

ANSI Standard for Emergency Equipment Updated - 10/21/2004

What you need to know about the 2004 revisions to ANSI Z358.1.

by Crystal Elfe

A drench shower hidden behind boxes on a cluttered factory floor or a portable eyewash station without flushing fluid can have devastating consequences. Not only could these types of violations cause permanent injury to someone, but they could negatively impact the company's balance sheet. That's why it is critical to stay up to date with the American National Standard for Emergency Eyewash and Shower Equipment. ANSI periodically updates the Z358.1 safety standard and has recently released its 2004 update, the first revision since 1998.*

In a nutshell, the ANSI Z358.1 standard sets the guidelines for emergency safety equipment fixtures and installation practices. The standard is periodically reviewed to ensure the best safety parameters are in place. A breakout is provided in different sections of the standard for plumbed and self-contained emergency showers, plumbed and self-contained eyewash equipment, eye/face wash equipment, combination units and supplemental equipment. Each section addresses how the equipment should perform, as well as testing procedures to ensure proper operation, installation, maintenance and training. Illustrations and appendices are also provided for more details.

Key Changes to the ANSI Standard

Drench Hoses – Not Just a Supplement. The uses for drench hoses have been expanded in the 2004 standard. In the 1998 standard, drench hoses had a minimum flow requirement of 3.0 gpm and were not to be used as replacements for eyewashes or drench showers. Drench hoses were simply to be used to supplement these devices. The 2004 standard eliminates any flow requirement for drench hoses. Although the 2004 version still does not allow drench hoses to replace a drench shower, it does allow these hoses as a replacement for an eyewash or combination eye/face wash – as long as the drench hose meets the appropriate requirements.

Keep in mind that eyewashes and eye/face washes each have separate guidelines within the ANSI standard. An eyewash only flushes your eyes while an eye/face wash flushes one's eyes and face simultaneously. The most notable distinction between these two categories of fixtures relates to the volume of flushing fluid that must be dispensed. Eyewashes must be able to provide flushing fluid at 0.4 gpm at 30 psi (1.5 liters). Eye/face washes must be able to provide flushing fluid at 3.0 gpm at 30 psi (11.4 liters). These requirements have not changed from the 1998 to 2004 standards.

Simplified Testing. In the past, ANSI mandated specific testing procedures that ANSI-approved testing agencies must follow to certify a self-contained eyewash as ANSI compliant. The 1998 standard required the following steps:

- Fill the eyewash with flushing fluid and then activate. Record the time needed to fill a gallon container.
- Verify that the water gently flows at 0.4 gpm at similar heights.
- After 15 minutes of operation, use the water collected to refill the container.
- Activate the unit again. Beginning 12 minutes after the flow, the time it takes to fill the gallon container must be 2 minutes or less.

While the 1998 standard emphasized specific testing procedures, the 2004 standard does not delve into those details. Rather, the 2004 standard notes the 15-minute test must meet the 0.4 gpm characteristics throughout the testing period. How to best verify that the product meets these requirements is up to the discretion of each ANSI-approved testing agency.

Choosing a reputable emergency equipment manufacturer whose products consistently meet ANSI testing requirements can provide peace-of-mind. Don't settle for products that look like they may comply or claim to be certified. While emergency fixtures may look similar, it does not mean their quality or performance capabilities are equal.

Only an independent, third-party organization can confirm that a manufacturer's product is certified to the ANSI standard. Well-known manufacturers clearly document compliance with ANSI standards because the testing and requirements are so important. If you have any compliance concerns, inquire about them before purchasing a product to ensure your safety needs are met.

Shower Heights and Pressure – Know Your Numbers. Should the drench showerhead be installed at a particular height, or is there a range? It's a good question, and one the 2004 standard clarifies. In both the plumbed and self-contained portions of the ANSI standard, it is indicated that the distance between where the user stands and the showerhead should be between 82 and 96 inches.

The 1998 standard specified the range of 82 to 96 inches, as well. However, the testing procedure in the plumbed portion of the standard also mentioned a set dimension of 84 inches from the surface the user stands on to the showerhead portion. As you can imagine, this had been causing some confusion during installation.

Also worth noting in the 2004 standard is a requirement for plumbed showers to have a flushing fluid flow of 20 gpm at 30 psi. No pressure restriction is designated in the 1998 standard.

More Details. To be sure plumbed units are always in proper operating condition, they should be activated on a weekly basis. ANSI standards from both 1998 and 2004 note this requirement. However, this year's revision offers more specific rationale regarding why it is so critical.

