



10.0 SAFETY SHOWER/EYE-WASH UNITS AND CHEMICAL HAZARDS

10.1 SECTION CONTENTS

This section provides guidance for design requirements of Safety Shower/Eye-Wash Units and chemical goggle areas in accordance with current regulations and Company policy.

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NOTE: An asterisk (*) after a section of text indicates that the information in that section is new or revised as of September 1996.

Fed-OSHA 1910.151(c)**10.2 REQUIREMENTS FOR SAFETY SHOWER/EYE-WASH UNITS****A. GENERAL REQUIREMENTS****Chevron Guidelines**

1. Safety shower/eye-wash units are units for quick drenching and flushing of personnel in an emergency.
2. Safety shower/eye-wash units are required where there exists a potential for exposure of personnel to injurious chemicals that can cause immediate and irreversible damage on contact or that have adverse systemic effects on contact. A 15 minute minimum continuous flush is required when such an exposure occurs.
3. Safety shower/eye-wash units may also be needed for quick drenching where there exists a potential for exposure of personnel to other chemicals and materials. Refer to Material Safety Data Sheets and use specific operating conditions for determining the nature and degree of hazard of chemicals and materials. (Company Industrial Hygiene specialists can also provide assistance and guidance).
4. Change room showers may serve as substitutes for safety showers provided proximity and accessibility are suitable for the particular chemical hazards involved.
5. See *Figure 10.1* for typical safety shower/eye wash unit details.

1. 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.

II OSHA Interpretations

Instruction [Fed-OSHA Instruction Std. 1-8.2, (3-8-82)] provides guidelines regarding eye wash and body flushing facilities required for immediate emergency use in electric storage battery charging and maintenance areas.

- In areas where the extent of possible exposure to electrolyte is small, (i.e., such as auto garages, service stations and in certain industrial and construction situations), a specially designed pressure controlled and identified water hose equipped with a proper face and body wash nozzle which will provide copious amounts of low velocity potable water, or an appropriate portable eye wash device containing not less than one gallon of potable water which is readily available and mounted for use, is considered to provide minimum employee protection when proper personal protective equipment is used.
- In addition to emergency eye and/or face wash procedures, the employer shall ensure that adequate provisions have been established for the emergency care of employees exposed to eye or face contact with electrolytes.
- At construction sites and commercial manufacturing facilities where batteries (such as industrial truck batteries) are serviced or handled, proper plumbed eye-wash and body drenching equipment shall be immediately adjacent to the work station(s) and within the work area regardless of the personal protective equipment required and used.
- Many of the portable or self-contained wall mounted type are limited in the quantity of water available for eye-wash purposes, and usually do not provide for body drenching. This equipment may be used for compliance with 1910.151(c) only when it is not economically feasible to provide plumbed equipment and/or where the potential employee exposure to electrolyte(s) is determined to be slight.
- Eye wash equipment should provide copious low velocity flow of potable water at suitable temperature, generally between 60°F and 105°F.



Cal-OSHA 5162

1. Plumbed or self-contained eye-wash or eye/face-wash equipment which meets the requirements of sections 5, 7, or 9 of ANSI Z358.1-1981, Emergency Eye-wash and Shower Equipment, shall be provided at all work areas where, during routine operations or foreseeable emergencies, the eyes of an employee may come into contact with a substance which can cause corrosion, severe irritation or permanent tissue damage or which is toxic by absorption.
2. Water hoses, sink faucets, or showers are not acceptable eye-wash facilities. Personal eye-wash units or drench hoses which meet the requirements of section 6 or 8 of ANSI Z358.1-1981, may support plumbed or self contained units but shall not be used in lieu of them.
3. An emergency shower which meets the requirements of section 4 or 9 of ANSI Z358.1-1981, incorporated herein by reference, shall be provided at all work areas where, during routine operations or foreseeable emergencies, areas of the body may come into contact with a substance which is corrosive or severely irritating to the skin or which is toxic by skin absorption.

B. WATER SUPPLY

Chevron Guidelines

1. Only potable water shall be provided to safety shower/eye-wash units. Some plants may require filters on the supply line. Piping material shall be suitable for potable water service.
2. The spray pattern for a safety shower shall have a minimum diameter of 20 inches at 5 feet 0 inches above the surface on which the user stands (see *Figure 10.2*).
3. The supply system should be sized to provide 30 gpm to the shower head and 1 gpm to the eye-wash fountain (3 gpm for face wash unit). Supply pressure for eye-wash or face wash unit shall be 30 psig max. A 20 gpm flow to the shower head is acceptable if the shower spray pattern (*Figure 10.2*) is maintained.
4. Water lines above grade in the sun must be insulated and have a reflective weathercoat to mitigate overheating of the water.

