Emergency Eyewash and Shower Equipment Designing for Safety

Bradley

Makers of Plumbing Fixtures, Thermostatic Valves, Toilet Accessories, Toilet Partitions, and Emergency Equipment and Accessories

This education program meets the requirements of the American Institute of Architects Continuing Education System (AIA/CES) for 1.0 Health, Safety, and Welfare Learning Units.

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Thank You!

Learning Objectives

- Understand use of emergency eyewash and shower equipment in workplace and teaching environments
- Understand regulations and design practices for locating and specifying emergency eyewash and shower equipment
- Understand how to meet tepid water requirements for emergency fixtures by using thermostatic mixing valves

Why Emergency Eyewash and Shower Equipment?

Emergency eye/face wash and shower equipment includes:

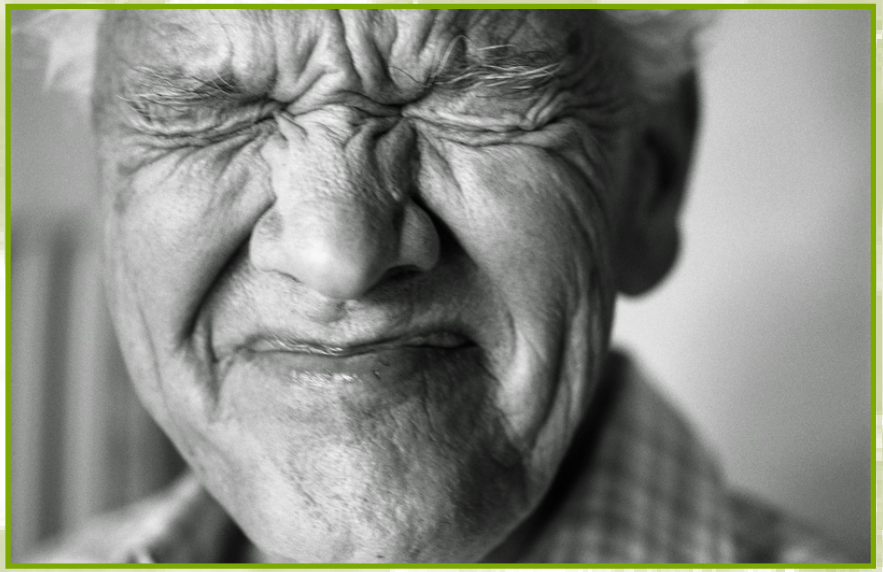
- Wall- and pedestal- mounted eye/face washes
- Laboratory fixture and deck-mounted eye/face washes
- Portable and personal eye/face wash stations
- Drench showers
- Combination shower/eyewash
- Drench hoses

Why Emergency Eyewash and Shower Equipment?

Industrial workers, researchers, and students are exposed to hazardous chemicals

Why Emergency Eyewash and Shower Equipment?

The first seconds following eye and skin exposure are critical to minimizing injury



Why Emergency Eyewash and Shower Equipment?

Personal wash units supplying immediate flushing are the a quick way to initially treat exposure to injurious chemicals

Why Emergency Eyewash and Shower Equipment?

Typical unit installation

Whether or not a personal wash unit is used, a full 15 minute eye flush is recommended to fully flush away contaminants.

Why Emergency Eyewash and Shower Equipment?

The owner should provide direction to the design professional on emergency eyewash and shower equipment selection and location, based upon the guidance of owner's physician, industrial hygienist, or other qualified professional.

OSHA Requirements

Federal and State Occupational Safety and Health requirements apply to employees in workplaces

- May be in addition to building code requirements
- Are not enforced by the building official
- Place responsibility for safety with employer
- Use current industry standards as basis for interpretation

OSHA Requirements

OSHA Workplace Inspections

- Scheduled on a regular basis
- May occur randomly without prior notice
- May occur due to a complaint or accident

OSHA Requirements

OSHA Penalties

- Warning, monetary fine or even a facility shut-down
- Design professionals can be affected

OSHA Requirements

Source for requirements for emergency eyewash and shower equipment in the workplace

29 CFR (Code of Federal Regulations) 1910.151(c):

- "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."
- "Suitable facilities" is defined by OSHA as meeting current industry standards.
- ANSI Z358.1 is the recognized industry standard.