Beyond confirming that units work, ANSI offers a couple of reasons for regular activation:

- Sedimentation is cleared, which can clog the supply line.
- Flushing stagnate water from plumbed fixtures reduces the chance of microbial hazards.

Consistent activation makes the difference between meeting minimum requirements for installed products, and having emergency equipment that is truly functional and provides the best performance in the event of an emergency. An inspection tag noting activation attached to each emergency fixture is a helpful tool to facilitate this process. This log may also serve as important documentation upon a plant inspection.

Another minor area of revision for the 2004 standard falls under personal wash units. Personal wash units are those that do not meet the requirements of plumbed or self-contained emergency equipment. They provide immediate flushing prior to the user accessing an ANSI-approved emergency fixture. The verbiage in this section is similar to the 1998 ANSI standard with a couple modifications. First, the 2004 standard specifies that tepid flushing fluid must be supplied. Second, the scope of emergency fixtures is widened. The 1998 standard only addresses personal eyewash equipment.

One final revision includes the expert who should be responsible for determining the best solution for particular emergency applications. A facility safety/health advisor is now indicated as the key contact for water temperature and related issues. These individuals are deemed to be the best consultants, rather than simply "medical advisors" who were mentioned throughout the 1998 standard.

Amended Appendices

While the appendices that follow the ANSI standard are not considered part of the requirements, they are helpful. There are several points that serve as guidelines for addressing issues that fall into gray areas.

First, the ANSI standard requires that emergency showers or eyewashes be accessible within 10 seconds or less of the hazard. Facility managers and others often ask, "How far of a distance is that?" According to the revised appendix, 10 seconds is approximately 55 feet.

Second, doors are a concern since they may hinder a user accessing emergency equipment. According to the 2004 appendix, it's acceptable for one door to separate potential users from emergency fixtures under certain conditions. However, the door cannot have a lock and it must open in the direction moving towards the shower or eyewash.

Lastly, the temperature range of "tepid" water is mentioned. The ANSI standard states that each application and situation must be evaluated on a case by case basis. However,

as a general rule, 100-degrees Fahrenheit is probably the highest temperature water should be, while the lower end should be 60-degrees Fahrenheit. The appendices indicate that temperatures over 100 degrees may intensify chemical burns to the skin and eyes, and hypothermia becomes a concern on the lower end of the scale.

Implementing a Safety Plan

To ensure you are meeting the necessary requirements, take a few moments to review the entire 2004 ANSI standard in detail. Be sure to resolve any concerns by consulting with a safety/health advisor. Emergency product manufacturers can also be a good resource for emergency planning and can help with job-site evaluations. It's worth the time to plan ahead, because in an emergency every second counts.

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What temperature should the water be?

The 2004 ANSI standard recommends that the water should be "tepid" but does not give a specific temperature. Other sources will use the term "lukewarm water". ANSI does provide a guideline that the water temperature should be under 38°C (100°F) and above 15.5°C (60°F). Temperatures higher than 38°C (100°F) are harmful to the eyes and can enhance chemical interaction with the skin and eyes. Long flushing times with cold water (less than 15.5°C (60°F) can cause hypothermia and may result in not rinsing or showering for the full recommended time (ANSI 2004). With thermal burns (injuries to the skin), the American Heart Association noted that optimal healing and lowest mortality rates are with water temperatures of 20-25°C (68-77°F).

Remember that any chemical splash should be rinsed for a minimum of 15 minutes but rinsing time can be up to 60 minutes. The temperature of the water should be one that can be tolerated for the required length of time. Water that is too cold or too hot will inhibit workers from rinsing or showering as long as they should.

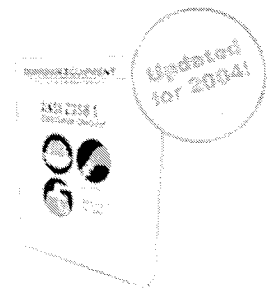
Install anti-scalding devices (temperature control valve or thermostatic tempering valve), constant flow meters, and other devices that will help maintain a constant temperature and flow rate. For cold or outdoor locations, emergency showers with heated plumbing are available. In hot climates, outdoor emergency showers should also have a tempering valve so that workers are not exposed to water that is too hot.

Legal Requirements

The Occupational Safety and Health Act of 1970 was enacted to assure that workers are provided with "safe and healthful working conditions." Under this law, the Occupational Safety and Health Administration (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 eye wash and shower equipment. The primary regulation is contained in 29 CFR 1910.151, which requires 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."