Note: [ANSI A14.1-1967 incorporated by reference 1910.31]



5. A tempered water safety shower/eye-wash unit should be provided if:
 - the chemical hazard requires an immediate full 15 minute washdown, and
 - a tempered water shower/eye-wash is not readily available from another source (i.e., nearby change-room), and
 - the winter ambient temperature regularly drops below 40°F, or the water temperature drops below 60°F.
6. The optimum temperature for tempered water is 75°F, but can vary $\pm 10^\circ\text{F}$. The water temperature should not exceed 95°F under any circumstances.

C. LOCATION OF SAFETY SHOWER/EYE-WASH UNITS

Chevron Guidelines

1. Safety shower/eye-wash units should be located:
 - normally no closer than 10 feet nor further than 50 feet from a hazard. (Use the nature, severity, and environment of the chemical hazard as a guide for determining the maximum allowable unobstructed distance.)
 - out of the most likely spray path of potential leaks such as pump seals, etc.
 - on the same level as the potential hazard. Stairs and ladders should not have to be negotiated.
 - along or adjacent to the normal path of access or egress
 - in a standardized location throughout the plant wherever possible
 - outside the chemical hazard area (yellow lined area) whenever possible
 - upwind of potential leak sources when toxic gases may be released if there is a prevailing wind
 - where a level unobstructed area of at least 3 feet 0 inches square, centered under the shower head is available
 - at a safe distance from electrical equipment and power outlets
 - in a well lighted area
 - in more than one place in the vicinity of a single hazard if more than one person is likely to be splashed at the same time

Cal-OSHA 5162

1. Emergency eye-wash facilities and deluge showers shall be in accessible locations that require no more than 10 seconds for the injured person to reach. If both an eye-wash and shower are needed, they shall be located so that both can be used at the same time by one person. The area of the eye-wash and shower equipment shall be maintained free of items which obstruct their use.

Chevron Interpretation

"No more than 10 seconds" means not more than 50 feet.

Cal-OSHA 6822

1. Safety shower and eye-wash fountain locations shall be made conspicuous by special marking, signs, or other identification.