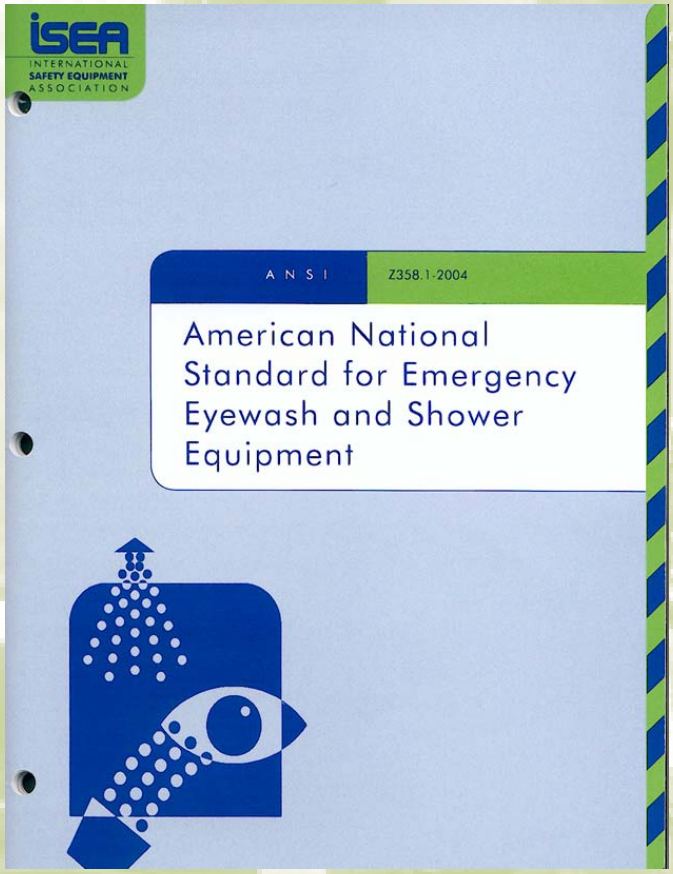
OSHA Requirements

State level OSHA regulations are typically the source for requirements for emergency eyewash and shower equipment in school laboratories.

ANSI Standards

What are ANSI standards?

- American National Standards Institute
- Voluntary industry consensus standards
- Developed by recognized industry organization
- Input from stakeholder companies and organizations



ANSI Standards

Who writes ANSI Z358.1-2004?

- Emergency Eyewash and Shower Group of the International Safety Equipment Association (ISEA):
  - Bradley Corporation
  - Bacou-Dalloz/Fendall, Inc.
  - H.L. Bouton Co., Inc.
  - Encon Safety Products
  - Haws Corporation
  - North Safety products
  - Speakman Safety Products
  - Zee Medical, Inc.

ANSI Standards

ANSI Z358.1-2004 American National Standard for Emergency Eyewash and Shower Equipment covers:

- Plumbed and Self-Contained Emergency Showers
- Plumbed and Self-Contained Eyewash Equipment
- Eye/Face Wash Equipment
- Combination Equipment
- Supplemental Equipment

ANSI Standards

Who else has input into the standard?

- Industry stakeholders, including:
  - American Society of Safety Engineers
  - International Chemical Workers Union
  - Lawrence Livermore National Laboratory
  - Safety Equipment Institute
  - State of California Occupational Safety and Health Administration

ANSI Standards

ANSI Z358.1-2004

- Is an industry standard, not a regulation
- Is not specified in OSHA 29 CFR 1910.151 … *BUT*
- Provides enforceable guidelines for OSHA inspection

Questions?

Why emergency eyewash and shower equipment?

The role of the ANSI standard?

The role of Federal and State OSHA regulations?

