

ANSI Z358.1-2009 Standard

On September 14, 2009, the American National Standards Institute (ANSI) released its 2009 update to the Z358.1 standard, the first revision to the standard since 2004. The ANSI Z358.1 standard sets the guidelines for 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 throughout the standard for further clarification.

OSHA on Compliance

The General Requirements in section 29 CFR (Code of Federal Regulations) 1910.151 states "...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."

Importance of the ANSI Standard

The ANSI Z358.1 standard further clarifies what the minimum requirements for "suitable facilities" are since the Code of Federal Regulations does not offer further documentation. While ANSI Z358.1 is considered a voluntary standard, the Occupational Safety and Health Administration (OSHA) often uses it as a guide when inspecting facilities. As a result, the ANSI Z358.1 standard has gained significant importance within the safety industry. By not complying with the ANSI standard, OSHA may elect to impose penalties from warnings and fines to rare plant shutdowns.

Annual Inspections (4.6.5, 5.5.5, 6.5.5, 7.5.5, 8.1.2.4)

Each year emergency products must be inspected to ensure they comply per the ANSI standard. While a fixture may be certified to meet the ANSI standard, once installed, it's important to make sure it is installed according to the standard's requirements.

Contact Bradley Corporation for your confidential annual site inspection.

Requirements for the ANSI Z358.1-2009

Each of the five sections of the ANSI Z358.1-2009 standard, which include plumbed and self-contained emergency showers, plumbed and self-contained eyewash equipment, eye/face wash equipment, combination units and supplemental equipment, has particular requirements.

This document is meant to summarize the key points within the standard, but not act as a substitute. It is recommended that the ANSI Z358.1 be consulted directly for further detail.

Weekly Activation Checklist

(4.5, 4.6, 5.4 5.5, 6.4, 6.5, 7.4, 7.5, Appendices)

Survey the facility to ensure that the appropriate flushing system is installed within ten seconds or 55 feet from the hazard.

NOTE: Material Safety Data sheets can help determine what flushing system is appropriate for your hazards.

Touring the facility

- Activate all eyewashes, drench showers and drench hose systems to ensure they are compliant and operational in case of an emergency. Activation clears sediment in the supply line.
 - Replace any broken or missing parts immediately.
 - Remove any obstructions or trip hazards.
 - Ensure the system is on the same plane as the hazard.
 - Be aware that a door may be considered an obstruction.
 - Protect equipment against freezing.
 - If a freeze protection valve is attached to bleed off cold water, be sure to funnel this water away from the system as it may be a slip hazard.
 - Evaluate if the user should be protected against scalding water.
 - If a scald protection valve is attached to bleed off hot water, be sure to funnel this water away from the system as it may be a slip hazard.
 - Consider an enclosed system if injured party may be exposed to freezing temperatures.
 - Self-contained eyewashes and drench showers must be visually inspected on a weekly basis to ensure they are ready for use.
 - Personal wash (supplemental) fixtures (ie: bottle eyewash, single-head drench hoses) should be protected from freezing.

NOTE: Personal wash systems are considered supplemental and must be coupled with a system that provides a full 15-minute compliant flush, according to ANSI.

- Measure the water released from the eyewash (min. .4gpm) or eye/face wash (3.0) system to ensure it is compliant. (A flow meter is recommended)
 - Use a Bradley test gauge to determine if the flow pattern is compliant to the ANSI Z358.1-2009 standard.
- Use a Bradley drench shower tester with a bucket to contain the water released from the drench shower.
 - Measure the water released from the shower to ensure it complies with the 20gpm ANSI minimum flow requirement.
 - Consider installing a shower flow control, if not already present, to limit the flow of water through the shower. As a reminder, a compliant showerhead with flow restrictor releases a minimum of 20gpm per minute, which equates to 300 gallons of water over a period of 15 minutes.
- Determine if it is in the organization and employee's best interest to install either flow switch alarms or flow switches alone to alert safety personnel that an emergency occurred.
 - Alarms are frequently requested to discourage false activations and save the facility from water damage. (Compliant systems ship with stay-open ball valves)
- Evaluate if there is a need for Bradley privacy curtains on drench showers, to encourage immediate flushing.
- Test the water temperature using an industrial thermometer to ensure it is tepid (60-100F, 15.5-37.7C), which encourages an injured party to complete the full 15-minute flush during an emergency.
- Document activations on the unit's inspection tag and in any centrally-controlled documentation log.