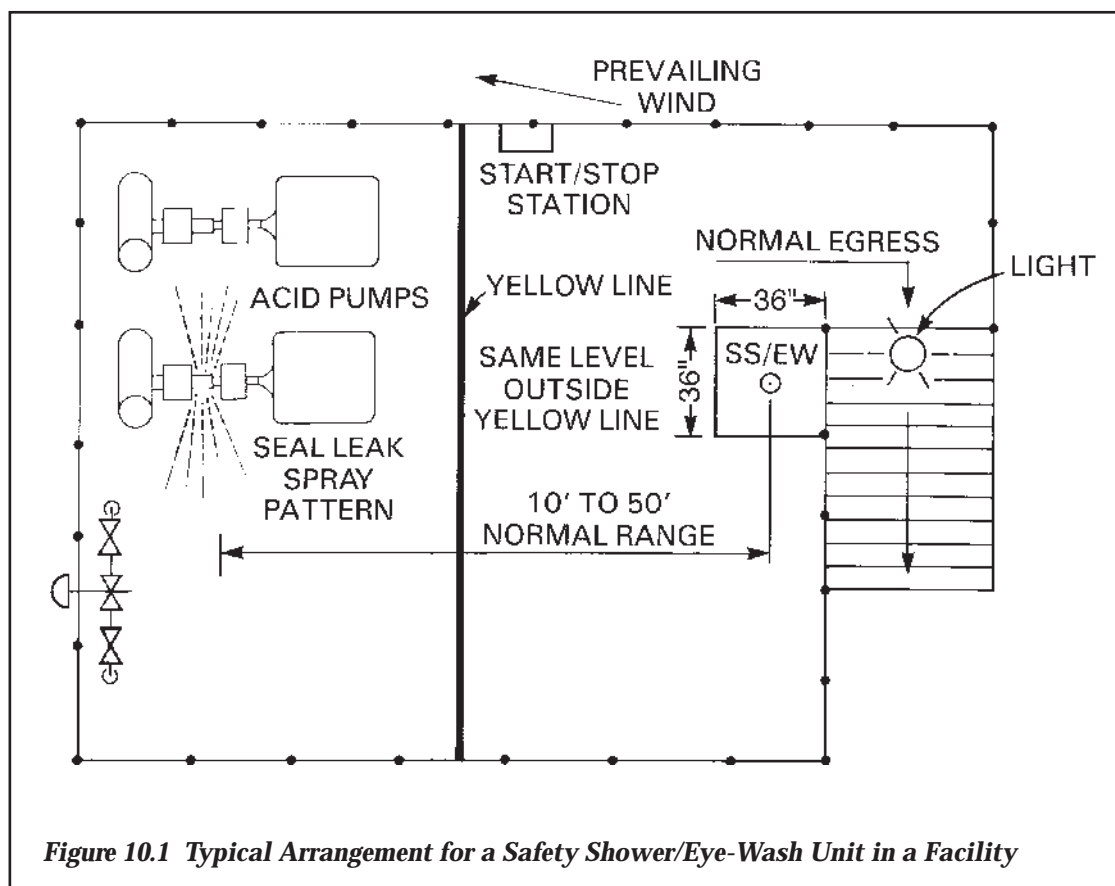


Figure 10.1 Typical Arrangement for a Safety Shower/Eye-Wash Unit in a Facility

D. DESIGN OF SAFETY SHOWERS/EYE-WASH UNITS

Cal-OSHA 5162

1. Plumbed and self-contained eye-wash and shower equipment shall supply potable water at the flow rates and time duration specified in ANSI Z358.1-198 1. The control valve shall be designed so that the water flow remains on without requiring the use of the operator's hands, and so that the valve remains activated until intentionally shut off for all but hand-held drench hoses. Personal eye-wash units shall deliver potable water or other eye-flushing solution approved by the consulting physician.
2. Plumbed eye-wash and shower equipment shall be activated at least monthly to flush the line and to verify proper operation. Other units shall be maintained in accordance with the manufacturer's instructions.

Chevron Guidelines

1. Normally a combination safety shower/eye-wash unit is required. If the potential exposure presents only a hazard to the eyes, an eye-wash unit may suffice. Never install a safety shower without an eye-wash unit. See *Figure 10.3*.
2. Controls should be uniform throughout a facility. Spring loaded control valves requiring one hand to hold valves in the open position are not acceptable.
3. Preferred shower head height - 7 feet 0 inches (6 feet 10 inches to 8 feet 0 inches acceptable).

STANDARD SS/EW UNIT

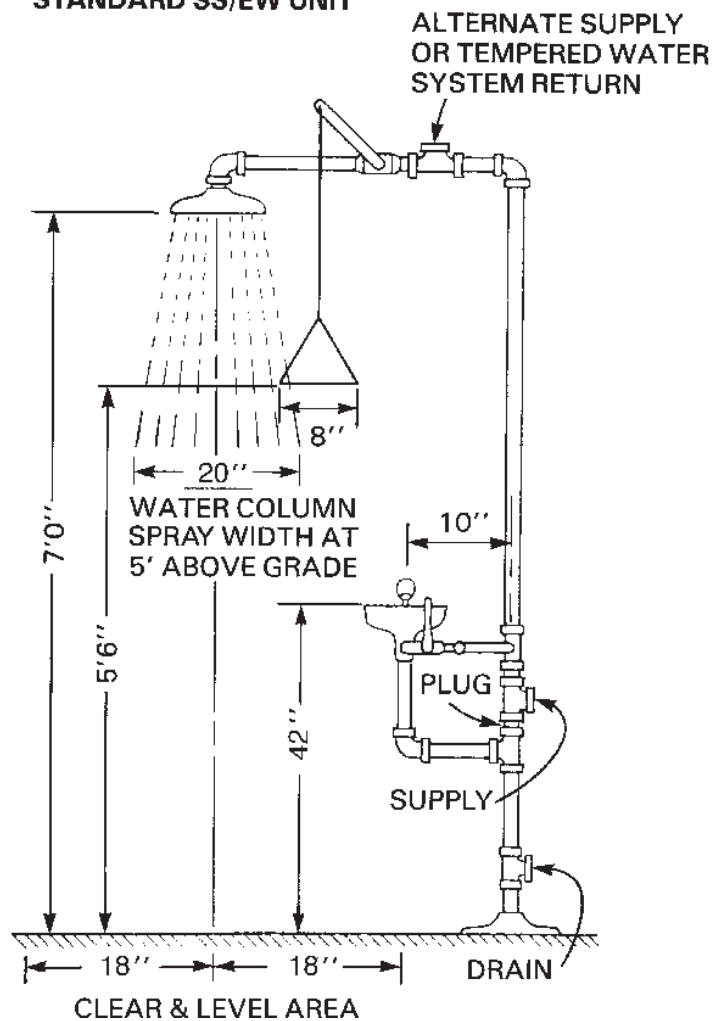


Figure 10.2 Typical Combination Safety Shower/Eye-Wash Unit

Shower head over eye-wash fountain is preferred configuration.



