



MNOSHA Instruction **STD 1-8.2G**

June 9, 2020

SUBJECT: Emergency Eyewash and Showers -- Inspection Procedures and Interpretive Guidelines

Purpose:

To provide guidelines and clarification of standards pertaining to emergency eyewashes and showers to ensure uniform enforcement.

Scope:

This instruction applies MNOSHA-wide.

References:

1. 1910.124(g)(2); Dipping and Coating Operations (hygiene facilities)
2. 1910.111(b)(10)(iii); Anhydrous Ammonia
3. 1910.151(c); Medical Services and First Aid
4. 1910.261(g)(5) and (g)(18)(i); Pulp, Paper and Paperboard Mills
5. 1910.262(pp); Textiles
6. 1910.1003(d)(2)(v); 13 Carcinogens
7. 1910.1048(i)(2) and (i)(3); Formaldehyde
8. 1910.1052(i)(1) and (2); Methylene Chloride
9. 1926.50(g); Medical Services and First Aid

10. 1926.441(a)(6); Batteries and Battery Charging
11. Federal STD 01-08-002 (03/08/82) - 29 CFR 1910.151(c) Medical Services and First Aid; 29 CFR 1926.50 and .51, Medical Services and First Aid, and ...
12. ANSI/ISEA Z358.1-2014 American National Standard for Emergency Eyewash and Shower Equipment

Cancellation:

This directive supersedes STD 1-8.2, dated April 16, 2015.

Background:

General industry standard 1910.151(c) applies to all general industry situations, unless a vertical standard applies to the specific hazard being addressed. 1926.50(g) applies in the construction industry, other than for battery handling areas and substances with specific standards. Neither the OSHA general industry nor construction standards contain specifications for design, construction, water temperature and travel distance for eyewash and shower units, so ANSI Z358.1-2014, "American National Standard for Emergency Eyewash and Shower Equipment," is used by MNOSHA as a guide for construction, installation, and use of this type of equipment.

Action:

A. Determining Whether an Eyewash or Shower is Needed.

Emergency eyewashes and showers are necessary when it is determined that the material is hazardous to the eyes and/or skin, and there is employee exposure, either actual or potential.

1. Determining the hazard.

The majority of the commonly encountered substances with eye/skin hazards are acids or bases. However, a non-acid/base material may also be considered hazardous because it is corrosive to the skin or because it is readily absorbed through the skin. Usually the material is a liquid or is in solution, but solids, gases, vapors and mists also may present hazards.

Refer to Appendix A of this directive for a list of commonly encountered materials that are eye and/or skin hazards. Remember that the strength or concentration of a solution may be a significant factor when determining if there is a hazard.

- a. For all hazardous substances:

- I. Consult the MSDS/SDS and/or label for pH and health effects. If the MSDS/SDS indicates irritation only, the MSDS/SDS does not support an eyewash/shower citation. If the MSDS/SDS states that burns, corneal damage, blindness, or eye damage may occur, it provides good support that the material is hazardous. The name of a specific chemical and the percentage in the product, may provide sufficient information to identify a hazard and support a citation. Additional hazard information may be obtained from Internet MSDS/SDS websites.
 - II. Check the "NIOSH Pocket Guide to Chemical Hazards," under the column labeled "Personal Protection and Sanitation." If the entry states "provide: eyewash and/or quick drench," additional information that eye/skin damage can occur or knowledge of a high or low pH is necessary to support a citation.
- b. For acids and bases:
- I. The strength of an acidic or basic solution is reported as pH, with very low and very high pH values posing a greater hazard.
 - II. The pH of a material in liquid form can be measured with a pH test strip. The OSHI should take adequate precautions to avoid personal exposure while taking a sample for pH measurement and while doing the measurement, such as wearing appropriate gloves and other necessary personal protective equipment.
 - III. iii. A pH reading can range from 0 (very acidic) to 14 (very basic or alkaline). A material with a pH of 0 to < 2, or > 11 to 14 will at the very least cause major eye irritation and may cause permanent damage or blindness. For skin, pH < 1 or > 12 is considered hazardous. However, a pH between 2 and 11 (for eyes), or between 1 and 12 (for skin) does not necessarily mean that a material will not cause injury (certain materials with pH between 2 and 11 may be extremely damaging to the eyes and skin.) Alkaline solutions tend to be more damaging to the eyes and skin than acidic solutions.

2. Determining employee exposure to the hazardous material.

To determine exposure, the OSHI must look at the potential for the hazardous material to splash or get in eyes or on skin. If there is skin exposure, the investigator must determine how much could splash on the skin. If the material is capable of contacting the eyes, quantity is not a consideration.

