

Emergency Shower and Eyewash Station Equipment

Introduction

In the perfect working environment, employers would always be aware of possible hazards to employees and would require that they always wear Personal Protective Equipment (PPE). In workplaces where corrosive chemicals are handled, the Occupational Safety and Health Administration (OSHA) require that facilities for drenching or flushing the eyes be provided in the work area for immediate emergency use.

Brief History and Facts

A 1920 Clear-Glass-8- Panel-Eye –Wash-Cup glass appears to be the oldest form of eyewash. The eyewash equipment has changed over time, but it was not until 1970, when OSHA was created and authorized to adopt safety standards and regulations to fulfill the mandate of improving worker safety. OSHA has adopted several regulations that refer to the use of emergency eyewash and shower equipment. The primary regulation contained in the 29 CFR 1910.151. (c) states that “Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use.”^{1,2} In addition, adopted in 1981 with additional versions produced in 1990, 1998 and 2004, it is essential to reference the American National Standard Institute (ANSI) Z358.1-2009 for “Emergency Eyewash and Shower Equipment” which outlines the specific requirements for emergency eyewash and shower equipment, installation, testing, performance, maintenance, training and use. This standard is referenced in the International Plumbing Code (IPC) for conformance with this code.

Equipment Compliance

Emergency equipment should be carefully selected to address the level of hazard exposure to workers and how many individuals will be affected while being cognizant of the regulatory requirements and standards for compliance.

- Emergency eyewash (and face wash) stations
- Emergency showers
- Self-contained eyewash equipment (not addressed in this bulletin)

Emergency shower and eyewash fixtures shall be of the on-off type valves designed to remain open upon initial single-step operation until manually turned off and operable with a single hand under partially distorted vision.

Emergency Eyewash Stations

- Effective for spills, splashes, dust, or debris likely to affect only the eyes
- Provides a controlled flow of water to both eyes simultaneously
- Delivers an uninterrupted, 15-minute supply; plumbed units can supply a greater volume of water available to the user, between 2.0 and 5.0 gpm (7.5 and 19.0 lpm), including emergency eye/face wash stations

Emergency Showers

- Flushes a larger portion of the body (minimum 20 gpm (76 lpm)) for conventional applications, but is not appropriate for the eyes

Equipment Location and Installation Requirements

Where chemical and biological materials are handled emergency fixture shall be located so as not to exceed 55 ft. (17m) from any point in a laboratory, with consideration to provide an eyewash fixture at each lab sink. ANSI 358.1-2009 requires the installation of emergency fixtures within 10 seconds of the hazard with unobstructed path. Emergency eyewash and

shower fixtures shall be provided in areas where cleaning chemicals are handled and dispensed, medical/pathological waste areas, pH treatment rooms, hazardous material, chemical storage areas, and other areas where hazardous chemicals are utilized or otherwise deemed necessary through consultation with the authority having jurisdiction.³ Having at least one emergency shower and eyewash available for each laboratory space/area where hazardous materials are handled (such as a chemical fume hood, chemical storage, and other similar activities) is required. Where laboratories require MEP validation, emergency showers should be included in the process.⁵

Other Considerations

Water Supply - The ANSI Z358.1 states that the water temperature should be “tepid.” Appendix B of this standard (provided for information only) suggest a safe temperature range of 60-100°F (16-38°C). Studies show that the water temperature range changed of 70-95°F (21-35°C) will reduce cold shock and legionellae bacteria hazard.⁴ The delivery of tepid water can create some challenges. The water source shall be from a potable source, protected with an approved backflow preventer to protect the water source from potential contamination from stagnant water. Other challenges such as adding hot water circulating pump(s), mixing valve(s) and avoiding piping dead ends, to bring the appropriate plumbing system while maintaining the water temperature range at all times need to be considered.

Microbial Growth - Dead legs pipes near the eyewash or emergency showers and lack of use of the equipment stagnant water inside the pipes increasing the potential for microbial growth. As a consequence, piping with dead legs needs to be avoided. On plumbed equipment, ANSI requires weekly activation of emergency fixtures to verify operation and fluid availability. Weekly 3-minutes flushes may temporarily decrease the amoebic and bacterial concentration due to water stagnation.⁶

High Hazard - Where large volumes of chemicals and concentrated corrosives are utilized, emergency showers serving chemical storage rooms, pH effluent treatment areas, and other areas deemed of high hazard, high-flushing (30 gpm (114 lpm) emergency showers should be considered.

Doors - The path of travel to the emergency station should be clear of obstructions and straight as possible. Locating an emergency fixture outside the area of the hazard shall consider doors, swing and hardware as they can be considered obstruction.

Alarm - In spaces of significant hazard and where likelihood exists that a user may be present without supervision, an activation flow alarm with remote notification should be considered to indicate emergency shower operation.

NIH Requirements - Both the NIH DOHS and the NIH DRM need to be consulted and referred to for additional requirements, specific applications and approvals of emergency fixtures, type and location.

Reference:

1. <https://www.wbdg.org/ccb/OSHA/29cfr1910.pdf>
2. <http://www.gesafety.com/downloads/ANSIGuide.pdf>
3. <http://www.orf.od.nih.gov/PoliciesAndGuidelines/BiomedicalandAnimalResearchFacilitiesDesignPoliciesandGuidelines/Pages/DesignRequirementsManualPDF.aspx>
4. http://www.unm.fr/upload/easyadmin/mediatheques/000181/CENTC332WG06N076_University_of_Wisconsin_ASPE_Research_Paper_EEW-ES_5-08_47501.PDF
5. http://orf.od.nih.gov/PoliciesAndGuidelines/ORFPolicies/Documents/bsi3_certguide_508.pdf
6. <http://www.ncbi.nlm.nih.gov/pubmed?term=8686659>