4. Preferred eye-wash fountain height - 42 inches (33 to 45 inches acceptable).
5. Water supply connections are shown (in *Figure 10.2*) to accommodate a circulating tempered water system, other configurations are acceptable.
6. The units shall be constructed of a material that will not corrode in the atmosphere to which they will be exposed.
7. Experience has proven freeze-proof units with valves below the frost line to be more reliable than electric heat traced units. However, because of the remote location of the valve, there is a time delay between activating the valve and the start of the water flow from eye-wash fountain or safety shower head. This design also may not be appropriate where tempered water is required.
8. Examples of acceptable safety shower/eye-wash units are:
 - ENCON Model #50-0055-52 (ABS/SS eye-wash bowl also available)
 - HAWS Model #84 46 CHV (Haws Drawing A-09102-5)

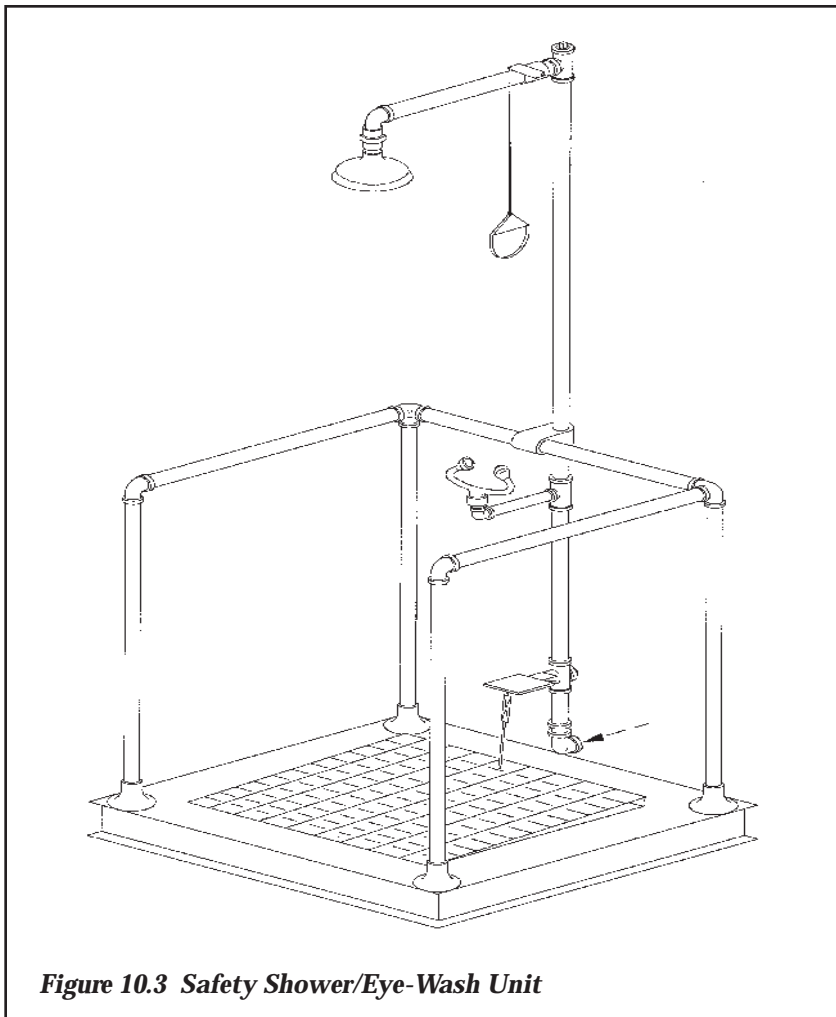


Figure 10.3 Safety Shower/Eye-Wash Unit

E. ENCLOSURES

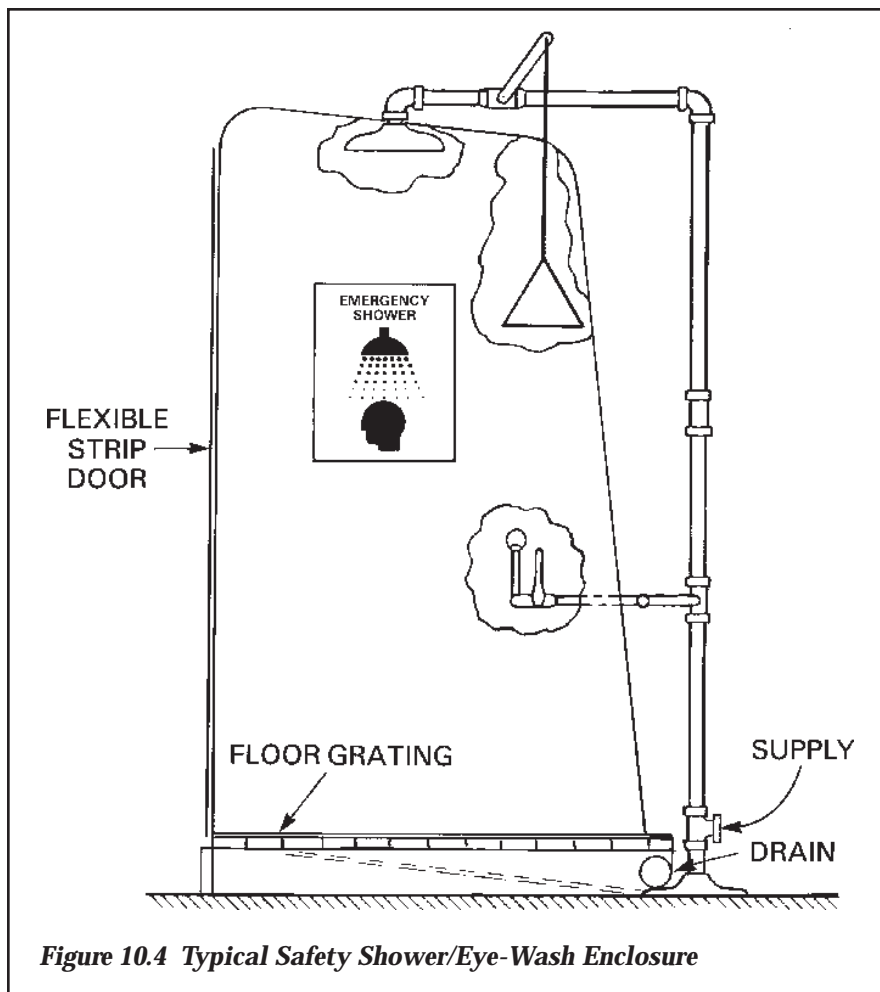
Chevron Guidelines

1. Safety showers in exposed areas where the temperature regularly drops below 40°F require enclosures.
2. The opening to the enclosure should have a see-through cover (e.g., clear flexible strip door).
3. A wool blanket in a watertight container or wrapping should be located near each enclosure.