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ANSI Z358.1

The OSHA regulation regarding emergency equipment is quite vague, in that it does not define what constitutes "suitable facilities" for drenching the eyes or body. In order to provide additional guidance to employers, the American National Standards Institute (ANSI) has promulgated a voluntary standard covering emergency eye wash and shower equipment. This standard—ANSI Z358.1—is intended to serve as a guideline for the proper design, performance, installation, use and maintenance of emergency equipment. ANSI Z358.1 was originally adopted in 1981. It was rewritten in 1990, 1998 and again in 2004. This Compliance Checklist summarizes and graphically presents the provisions of the 2004 version of the standard.

General Considerations

ANSI Z358.1-2004 contains provisions regarding the design, performance, installation, use and maintenance of various types of emergency equipment (showers, eye washes, drench hoses, etc.). In addition to these provisions, there are some general considerations that apply to all emergency equipment. These considerations may not necessarily be part of the standard, but we believe that they should be addressed when considering emergency equipment. These include the following:



First Aid Devices

Emergency eye wash and shower units are designed to deliver water to rinse contaminants from a user's eyes, face or body. As such, they are a form of first aid equipment to be used in the event of an accident. However, they are not a substitute for primary protective devices (including eye and face protection and protective clothing) or for safe procedures for handling hazardous materials.

Emergency Response

Simply installing emergency equipment is not a sufficient means of assuring worker safety. Employees must be trained in the location of emergency equipment and in its proper use. Emergency equipment must be regularly maintained (including weekly activation of the equipment) to assure that it is in working order and inspected at least annually for compliance with the standard. Most importantly, employers should develop a response plan to be used in the event that an accident does occur. The focus of the response plan should be to provide assistance to the injured worker as quickly as possible. We offer a variety of alarm systems which may be installed in conjunction with our emergency equipment. They serve to alert personnel and summon assistance if an eye wash or shower is activated. WE RECOMMEND INSTALLING AN ALARM UNIT WITH ANY EMERGENCY EYE WASH OR SHOWER UNIT.

Location of Emergency Equipment

In general, the ANSI standard provides that emergency equipment be installed within 10 seconds walking time from the location of a hazard. The equipment must be installed on the same level as the hazard (i.e. accessing the equipment should not require going up or

down stairs or ramps). The path of travel from the hazard to the equipment should be free of obstructions and as straight as possible.

However, there are certain circumstances where these guidelines may not be adequate. For example, where workers are handling particularly strong acids, caustics or other materials where the consequences of a spill would be very serious, emergency equipment should be installed immediately adjacent to the hazard.



Laboratory environments may also require special consideration. It is common in many laboratory buildings to install emergency equipment in a corridor or hallway outside of the lab room. This may satisfy the provisions of the standard but still not provide workers with immediate access to emergency equipment. In these cases, we recommend installing combination eye wash/drench hose units at lab sinks (see page 7). These units are highly accessible and versatile. They provide immediate protection for the eyes, face or body when a spill involves a relatively small amount of hazardous material.

Water Temperature

The 2004 version of the standard states that the water temperature delivered by emergency equipment should be "tepid" (i.e. moderately warm or lukewarm). However, where it is possible that a chemical reaction might be accelerated by warm water, a medical professional should be consulted to determine what the optimum water temperature would be.

The delivery of tepid water to emergency equipment may raise complicated engineering issues. At a minimum, it generally involves providing both hot and cold water to the unit, and then installing a blending valve to mix the water to the desired temperature. Guardian offers a variety of mixing valves to blend and temper water. Please contact our office for further information.

Disposal of Water

The standard does not include any provisions regarding the disposal of waste water. However, designers must give consideration to where waste water will go. In particular, care must be taken that waste water not create a hazard (i.e. by creating a pool in which someone might slip) or freeze.

Generally, Guardian eye wash, eye/face wash and safety station units are designed with waste connections for connection to drain piping. We recommend that emergency eye wash and shower units be connected to drain piping. For emergency showers AND FOR OTHER UNITS WITHOUT WASTE CONNECTIONS, floor drains should be provided. After an emergency eye wash or shower has been used, the waste water may contain hazardous materials that cannot or should not be introduced into a sanitary sewer. It may be necessary to connect the drain piping from the emergency equipment or floor drain to the building's acid waste disposal system or to a neutralizing tank.