Requirements by Emergency Equipment Product Category

Plumbed and Self-Contained Emergency Showers (Section 4)

Emergency shower equipment must be constructed of materials resistant to corrosion (Section 4.1.5). The flushing fluid it delivers must be at a flow that is non-injurious to the user (Section 4.1.1) and protected from airborne contaminants (Section 4.1.5).

Critical Dimensions

- 82"–96" from the showerhead to the surface the user stands (Section 4.1.3).
- Sprayhead pattern must have a 20" diameter by the time the flushing fluid is 60" above the surface the user stands (Section 4.1.4).
- Center of the sprayhead pattern should be 16" from obstructions (Section 4.1.4).
- 69" maximum height from where the user stands to the valve (Section 4.2).

Performance and Maintenance Criteria

- Minimum flushing fluid of 20 GPM at 30 PSI for 15 minutes (Section 4.1.2).
- Valve should easily activate in a second or less and remain open on its own until it is intentionally turned off (Section 4.2).
- If the potential for freezing conditions exists, product specifically designed to avoid freezing should be utilized (Section 4.5.5).
- Plumbed units should be activated on a weekly basis long enough to be sure flushing fluid is provided (Section 4.6.2).
- Self-contained units should be visually inspected and necessary cleaning or flushing fluid replacement should be determined (Section 4.6.3).
- Using a temperature gauge or other means, determine that the flushing fluid is tepid (4.5, 5.4.7, 6.4.7, 8.2.3).
- Determine that flushing fluid is substantially dispersed throughout the pattern" (4.4.1.4).

Plumbed and Self-Contained Eyewash Equipment (Section 5)

Emergency eyewash equipment must be constructed of materials resistant to corrosion (Section 5.1.5). The flushing fluid it delivers must be at a flow that is non-injurious to the user (Section 5.1.1) and protected from airborne contaminants (Section 5.1.3).

Critical Dimensions

- 33"–45" from the nozzles to the surface the user stands (Section 5.4.4).
- Nozzles must also be at least 6" away from a wall or any type of obstruction (Section 5.4.4).
- An eyewash gauge should be utilized to assess the flow pattern. See Illustration 7 on page 22 of ANSI Z358.1-2009 for exact dimensions. (Section 5.1.8).
- Using a temperature gauge or other means, determine that the flushing fluid is tepid (4.5, 5.4.7, 6.4.7, 8.2.3).

Performance and Maintenance Criteria

- Minimum flushing fluid of .4 GPM at 30 PSI for 15 minutes (Section 5.1.6).
- Valve should easily activate in a second or less and remain open on its own until it is intentionally turned off (Section 5.2).
- If the potential for freezing conditions exists, product specifically designed to avoid freezing should be utilized (Section 5.4.5).
- Plumbed units should be activated on a weekly basis long enough to be sure flushing fluid is provided (Section 5.5.2).
- Self-contained units do not require activation, but require a visual inspection to verify adequate flushing fluid is available (Section 5.5.3).

Eye/Face Wash Equipment (Section 6)

Emergency eye/ face wash equipment must be constructed of materials resistant to corrosion (Section 6.1.5). The flushing fluid it delivers must be at a flow that is non-injurious to the user (Section 6.1.1) and protected from airborne contaminants (Section 6.1.3).

Critical Dimensions

- 33"–45" from the nozzles to the surface the user stands (Section 6.4.4)
- Nozzles must also be at least 6" away from a wall or any type of obstruction (Section 6.4.4)
- An eyewash gauge should be utilized to assess the flow pattern. See Illustration 7 on page 22 of ANSI Z358.1-2009 for exact dimensions. (Section 6.1.8)

Performance and Maintenance Criteria

- Minimum flushing fluid of 3 GPM at 30 PSI for 15 minutes (Section 6.1.6).
- Valve should easily activate in a second or less and remain open on its own until it is intentionally turned off (Section 6.2).
- If the potential for freezing conditions exists, product specifically designed to avoid freezing should be utilized (Section 6.4.5).
- Plumbed units should be activated long enough on a weekly basis to be sure flushing fluid is provided (Section 6.5.2).
- Self-contained units do not require activation, but require a visual inspection to verify adequate flushing fluid is available (Section 6.5.3).

Combination Units (Section 7)

Showers, eyewashes, eye/face washes, and drench hoses all can be utilized in Combination Units. The requirements of each of these types of product categories must be met when utilized with other categories of emergency equipment (Section 7.1.1, 7.1.2, 7.1.3, 7.1.4).

It must be assumed that all drenching systems may be activated simultaneously. In such an event, the system must be capable of delivering an uninterrupted 15-minute, ANSI-compliant, tepid flush (7.4.4).