4. Prefabricated enclosures (see *Figure 10.4*) are available from safety shower manufacturers. Larger ones can be supplied on custom order made of fiberglass or ABS plastic or they can be fabricated on-site.
5. Enclosures should be safety green, either by painting or by having the color in the material, such as fiberglass or ABS plastic, for maximum contrast with other parts of the plant.

F. EYE-WASH UNITS

Chevron Guidelines

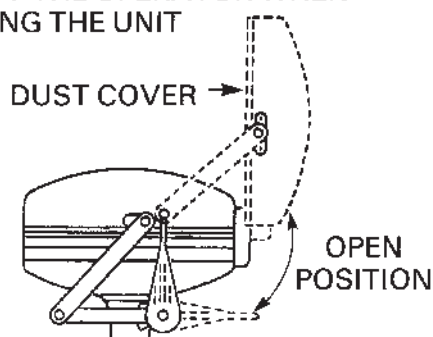
1. Eye-wash bowls are available in plastic or stainless steel. If subject to physical damage, stainless steel should be selected.
2. Heads are available for eye-wash only or eye-wash and face wash. Also available is a face spray ring. Eye and face combinations are advantageous in some cases but they require more water and more maintenance to keep the small holes from plugging.
3. Other configurations such as wall mounted or counter top units are available, particularly for laboratory use.
4. Filters or screens are recommended on the supply line to eye-wash fountains. If provided, it is essential that they are checked frequently to prevent plugging.
5. Emergency hand-held spray units are not a substitute for eye-wash fountains because both hands need to be available to hold both eyes open.
6. See *Figure 10.5* for details of typical eye-wash unit.