ANSI Z358.1-2004

Critical subjects addressed in the standard:

- Performance of emergency eyewash and shower equipment
- Installation requirements
- Maintenance and training
- Testing procedures

ANSI Z358.1-2004

Changes from the 1998 version

- 2004 standard maintains 1998 guidelines
- Pressure requirement for drench showers set at 30 PSI
- New note indicates intent of weekly activation test
- New notes indicates status of drench hose use

ANSI Z358.1-2004 Performance

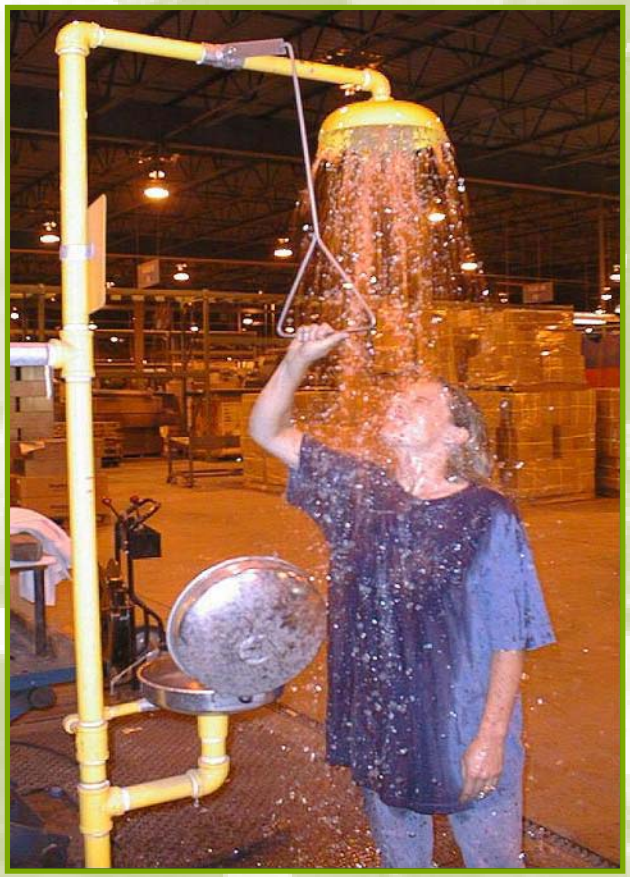
Minimum drench or wash of 15 minutes

- The standard requires a 15 minute continuous flushing due to medical evidence that residual chemicals on the body require extended flushing to ensure their removal

