

Water Works

New Generation of Plumbed Emergency Equipment Enhances Safety in Hazardous Work Environments

Hazards are ever-present in the steel plant environment, and a heightened awareness and emphasis on safety is a necessary priority for our industry. This monthly column, coordinated by members of the AIST Safety & Health Technology Committee, focuses on procedures and practices to promote a safe working environment for everyone.

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Comments are welcome. If you have questions about this topic or other safety issues, please contact safetyfirst@aist.org. Please include your full name, company name, mailing address and email in all correspondence.

Work settings such as steel production plants pose the inherent risk of workers coming into contact with hazardous substances — a stark reality that affects lives and businesses. Setting — and maintaining — high standards for providing a safe work environment is an employer’s moral and regulatory obligation. A solid safety program also protects businesses from possible liability and reputation management crises.

Being prepared with emergency eye/face wash and other shower equipment is an integral part of any company’s emergency response system. While many facilities use eye and face wash fixtures that may comply with ANSI requirements, the story shouldn’t end there. Plant managers and safety personnel need to consider a number of factors when choosing and evaluating plumbed safety equipment, including facility design, accessibility, and product requirements, features and cost.

It is imperative to know the basic requirements of eye/face wash systems, and to stay current on the newest and most effective technologies available, as the safety products industry continues to improve the efficacy of emergency products.

This article provides a review of where plumbed safety fixtures should be placed in facilities, as well as water requirements.

ANSI Requirements

During a walk-through or in the facility planning stage, it is essential to reference ANSI Z358.1 emergency equipment standard, which outlines the specific requirements for emergency eye-wash and drench shower equipment installation, testing, performance, maintenance, training and use. ANSI provides the following guidelines for placement of these products:

- A drench shower, eye-wash or combination unit should be located within 10 seconds of any worker at risk for chemical exposure. The distance a worker can travel in this time frame is estimated to be 55 feet.
- The equipment must be on the same level on which the user is working. If there are doors between the hazard and the fixture, they must swing in the direction of travel.
- If the worker’s ability to walk or move might be impacted by the chemical exposure, the fixture should be placed closer to the worker.
- If highly corrosive chemicals are used, the drench shower or eyewash should be placed immediately adjacent to the hazard.
- If a potential chemical spill is likely to affect multiple workers in an area, a sufficient number of fixtures should be in place to prevent one worker from

having to wait 15 minutes while another is drenched.

- Outlets used for eye/face washes should be protected from contaminants, and should be located between 33 and 45 inches from the floor and 6 inches from the wall.

Safety fixtures should also be clearly identifiable and easy to reach:

- The area around the fixture should be well lit.
- Each fixture should be identified with a highly visible sign.
- A drench shower or eyewash in a bright color, such as yellow, is easiest to spot in a busy industrial environment.
- Eyewash spray heads should be a minimum of 6 inches from walls or obstructions to allow the user clear access for eye flushing.
- The area for flushing under the drench shower should be unobstructed. The only exception is the eyewash on a combination drench shower and eyewash fixture. In this case, the eyewash is

placed in line with the drench shower to allow for simultaneous use.

Water Requirements

When choosing locations for the placement of emergency fixtures, note that there must be an adequate water supply at an appropriate pressure and temperature:

- **Water Flowrate and Velocity** — For both drench showers and eyewashes, a minimum water pressure of 30 pounds per square inch (psi) should be supplied to the unit. It must also satisfy the ANSI minimum flowrate, which is at least 20 gallons per minute (gpm) for drench showers, 0.4 gpm for eyewashes and 3.0 gpm for eye and face washes. Actual flowrates vary by product, so consult with the equipment manufacturer to verify flowrates. Water supply to the unit must be sufficient to support a full 15-minute flow of flushing fluid.



Hinged dustcovers used with newer eye/face wash models like Halo shield the entire bowl, providing extra protection from debris and bacteria. The cover is easily opened with a hand-activation paddle — easy to reach from any direction — that starts the flow of water immediately for fast relief.

- **Water Temperature** — ANSI requires that a 15-minute flow of tepid water be supplied to emergency equipment and suggests an incoming water temperature between 60 and 100°F.

Thermostatic mixing valves (TMVs) blend hot and cold water to a specific setpoint and deliver tempered water to emergency fixtures. There are also on-demand water heaters that are specifically designed to provide water to emergency fixtures. If the tempering design involves the selection of an emergency TMV, be sure to select a valve that is an emergency thermostatic mixing valve and not a standard valve. Emergency TMVs are designed to allow for a continuous free flow



Bradley's SpinTec showerhead delivers an even distribution of water. Its unique shower pattern rinses effectively at a high velocity, resulting in fast removal of hazardous contaminants from the affected user.

of cold water if the hot water supply is interrupted or runs out.

When selecting a tankless heating system, it is important to look for a system that has been specifically designed for use in emergency drench shower and eyewash systems, as they contain additional safeguards to prevent scalding of an injured worker. It's advisable to use systems that have a low pressure drop (10–12 psi). Systems with this capacity will curb potential post-installation complications due to a sudden pressure drop, resulting in minimal pressure at the fixture. It is also preferable to look for a tankless water heater that uses incoloy sheathed heating element to protect internal components and provide longer element life, increasing operational reliability.

New Trends and Technologies

In recent years, a number of advancements have been made relative to flow control, coverage, and efficacy of eye/face washes and emergency fixtures, and have set a new market standard for ANSI-compliant safety solutions. Selection considerations about the features of the newest emergency eye/face wash technology include the following:

Washdown Coverage — The newest generation of emergency fixtures is designed to deliver a more uniform and complete spray pattern distribution to reach the entire face and/or body. Older shower designs push the flow of water to the outer rim of the showerhead, creating a hollow space in the center of the pattern that can miss affected areas.

Using fluid dynamics technology, the new shower designs work together with a pressure-regulated flow control and the spinning motion of water, creating an optimal spray pattern to rinse off the injured as quickly and thoroughly as possible. The contoured shape, coupled with the spinning water, funnels the water into a concentrated, yet gentle, deluge to ensure the most effective flush available. The result is a superior, all-inclusive spray pattern that quickly washes contaminants from the user's body.

Due to advances in design, one of the newest eye/face washes available covers 85% of the user's face, which is more than 20% better than other designs. This improvement in coverage ensures water is distributed to the entire face at one time, versus concentrating the water in the eye area.

Cleanliness — Stagnant water left from required weekly testing, tampering and other misuse by workers can contaminate eye/face washes with dirt and bacteria. Newer eyewash designs come equipped with



In addition to being accessible from any direction, eyewash stations should be handicap accessible.

either plastic or stainless steel dust covers that shield the entire bowl.

The new design of a recently introduced eyewash system uses a plastic see-through hinged dustcover, which allows for quick and easy visual inspection. Opening the dustcover cover starts the flow of water immediately, giving the user instant relief.

This newer eye/face wash model comes equipped with a self-draining design that eliminates any standing water in the system. This model also incorporates clearly separated supply and waste pipes with all supply connections above the bowl to prevent cross-contamination from the clean inlet water and wastewater.

Finally, these new eye/face wash models employ antimicrobial protection, guarding spray heads from germs and bacteria.

While the basic requirements for eye/face wash equipment haven't changed, the product choices have multiplied and improved, enhancing the safety of organizations. When formulating a safety plan and researching products, it's always best to work with a knowledgeable manufacturer who can offer expertise and customer and technical service to optimize the facility's safety equipment and overall emergency preparedness. ♦