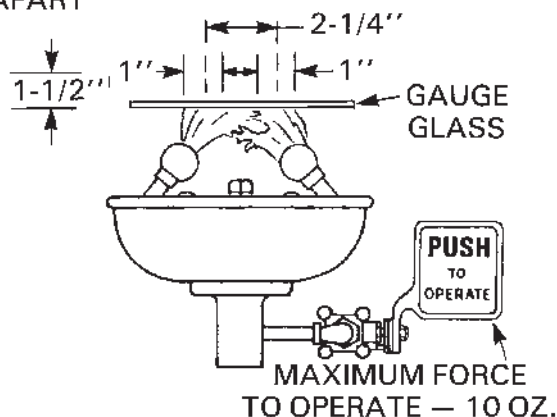
DUST COVERS

1. PROTECT EYE-WASH NOZZLES FROM AIRBORNE CONTAMINANTS SUCH AS DUST AND CORROSIVE MISTS WITH A DUST COVER
2. REMOVAL OF THE DUST COVERS SHALL NOT REQUIRE A SEPARATE MOTION BY THE OPERATOR WHEN ACTIVATING THE UNIT



PERFORMANCE CRITERIA

WITH A GAUGE GLASS PLACED 1-1/2 INCHES BELOW THE PEAK OF UNRESTRICTED FLOW, WATER SHOULD CONTACT THE GLASS IN TWO PLACES 1 INCH WIDE CENTERED 2-1/4 INCHES APART



CONTROL VALVES

1. THE PUSH-TO-OPERATE AND STAY OPEN VALVE AS SHOWN TO THE LOWER LEFT IS RECOMMENDED; HOWEVER A SPRING LOADED FOOT PEDAL IS ACCEPTABLE. SPRING LOADED CONTROL VALVES REQUIRING ONE HAND TO HOLD IN THE OPEN POSITION ARE NOT ACCEPTABLE
2. CONTROLS SHOULD BE THE SAME THROUGHOUT A FACILITY

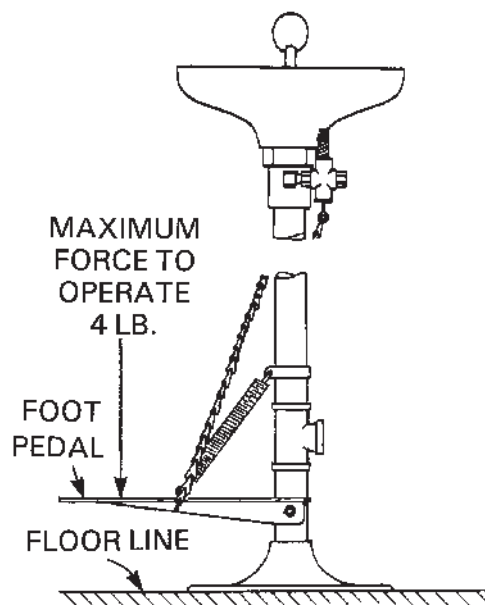


Figure 10.5 Typical Eye-Wash Unit Requirements



G. ALTERNATIVE EYE-WASH UNITS

Chevron Guidelines

1. Use alternative eye-wash units only when a permanent installation is not possible - may be used for remote short duration maintenance jobs.
2. Eye-wash bottles are not recommended because of limited supply of water.
3. The minimum requirement for Portable Eye-Wash Units is delivery of 0.4 gpm for 15 minutes at less than 30 psi. The minimum requirement for Eye, Face, and Body Units is delivery of 3.0 gpm for 15 minutes at less than 30 psi (see *Figures 10.6 and 10.7*).
4. The water must be changed regularly or a non-toxic additive must be added to eliminate the formation of bacteria.

This unit is acceptable for eye and skin contact hazards. These units are available with hand pumps or outfitted to be pressurized with air. Pressurized units require periodic monitoring of pressure.

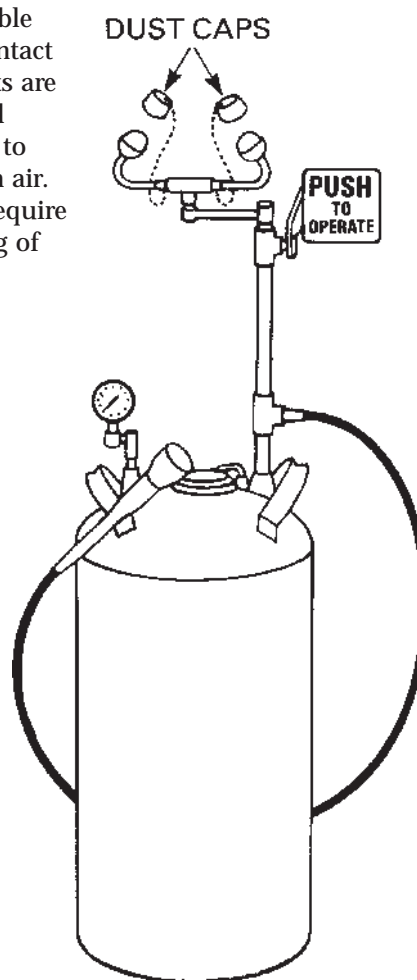


Figure 10.6 Portable Eye, Face, and Body Spray Unit



H. IDENTIFICATION

Chevron Guidelines

1. Safety shower/eye-wash units should have a 3 foot wide by 7 foot high area behind them, and any enclosures housing them, distinctively painted safety green so they can be easily seen.
2. Sign A (*Figure 10.8*) may be mounted in a clearly visible location near each safety shower/eye-wash unit.
3. The Sign B pictogram (*Figure 10.8*) has been approved by the International Organization for Standardization (ISO) and may be used in conjunction with Sign A.