All determinations of employee exposure are made without regard to the use of personal protective equipment and clothing, such as goggles, face shields, gloves, boots and aprons.

B. Requirements for Eyewashes and Showers.

Eyewashes and showers should be in compliance with ANSI Z358.1-2014. Where an eyewash or eyewash and shower is required and is provided by the employer, the investigator shall determine if construction, installation and location meet the ANSI requirements.

1. Refer to Appendix B of this directive for a checklist of ANSI and MNOSHA requirements. Refer to the complete text of ANSI Z358.1-2014 if Appendix B does not contain sufficient detail needed for a particular situation.
2. Most faucet mounted (gooseneck) "eyewashes" do not meet the requirements, principally because of the lack of quick opening valves and potential for high water temperatures. Faucet mounted eyewashes are not addressed specifically by ANSI.
3. Eyewashes and showers should be located within 10 seconds of the hazard and on the same level. The more hazardous the material, the closer in time and distance the unit should be. For strong acids (pH < 1) or bases (pH > 12), eyewash units should be immediately adjacent to the hazard. Appendix B of ANSI Z358.1-2014 states that an average person covers a distance of approximately 55 feet in 10 seconds when walking at a normal pace.
4. Flushing fluid temperature for eyewashes and showers shall be tepid or lukewarm (should be between 60° and 100° Fahrenheit). Temperatures outside this range are likely to discourage use of the equipment. For showers, there is the additional concern that shock or hypothermia may occur if the water is too cold. Temperatures > 100° F have been shown to be harmful to the eyes and can enhance chemical interaction. Where chemical reactions present special hazards (material reacts with water, or water temperature accelerates reaction), a medical advisor should be consulted.
5. Plumbed eyewashes/showers should be flushed weekly to ensure proper operation. Eyewash flushing for at least three minutes has been suggested to reduce contamination by Acanthamoebae. Acanthamoebae can cause severe eye infections when introduced into traumatized eyes.
6. Self-contained eyewash units must have regular maintenance to ensure that the units are full and operational, and that the flushing solution is changed according to manufacturer's instructions. Only commercially available solutions intended for eye flushing should be used.

C. Citations for Eyewashes and Showers.

1. General

If it has been determined that an eye or skin hazard exists and is capable of causing injury, and an eyewash and/or shower was not provided, cite either 1910.151(c) (1926.50(g) in construction), or the applicable vertical standard (specific requirements vary).

If an eyewash (or shower) was provided but does not meet ANSI Z358.1-2014 requirements, determine if the deficiencies are such that the eyewash or shower is unsuitable, and the deficiencies are sufficient to create a hazard. For example, deficiencies such as travel time much greater than ten seconds, traveling through multiple doors, or minimal flow generally would render an eyewash/shower unsuitable, and a citation should be proposed.

Eyewash and shower violations are generally cited as serious violations; consult the Citation Rating Guide (CRG) and Field Compliance Manual (FCM) Appendix M for guidance on severity ratings.

Note: in some facilities more than one standard may apply. For example, in a plating shop, 1910.124(g)(2) may apply at open surface tanks, and 1910.151(c) may apply in waste treatment areas.

2. **Battery charging.** In general industry, where batteries are charged for powered industrial trucks, automobiles, etc., an eyewash is required if electrolyte or water is added to cells and there is a potential splash hazard. Cite 1910.151(c). If there is no maintenance of batteries, only charging, then an eyewash is not required. The construction standard, 1926.441(a)(6), specifies a maximum 25 ft. travel distance to an eyewash in battery charging areas. Refer to Federal STD 01-08-002 for additional guidance related to battery charging (drench hose or 1-gallon eyewash may be acceptable in some circumstances.)
3. **Open surface tanks.** 1910.124(g)(2) allows the use of hoses at tanks in lieu of an eyewash and shower. Near each tank containing harmful liquids, there shall be a supply of clean, cold water provided by a 3/4" diameter, 48" or longer hose, with a quick-opening valve. Pressure shall not exceed 25 psi. Note that static rinse tanks may have very low or high pH.
4. **Formaldehyde.** Where there is exposure to formaldehyde solutions with concentration > 0.1%, an eyewash is required. Concentration >1% also requires a shower.
5. **Methylene chloride.** If it is reasonably foreseeable that an employee's eyes may contact > 0.1% methylene chloride, an eyewash is required. Note that for skin contact, washing facilities are required, but an emergency shower is not stated specifically.
6. **Use of PPE.** In general, if an eyewash and/or shower are required, adequate eye and face protection and protective clothing are also required and should be cited independently. Note that if splash protection is needed for the eyes, goggles are required (safety glasses and a face shield are not sufficient unless the face shield is compliant with ANSI Z87.1-2010 and is marked D3.)

