly effective if the discharge from bleeder or drain valves presents a handling problem. This may be the case in plant areas where all discharges must be controlled or reported, or where discharge treatment problems and expenses outweigh the benefits of bleeder/drain valves.

Failing to provide comfortable water for safety showers can be easily interpreted as a safety violation.

But electrical tracing is not without problems. In large installations, it may be prohibitively expensive to install and maintain. It may also be ineffective; if a cable breaks, for example, parts of the system may be vulnerable to freezing. And if power goes out, the entire system could be rendered inoperable. It also may be dangerous in a facility handling combustible substances, because of the possibil-

ity of sparking.

In steam tracing, the electric cable is replaced by small-diameter tubing connected to a steam supply. This system depends on steam traps located at the end of the tracing line to maintain heat. If these traps fail, the pipeline could be left unprotected. Also, an electrical power failure typically results in boiler shutdown and consequent loss of protection.

The second method, the bleed/drain technique, relies on self-actuated valves installed at various points throughout the system. These valves operate by draining or bleeding water as the temperature approaches freezing. Each valve contains a temperature-sensitive material that contracts when exposed to water temperatures between 40°F and 35°F, allowing the valve to open and water to flow. As the water temperature in the valve approaches 40°F, the thermal material expands and closes the valve. In this way, cold water is eventually bled from the system and replaced by warmer water from the underground supply line, keeping the water in the system at about 40°F or higher.

Self-actuated valves have significant advantages over tracing systems. They are generally more economical to install and operate, particularly in remote areas where steam or electricity is not available and the cost to provide them is high. And because valves have no power requirements, they can continue to operate when there's a power failure. For this reason, freeze protection valves often are used as backup protection even on steam or electrically traced systems.

Installation

To install freeze prevention valves properly, keep in mind the following:

■ Locate the valves at the extreme ends of any pipe lines, because any water downstream from the valve will not be purged and could freeze. Also, side branches attached to the exposed run of pipe must have a freeze protection valve at their far ends. The discharge from these valves must be handled carefully, because any discharge from the freeze protection valve might freeze and block the purging flow. Consult the manufacturer's recommendations for proper installation.

■ Do not insulate a freeze prevention valve. It should have the quickest cooling rate to assure that it opens before any other part of the pipeline reaches freezing temperature. In a sense, these valves act like circuit breakers in an electrical system. They must be the most sensitive components in the system and the first to react to a circuit abnormality, in order to save the system from damage.

■ Do not locate the valve near any heat source, such as a steam line-even if it is insulated. The radiant heat may be enough to warm the valve and prevent it from operating, even though a portion of the pipe not near the steam line is starting to freeze.

■ Test your valve before each cold season. A simple test consists of slipping an icefilled can up and around the valve. In several minutes the can should start to overflow, which indicates that the valve is opening. Remove the can, and in a few minutes the valve should close. If it performs this way, it is fine.

The Importance of Scald Protection

Scald protection may seem unnecessary during the cold winter months, but this is not the case. Solar radiation can elevate the water temperature in outdoor units to where it is high enough to cause third degree burns. If steam or electric tracing is installed, excessive heat output also can heat the water in the pipe to dangerously high temperatures. And indoor units and lines may be subject to high ambient temperature conditions from process, steam, or condensate lines.

Here, again, the installation of selfactuated valves can prevent problems from occurring. Scald protection valves operate like valves used for freeze prevention. Instead of draining the system of cold water when the temperature nears freezing, however, these valves open gradually as water temperature rises above 95°F, reaching full flow at 105°F or above. As a result, hot water is purged from the system and replaced by cooler water in the supply line.

Scald protection valves should be installed so the full shower station and system piping can be purged of hot water.

Benefits of Comfortable Water

One of the biggest problems caused by cold temperatures is that they can discourage workers from using the safety showers for the full 15 minutes recommended in OSHA and ANSI standards. Although ANSI does not specifically recommend a temperature at which safety showers should perform, it does recommend "tepid" water temperatures, typically not to exceed 100°F

Freeze or scald prevention valves do little to provide water that is comfortable enough for prolonged use. Instead, this can best be achieved using a tempered water supply system. These units use either steam or hot water and indirectly heat incoming cold water until it reaches a temperature of 85°F-not warm enough to open the skin pores, and not cold enough to deter use. If incoming water is above 95°F, the units can shut off the supply of hot water or steam and increase the flow of cold water relative to the heated water, as needed. The most effective tempered water supply systems also feature freeze protection valves that can be installed on the shower system so water can continue to flow in outdoor locations, even when temperatures dip below freezing.

It's Not Too Early

The time to winterize your safety showers is before cold weather sets in. The earlier it is done, the better your facility will be able to avoid problems once the temperature drops.

Take the time to evaluate your system now to determine whether it is adequately prepared to handle cold temperatures. Survey your systems and list any modifications that can make them better, then take the steps to put them in place.■

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