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Eye Wash and Shower Stations

The ANSI Z358.1-2014 standard establishes a universal minimum performance and use requirements for all Eyewash and Drench Shower equipment used for the treatment of the eyes, face, and body of a person who has been exposed to hazardous materials and chemicals. The ANSI Z358.1 Eyewash standard was first implemented in 1981. The standard was modified in 1990, 1998, 2004, 2009 and 2014. Equipment that falls under this standard includes:

- Drench Showers units
- Eyewash units
- Eye/Face Wash units
- Portable Eyewash units
- Combination Eyewash & Drench Shower units

The ANSI Z358.1 standard also covers equipment performance and use requirements for Personal Wash Unit Units and Drench Hoses, which are considered to be supplemental equipment to emergency Eyewash and Drench Shower units. In addition to performance and use requirements, the ANSI Z358.1 standard also provides uniform requirements for testing procedures, employee training, and maintenance of flushing equipment.

2014 Updates to ANSI Z358.1-2009 Eyewash Standard

While most of the ANSI Z358.1 standard did not change much since the 2009 version, here's a quick list of two important changes that were made.

- Emergency showers must now be designed, manufactured and installed so that once activated, they can be used without requiring the use of the operator's hands.
- Self-contained units shall be visually checked weekly to determine if flushing fluid needs to be changed or supplemented. Such inspections shall be conducted in accordance with the manufacturer's instructions. (2009 standard did not specify weekly checks were to occur)
- Eyewashes and eye/face washes must maintain a "flushing fluid flow pattern" not less than 33 inches and no greater than 53 inches from the surface on which the user stands, and 6 inches minimum from the wall or nearest obstruction. (2009 standard specified that the "height of the nozzles" be no greater than 45 inches.)
- Appendix B5 – A single step up into an enclosure where the equipment can be accessed is not considered to be an obstruction. Installers should allow for adequate overhead clearance to accommodate the presence of cabinets over the counter or faucet mounted emergency eyewashes so as not to create an additional hazard that could be encountered when using the device. (2009 standard did not contain this verbiage)

Equipment Location

The ANSI standard states that all flushing equipment must be located in areas that are accessible within 10 seconds (roughly 55 feet). This is commonly referred to in the industry as the 10 second rule. Best practices are to use a stop watch from your hazardous areas and determine if you have the proper flushing fluid located within 10 seconds. Keep in mind that an injured worker may need additional time to reach the flushing stations, as the severity of their injury

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could vary. In the presence of highly corrosive chemicals, consideration should be given to install the flushing equipment much closer to the hazard. Be cautious of electrical supply panels that may be within "splashing distance" such as charging stations for Forklifts and other battery-operated machinery.

Obstructions

The Safety Showers and/or Eyewash Stations must be located on the same level as the hazard and the path of travel shall be free from obstructions. If your facility contains a hazardous area that is located on a different level, floor, or platform than your current flushing stations, you must install equipment on every level that contains a hazard. Items such as trash cans, pallet jacks, boxes, raw materials, or any other stored items must not block access to the flushing stations. Also, a door is also considered an obstruction. If the hazard is non-corrosive, 1 door can be present as long as it opens in the same direction of travel as the person requiring the use of the flushing station.

Identification

Eyewash and Drench Shower Stations must be installed in a well-lit area and identified with a highly visible safety sign.



Supply Lines

All water supply lines must be provided to meet the ANSI minimum flow requirements at 30-90 PSI. The recommended incoming pipe sizes are as follows:

- 1/2" (1.27 cm) IPS for Eyewash Stations and Eye/Face Wash Stations
- 1" (2.54 cm) IPS for Drench Showers
- 1-1/4" (3.175 cm) IPS for Combination Eyewash Drench Showers

Shut-Off Valves

If shut-off valves are installed on the supply line for maintenance purposes, provisions must be in place to prevent unauthorized shut-off. Lock-out Tag-out devices are the most common method to secure shut-off valves.

Waste Disposal

Proper disposal of contaminated flushing fluid must be considered when installing new equipment. Drainage, freezing temperatures, pollutants, and elevated showers are some factors to consider. Consult with your local, state, and federal authorities for additional guidance on the proper wastewater disposal.

Water Temperature & Tepid Water

Delivering tepid water is a crucial but often overlooked component of providing compliant Eyewash and Drench Shower flushing stations. ANSI defines "tepid water" as "*A flushing fluid temperature conducive to promoting a minimum 15-minute irrigation period. A suitable range is 60-100°F (16- 38°C)*". Recent data compiled from end user customers and regulatory authorities has indicated that tepid water is becoming an increased focus during Eyewash/Shower facility inspections, especially at healthcare facilities.

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Medical professionals recommend that tepid flushing fluids be used to treat chemically injured eyes and body tissue. Temperatures that exceed 100°F can enhance chemical interaction with the eyes and skin. Additionally, flushing fluid temperatures below 60°F can cause hypothermic shock. While cooler flushing fluids may provide immediate relief after chemical contact, *“prolonged exposure to cold fluids affect the ability to maintain adequate body temperature and can result in the premature cessation of first aid treatment”*.