ANSI Z358.1-2004 Performance

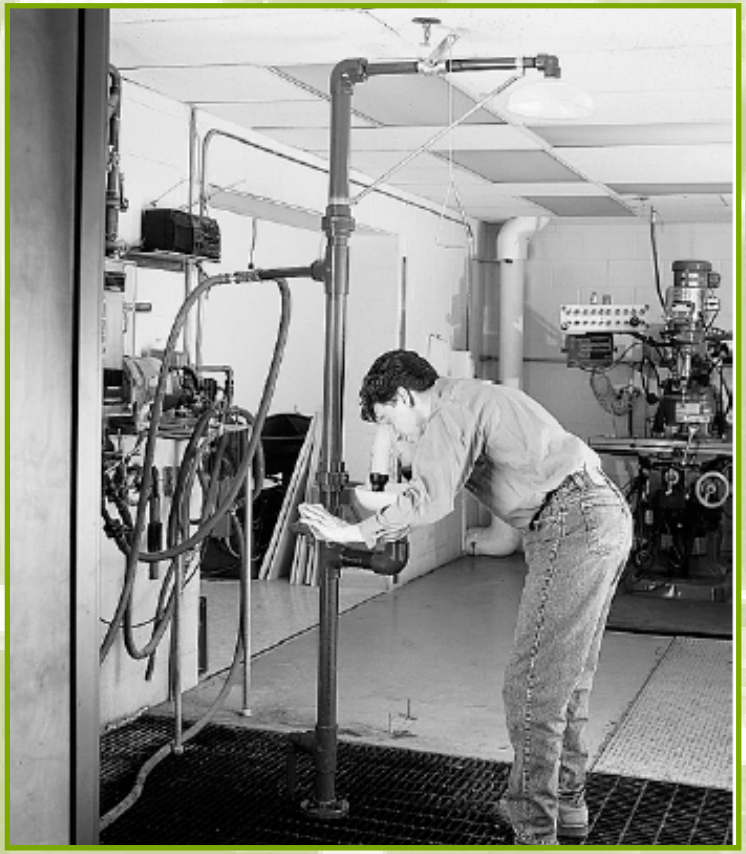
Minimum flow requirements

- 0.4 gallons per minute (GPM) at 30 pounds per square Inch (PSI) for Eyewashes
- 3.0 GPM at 30 PSI for Eye/Face Washes
- 20.0 GPM at 30 PSI for Drench Showers
- 3.0 GPM for Drench Hoses



ANSI Z358.1-2004 Performance

Combination showers with Eye and Eye/Face Washes



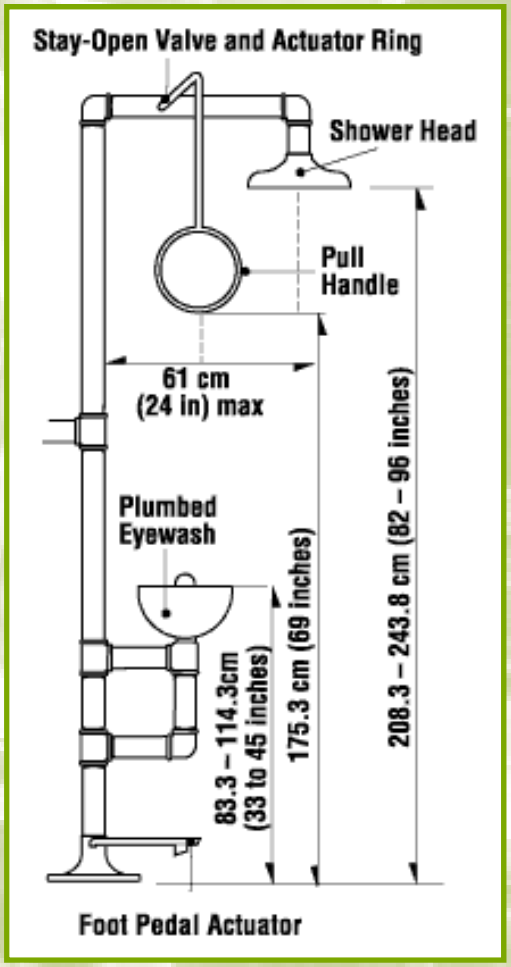
ANSI Z358.1-2004 Installation

Shower Height from Surface on which user stands

- Minimum 82 inch to maximum 96 inch

Eyewash Height from Surface on which the user stands

- Minimum 33 inch to maximum 45 inch



ANSI Z358.1-2004 Installation

No special accessibility provisions in ANSI standard

- Designer should review provisions of ADAAG and local accessibility regulations
- Units are available with under-fixture clearance and shower pull rods designed to meet ADAAG and ANSI A117.1 requirements

ANSI Z358.1-2004 Installation

Designing fixture locations:

- Accessible location no more than 10 seconds to reach
- Travel distance no greater than 30.5 meters (100 feet) from hazard
- Located on same level as hazard
- Path of travel free of obstructions, including doors
- Highly visible sign
- Well lit

ANSI Z358.1-2004 Installation

Flow switch alarm systems

- Automatic, audible and visual alarm indicates when unit is being used
- Summons additional aid
- Can be wired into an existing system

ANSI Z358.1-2004 Installation

Shut-Off Valves

- If shut-off valves are installed in shower line for maintenance purposes, provisions shall be made to prevent unauthorized shut-off

