Health Effects from Contaminated Water in Eyewash Stations

Eyewash stations used in workplaces must be maintained to prevent injury and illness to workers. Eyewash stations are critical emergency safety equipment intended to mitigate eye injuries when control methods do not prevent exposure to a physical or chemical irritant or a biological agent.

Where are eyewash stations used?
Eyewash facilities are required in workplaces where corrosive chemicals are used (29 CFR 1910.151(c)), as well as in HIV and HBV research laboratories and production facilities (1910.1030(e) (3)(i)), and where there is any possibility that an employee's eyes may be splashed with solutions containing 0.1 percent or greater formaldehyde (1910.1048(i) (3)). They may also be found in research and production laboratories, in medical facilities and other workplaces with materials that may cause injury to or infection of the eyes.

How can improperly maintained eyewash stations cause infections?
Water found in improperly maintained eyewash stations is more likely to contain organisms (e.g., Acanthamoeba, Pseudomonas, Legionella) that thrive in stagnant or untreated water and are known to cause infections. When a worker uses an eyewash station that is not maintained, organisms in the water may come into contact with the eye, skin, or may be inhaled. Workers using eyewash stations after exposure to a hazardous chemical or material may have eye injuries that make the eye more susceptible to infection. Also, workers with skin damage or compromised immune systems (e.g., transplant recovery, cancer, lupus) are at increased risk for developing illnesses from contaminated water. Early diagnosis is important to prevent infections from causing serious health effects, including permanent vision loss and severe lung diseases (e.g., pneumonia).

The following are a few organisms that thrive in eyewash stations when not maintained properly and the health hazards they present. This list is not all inclusive. There are many other micro-organisms that live in stagnant water that are not listed below.

**Acanthamoeba** is a microscopic single cell organism (amoeba) that may cause eye infections. This organism can live in treated water and is commonly found in mucous membranes (e.g., nose, throat, eyes) and in neurological tissues (e.g., brain) without causing harm to the person. On rare occasions, exposure to Acanthamoeba results in harmful eye infections known as Acanthamoeba keratitis. Along with keratitis, workers with compromised immune systems face a significantly higher risk for developing neurological infections (Granulomatous Amoebic Encephalitis) or whole body infections. Workers may also experience eye redness, pain, tearing, blurred vision, light sensitivity, and eye inflammation several days after the use of a contaminated eyewash station. Diagnosing Acanthamoeba keratitis is difficult because more common eye infections have similar symptoms.

**Pseudomonas** infections are typically caused by a common bacteria species. Pseudomonas aeruginosa may cause infections to eyes, skin, muscle, lung, and other tissues. One symptom specific to Pseudomonas aeruginosa infection is green-blue pus in or around the infected area. If a pseudomonas infection spreads through the bloodstream (i.e., septicemia), workers may become very sick with fevers, chills, confusion, shock, and even death. This bacterium has developed resistance to many antibiotics, which may make it harder to treat.
Legionella is a group of bacteria that are found in nature living with amoeba and may cause a serious lung infection. For example, since Acanthamoeba are effective hosts for Legionella, they may both be present in contaminated water. Although Legionella does not cause eye infections, inhaling water droplets containing the bacteria can cause Legionnaires’ disease, a severe and fatal form of pneumonia. Workers with compromised immune systems, workers over the age of 55 or those with pre-existing lung diseases, such as Chronic Obstructive Pulmonary Diseases (COPD) are more at risk for infection. Legionnaires’ disease symptoms occur 2 to 14 days after exposure, including coughing, breathlessness, high fever, muscle aches, and headaches, often requiring hospitalization. For more information on Legionnaires’ disease visit www.osha.gov/SLTC/legionnairesdisease.

How can eyewash stations be maintained to prevent infections?
Eyewash station manufacturer instructions provide direction on how often and how long to activate specific plumbed systems to reduce microbial contamination and generally reference the American National Standards Institute (ANSI) standard Z358.1-2014. Self-contained eyewash units must be maintained and employers should consult the manufacturer’s instructions for maintenance procedures. This includes flushing the system and using only solutions appropriate for flushing eyes.

Workers’ Rights
Workers have the right to:
» Working conditions that do not pose a risk of serious harm.
» Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply to their workplace.

» Review records of work-related injuries and illnesses.
» File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA’s rules. OSHA will keep all identities confidential.
» Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

Contact OSHA
For questions or to get information or advice, to report an emergency, fatality, inpatient hospitalization, amputation, or loss of an eye, or to file a confidential complaint, contact your nearest OSHA office, visit www.osha.gov, or call OSHA at (800) 321-OSHA (6742), TTY (877) 889-5627.

OSHA’s On-site Consultation Program offers free and confidential advice to small and medium-sized businesses in all states across the country, with priority given to high-hazard worksites. On-site consultation services are separate from enforcement and do not result in penalties or citations.

For more information, to find the local On-site Consultation office in your state or to request a brochure on Consultation Services, visit www.osha.gov/consultation, or call (800) 321- OSHA (6742).

Many states operate their own OSHA-approved safety and health program. For further information, please visit www.osha.gov/dcsp/osp.

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