Tepid water can be delivered to Eyewash and Shower flushing stations by many different means. The most common method is by installing Thermostatic Mixing Valves (TMV's) or Water Tempering Valves. These valves blend hot and cold water to provide a comfortable flushing fluid within the temperature range as defined by ANSI. Access to hot water is a necessary component and can be achieved through traditional water heaters, on-demand water heaters (tank-less water heaters), and re-circulating systems. It's important to note that standard water mixing valves should not be used for the purpose of providing tepid water to Emergency Eyewash and Drench Shower Stations. Mixing valves designed specifically for Eyewash related products include a hot water shut-off to prevent accidental scalding, and a cold-water bypass to ensure the delivery of flushing fluids in the event that the hot water supply fails.

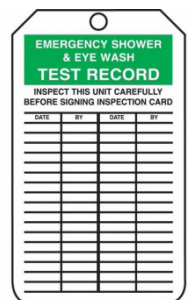
During the winter months, most facilities located in the U.S. have outside temperatures that are below 32°F. Eyewash Stations and Drench Shower units that are exposed to freezing temperatures must be protected. ANSI states that *“Where the possibility of freezing conditions exists, equipment shall be protected from freezing or freeze-protected equipment shall be installed”*. Freeze Protection valves are a cost-effective way to prevent water from freezing in supply pipes and within the flushing stations. Additionally, Heat Trace units, Heater Jackets, and Freeze Protected Eyewash equipment can be used to prevent the freezing of Flushing Stations. For locations where the ambient water temperature may exceed 100°F, anti-scald valves should be used to purge potentially scalding water from the supply lines. This may include outdoor locations that are exposed to direct sunlight, or indoor locations that may be exposed to extreme temperatures from machinery or manufacturing processes.

Training

All employees who may be exposed to hazardous, particulate, or corrosive materials shall be instructed on the proper operation of Eyewash & Drench Shower equipment. In addition, all employees must be made aware of the locations of flushing stations.

Maintenance & Testing

Proper maintenance and weekly testing are necessary to ensure that Emergency Drench Showers and Eyewash Stations are functioning safely and properly. Weekly testing helps clear the supply lines of sediment and bacteria build-up that is caused from stagnant water. The ANSI standard states that plumbed flushing equipment, *“shall be activated weekly for a period long enough to verify operation and ensure that flushing fluid is available”*. Furthermore, the ANSI Z358.1-2014 standard also requires Personal Wash Units and Self-Contained equipment *“be visually checked to determine if flushing fluid needs to be changed or supplemented”*.



Personal Wash Units/Bottled Eyewash

Bottled Eyewash or other Personal Wash Units such as single head Drench Hoses are considered to be supplemental equipment only. These types of flushing units do not meet ANSI's requirements for Eyewash and/or Drench Shower stations and should not be used as an alternative to a 15-minute flushing station. The ANSI Z358.1-2014 standard states, *“A personal wash unit may be kept in the immediate vicinity of employees working in a potentially hazardous area. The main purpose of these units is to supply immediate flushing. With this accomplished, the injured individual should then proceed to a plumbed or self-contained Eyewash and flush the eyes for the required 15-minute period.”*

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Performance & Installation Requirements

Eye Wash Stations

- Minimum flow for plumbed and portable Eyewash units is .4 GPM at 30 PSI
- Units must be capable of delivering a minimum of 15 minutes of flushing fluid
- Eyewash units shall be capable of being activated in 1 second or less
- Stay open ball valves must be used to accommodate for hands-free rinsing
- Flushing fluid must be provided to both eyes simultaneously
- Dust caps or dust covers must be installed to protect the unit from contaminants
- Spray heads must be positioned between 33" and 53" from the floor
- Spray heads must be positioned at least 6" from the wall or nearest obstruction

Eye/Face Wash Stations

- Minimum flow for plumbed and portable Eyewash units is 3 GPM at 30 PSI
- Units must be capable of delivering a minimum of 15 minutes of flushing fluid
- Eyewash units shall be capable of being activated in 1 second or less
- Stay open ball valves must be used to accommodate for hands-free rinsing
- Flushing fluid must be provided to both eyes simultaneously
- Dust caps or dust covers must be installed to protect the unit from contaminants
- Spray heads must be positioned between 33" and 53" from the floor
- Spray heads must be positioned at least 6" from the wall or nearest obstruction

Drench Showers

- Minimum flow for Drench Showers is 20 GPM at 30 PSI
- Units must be capable of delivering a minimum of 15 minutes of flushing fluid
- Drench Showers shall be capable of being activated in 1 second or less
- Stay open ball valves must be used to accommodate for hands-free rinsing
- Drench Shower pull-rod must be installed no more than 69" from the floor
- Drench Shower spray head must be positioned between 82"-96" from the floor
- Spray-pattern must be 20" in diameter at 60" above the floor.
- Center of spray pattern must be at least 16" away from any obstruction
- Combination Units must meet both criteria for Drench Showers & Eyewash

This Tribal First Risk Control Consulting fact sheet is not intended to be exhaustive. The discussion and best practices suggested herein should not be regarded as legal advice. Readers should pursue legal counsel or contact their insurance providers to gain more exhaustive advice. For more information on this topic, please contact Tribal First Risk Control Consulting at (888) 737-4752 or riskcontrol@tribalfirst.com.