Critical Dimensions

Refer to the shower, eyewash, eye/face wash, and drench hose sections of this document or the ANSI standard for applicable dimensions.

Performance and Maintenance Criteria

- Refer to Sections 4, 5, 6, and 8.2.2 for valve information (Section 7.2).
- If the potential for freezing conditions exists, product specifically designed to avoid freezing should be utilized (Section 7.4.4).
- Plumbed units should be activated long enough on a weekly basis to ensure flushing fluid is provided (Section 7.5.2).
- Self-contained units do not require activation, but require a visual inspection to verify the adequate flushing fluid is available (Section 7.5.3).

Supplemental Equipment (Section 8)

Supplemental equipment is intended for immediate use. However, supplemental equipment must be followed up by the usage of emergency product that can provide a minimum of 15 minutes of flushing fluid continuously (Section 8).

Also note personal wash units and drench hoses are considered supplemental equipment. Supplemental equipment is only designed to assist other types of emergency products, but can not be the only product available to address an emergency situation. For example, a personal eyewash could be used in conjunction with an eyewash or eye/face wash. It would be best if the personal eyewash is in close proximity to a worker's area for immediate treatment. However, they would then proceed to the nearest eyewash or eye/face wash fixture for the full 15-minute flush required by the ANSI standard.

Critical Dimensions

- Dual-head drench hoses may be used as eye/face washes if they meet the requirements of those types of products (Section 8.2.1).

Requirements for all Emergency Equipment

Tepid Water (Sections 4.5.6, 5.4.6, 6.4.6, 7.4.5, 8.1.1.2, 8.2.3.4)

Tepid flushing fluid is considered necessary in all types of emergency equipment applications. Tepid is defined in the standard, as "A flushing fluid temperature conducive to promoting a minimum 15-minute irrigation period. A suitable range is 16–38°C (60–100°F)" (Definitions p.8). Generally, temperatures higher than 100 degrees Fahrenheit may cause chemical interactions with the skin and result in further damage. At 60 degrees Fahrenheit and below hypothermia becomes a concern. Consulting a safety/ health advisor will be a helpful aid in the determination of the best temperature parameters. No two hazards are exactly the same and each should be evaluated on a case-by-case basis.

Manufacturer's Instructions (4.5.1, 4.6.1, 5.4.1, 5.5.1, 6.4.1, 6.5.1, 7.4.1, 7.5.1, 8.1.2.1, 8.1.2.2, 8.2.3.1, 8.2.4.1)

Without proper installation as deemed by the manufacturer, a product may not function as needed in an emergency. Therefore, manufacturers must provide clear instructions regarding installation, operation, and any maintenance issues. These instructions should also be readily available for reference by maintenance and training staff.

Emergency Fixture Location (4.5.2, 5.4.2, 6.4.2, 7.4.2)

Emergency fixtures must take no more than 10 seconds to reach and the path to the fixture must not be hindered with obstructions. Therefore, not only is the location of the fixture critical, but also being sure the area nearby is free of debris or other hazards that may impede its use. Appendix B5 notes the suggested distance of 55 feet as a guideline of what type of area may be covered within 10 seconds.

NOTE: Doors are a concern since they may hinder a user accessing emergency equipment. One door may be permitted to separate potential users from emergency fixtures. However, the door cannot have a lock and it must open toward the shower or eyewash (Appendix B5).

Signs and Lighting (4.5.3, 5.4.3, 6.4.3, 7.4.3, 8.2.3.2)

In an emergency situation one's vision may be impaired. Therefore, emergency equipment requires what ANSI describes as a "highly visible sign." This signage must be in close proximity to the emergency equipment for quick identification. Adequate lighting must also be provided in the area surrounding emergency equipment.

Training (4.6.4, 5.5.4, 6.5.4, 7.5.4, 8.1.2.3, 8.2.4.3)

Employees must be made aware of the location and operation of emergency equipment. Even the best emergency products won't be able to serve their purpose if employees are unaware of where they are or how to use them.

Conclusion

When it comes to keeping your workforce safe, ANSI is regarded as a key resource for safety regulations. Of even greater concern is the health and safety of employees that may unnecessarily be in harm's way if proper precautions are not in place. To ensure you are meeting the necessary requirements, review the entire 2009 ANSI standard in detail. Please contact Bradley at 1-800-BRADLEY or visit us at www.bradleycorp.com if you have any questions regarding Bradley's emergency fixtures and how they comply with the ANSI standard.