Figure 10.7 Portable Eye-Wash Unit

This unit is acceptable when the hazard is to the eyes only.

1. EMERGENCY SHOWER

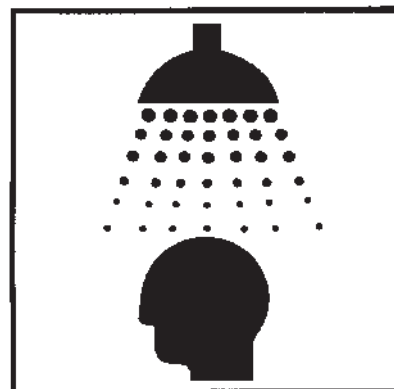
- a. Get into shower immediately
- b. Remove contaminated clothing
- c. Flush for 15 minutes

2. EYE-WASH FOUNTAIN

- a. Flush for 15 minutes
- b. Hold affected eyes open

3. SUMMON MEDICAL ASSISTANCE

SIGN (A)



SIGN (B)

Figure 10.8 Safety Shower Identification Signs

Fed-OSHA 1910.144(a)(3)**I. ALARMS****Chevron Guidelines**

1. An alarm that is activated when either the eye-wash or safety shower is activated should be provided. The alarm should sound at a place that is attended during all working hours, such as control rooms, and not in the local vicinity of the safety shower.
2. The alarm can be activated by a flow switch or microswitches on the control valves.
3. The alarm should appear on a visual display board in the attended location to identify the location of the emergency.
4. A red warning light above the safety shower that is activated with the alarm should be used to highlight the shower in use.

10.3 HAZARDOUS CHEMICALS**A. REQUIREMENTS FOR HAZARDOUS CHEMICAL AREAS (YELLOW LINED AREAS)****Chevron Guidelines**

1. Color identification: Yellow - Yellow shall be the basic color for designating caution and for marking physical hazards such as striking against, stumbling, falling, tripping and "caught in between."

Cal-OSHA 6822

1. Sampling stations shall be designed, installed and maintained to prevent exposure to employees to harmful substances. Warning signs or legends shall be conspicuously posted where the substance being sampled or gaged is corrosive.

1. Mandatory hazardous chemical areas (chemical goggle areas) are required where chemicals capable of causing irreversible eye damage are contained in equipment or systems such that a leak or splash could contact the eyes. Everybody entering these areas is required to don approved chemical goggles (goggles through which a direct splash will not pass). Examples of such areas are around:• pumps where a seal leak could result in eye contact
• valve manifolds where a packing leak may occur
• packaging equipment
• open mix tanks, dip tanks, etc.
2. Some areas, such as sample stations, laboratories, etc., may require chemical goggles when specific jobs are performed. Post "CAUTION" signs in these areas to remind personnel of specific chemical goggle requirements. *Figure 10.9* shows two examples of typical signs.
3. **Chemical protective clothing, faceshield, gloves, boots, and chemical goggles** may be required for some maintenance work such as in the opening of equipment in corrosive chemical service. Proper job review of maintenance procedures is required to determine the need for appropriate personal protective equipment.*



Figure 10.9 Typical Caution Signs for Specific Chemical Goggles Requirement

See Figure 12.1 for color and use of safety signs.

B. LAYOUT AND DESIGNATION OF HAZARDOUS CHEMICAL AREAS (YELLOW LINED AREAS)

Chevron Guidelines

1. Basic guidelines:

- Keep equipment controls outside yellow line, when possible.
- Distance to yellow line will depend on severity of contact, pressure, direction chemical is likely to spray, etc.
- Keep normal access ways out of yellow lined areas.
- Post requirements for personal protective equipment to be worn in yellow lined areas. **Posting should be visible from all directions of approach.** See Figure 10.10 for details.*

2 Means of designation:

- For smooth surfaces, paint a 4-inch wide yellow line around the area.
- Where paint is difficult to maintain use yellow plastic markers spaced on about 8-inch centers.
- For unpaved areas use yellow posts 42 inches high at each corner, on both sides of normal access to area, and in between when spacing exceeds 6 feet. Hang plastic yellow chain between posts except across normal accessway. Provide one weak link between each post to allow chain to break easily for a person fleeing the area.