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Attachments: Appendix A – COMMON EYE/SKIN HAZARDOUS CHEMICALS
Appendix B – EYEWASH/SHOWER CHECKLIST

NOTICE: Minnesota OSHA Directives are used exclusively by MNOSHA personnel to assist in the administration of the OSHA program and in the proper interpretation and application of occupational safety and health statutes, regulations, and standards. They are not legally binding declarations and they are subject to revision or deletion at any time without notice.

APPENDIX A: COMMON EYE/SKIN HAZARDOUS CHEMICALS

Some commonly encountered chemicals that present eye and/or skin hazards are listed below. Be aware that dilute solutions may not be hazardous. This list does not include all hazardous chemicals that may be encountered. The hazardous materials may be liquids, gases or solids.

VERY ACIDIC (Low pH)

acetic acid
chromic acid (crystals or solution)
hydrochloric acid (muriatic acid)
hydrofluoric acid (glass etching, drycleaners/laundry)
nitric acid (aqua fortis)
phosphoric acid (solid or liquid)
sulfuric acid (battery acid)

HIGHLY ALKALINE (High pH)

ammonia
ammonium hydroxide (aqueous ammonia)
boiler additives
calcium hydroxide (hydrated lime, slaked lime)
calcium oxide (lime, quick lime, unslaked lime)
diethylaminoethanol (boiler treatment)
ethanolamine (corrosion inhibitor, detergents)
ethylenediamine (solvent, photoresist stripper, corrosion inhibitor in antifreeze)
hypochlorites (disinfectants, household bleach)
potassium hydroxide (lye, caustic potash)
sodium hydroxide (lye, caustic soda)
sodium metasilicate (water glass, detergents)
trisodium phosphate (TSP, detergents)

OTHER

chlorine
chlorine dioxide
cyanoacrylate adhesives (Super glue)
diethylene dioxide (boiler treatment, toxic through skin absorption)
epoxy resins (epichlorohydrin/bisphenol A)
ethylene oxide (gas sterilant)
formaldehyde (gas, or up to 50% solution, Formalin)
glutaraldehyde (cold sterilant)

hydrogen peroxide (> 5%, a bleach)

isocyanates (MDI, TDI)

methyl ethyl ketone peroxide (MEKP, catalyst for styrene resins)

any chemical labeled oxidizer, corrosive, or caustic

APPENDIX B: EYEWASH/SHOWER CHECKLIST

Eyewash units and shower units

- Sole purpose must be as an eyewash or emergency shower unit.
- If shower is needed, separate eyewash required (combination unit is acceptable).
- Quick opening valve which remains open (simple to operate in < 1 second).
- Operational with both hands free.
- Water temperature must be tepid or lukewarm (between 60° and 100° Fahrenheit).
- Travel time < 10 seconds. Eyewashes should be located immediately adjacent to the hazard for highly corrosive materials. (Average person covers about 55 feet in 10 seconds at normal walking pace.)
- Unit should be on the same level as the hazard.
- Location well lit, highly visible, marked with highly visible sign.
- Unobstructed passages and access to units.
- Operable at all times with provisions to prevent unauthorized shutoff.
- Sewer connection or drain not required unless special hazards noted.
- Plumbed units activated weekly for a period long enough to verify operation and ensure that fluid is available.
- Units shall be installed in accordance with manufacturer's instructions.

Shower units only

- Top of water column 82" - 96" from floor or platform.
- Minimum of 20 GPM flow of flushing fluid dispersed throughout pattern.
- Valve actuator location < or equal to 69" above standing level.

Eyewash units only

- ___ Installed so that fluid flow pattern is 33-53" above standing level.
- ___ Controlled flow of flushing fluid to both eyes simultaneously.
- ___ Minimum of 0.4 GPM flushing fluid for 15 minutes.
- ___ Where contamination can occur, nozzles protected from contaminants by covers. Removal of covers should not require extra step beyond activation of unit.
- ___ Squeeze bottles (personal eyewash) used only in conjunction with eyewashes.
- ___ Drench hoses used only in conjunction with eyewashes unless at open surface tanks.
- ___ Faucet mounted eyewashes not acceptable unless all requirements for plumbed units are met.

Training

- ___ Employees are to be trained on the location and proper use of eyewashes and emergency showers.
- ___ If squeeze bottles are also provided, training must address proper use in conjunction with eyewashes.
- ___ Training must address holding eyelids open and rolling eyeballs to flush the entire eye.