Emergency Mixing Valves

By Grant Brekke

Imagine working in a facility where you are working with or transporting harmful chemicals everyday. On that rare day, a gallon of Hydrochloric Acid falls and hits the floor; and when the container rips open from the impact, it splashes upward and covers your whole lower body. Immediately it starts to eat away at your clothing; within seconds it will start burning your flesh. Panic sets in and you run for the combination shower eyewash exactly as you were trained to do. You pull the chain and 20 gallons a minute come cascading down over your body. There's only one problem: the water coming out of the deluge shower head is 40 degrees F. After the first 30 seconds, your body starts going numb. After all, who would ever take a shower in 40 degree water? The water is so cold that you can't stand it. If there is no one to force you to stay in the cold water, you will run (if you are still conscious) for the closest locker room and turn on a shower valve that delivers a nice warm 95 degree water flow at 2.5 gpm. Another problem arises: although you are warming up, the Hydrochloric Acid becomes more aggressive at temperatures above 85 degrees; but you don't know that, and within a few seconds you have third degree burns on 85% of your lower body.

This scenario happens at an average of 383 times each day and a high percentage of these accidents result in either permanent injury or death. Also, the 40 degree cold water contributes to possible shock and hypothermia. Recent changes to the ANSI Z358.1 – 1998 standard will reduce these injuries and deaths. This standard regulates emergency shower and eye wash requirements that every consulting engineer uses as their guidelines for their projects. One of the most important changes in this standard pertains to the delivery water temperature to emergency eye washes and showers. The standard now requires the delivery of "tepid water" – moderately warm or lukewarm – for 15 minutes at 20 gpm for showers. From a logical standpoint, warm water will encourage proper use of drench showers in emergency situations. Warm water will also prevent bodily heat loss. The standard does not tell the contractor how to do this; but, only that you must provide "tepid" water. The most common and economical way to provide warm water is by using thermostatic mixing valves. There are approximately 5 companies today that build mixing valves specifically designed for emergency showers and eye washes. It is not recommended to use traditional thermostatic mixing valves because of their current design and for liability reasons. When you decide what emergency valves to choose for your projects, choose valves that have two very important safety features: 1) valves designed to completely shut off the incoming hot water in the event of a cold water supply failure. 2) it is imperative that these mixing valves have a cold water by-pass with the same capacity of the emergency equipment it supply's. For example, if an emergency mixing valve is being used with a deluge shower head that can provide 20 gpm, when the valve goes into cold water by-pass mode, it still must be able to provide 20 gpm to the head. With the use of thermostatic mixing valves, one of the benefits to the owner is that now their water heaters can be turned up to an adequate temperature to prevent Legionella from growing in their water heaters. In this litigious society, contractors would be prudent in protecting themselves by quoting and installing emergency mixing valves on every job where emergency equipment must be provided.

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