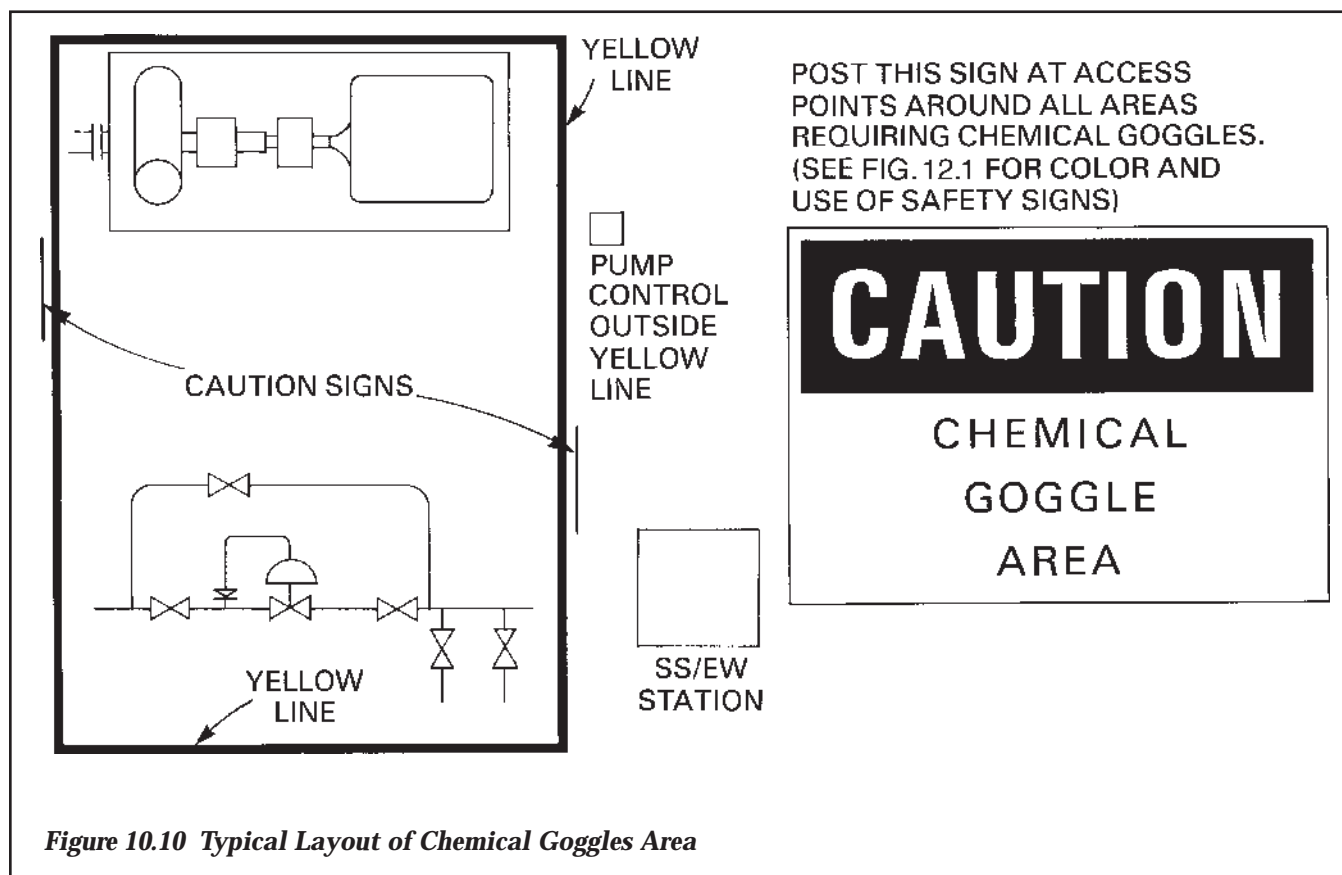


Figure 10.10 Typical Layout of Chemical Goggles Area

10.4 NOTES AND REFERENCES

OTHER GUIDES

National Safety Council Data Sheet 1-686-80
"Emergency Showers and Eye-Wash Fountains"

American National Standard ANSI Z358.1 - 1990
"Emergency Eye-Wash and Shower Equipment"

ADDITIONAL REFERENCES

CRTC Standard Form EF-528
"Safety Signs For . . ."

CRTC Loss Prevention Guide No. 5
"Safety Shower and Eye-Wash Units"