ANSI Z358.1-2004 Maintenance and Training

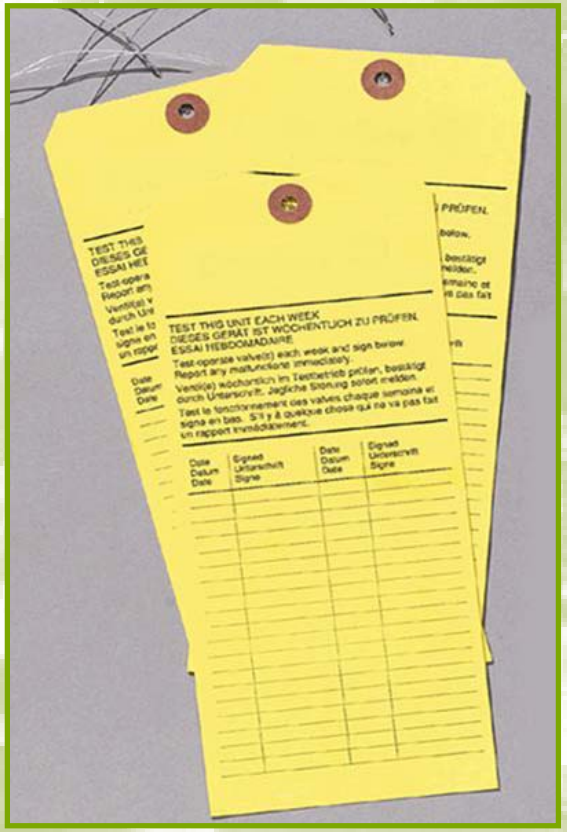
Manufacturers must provide operation, inspection, and maintenance instructions with shower and eye wash equipment.

Instructions accessible to maintenance and training personnel.

ANSI Z358.1-2004 Testing

Weekly test of all plumbed units

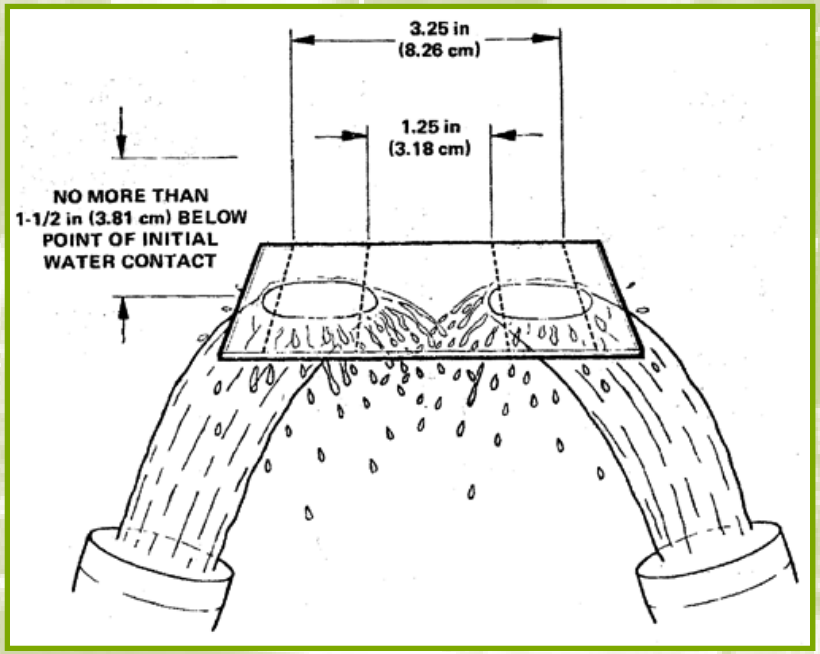
- Inspection tags recommended to document compliance



ANSI Z358.1-2004 Testing

Eye Wash Testing

- Eye wash unit shall provide flushing fluid to both eyes simultaneously.
- Test gauge for making determination of suitable eye wash pattern



ANSI Z358.1-2004 Testing

Annual Equipment Inspections

- All emergency equipment shall be inspected annually to assure conformance with ANSI Z358.1 requirements.

Questions?

Performance of emergency eyewash and shower equipment?

Installation issues?

Testing and inspection requirements?

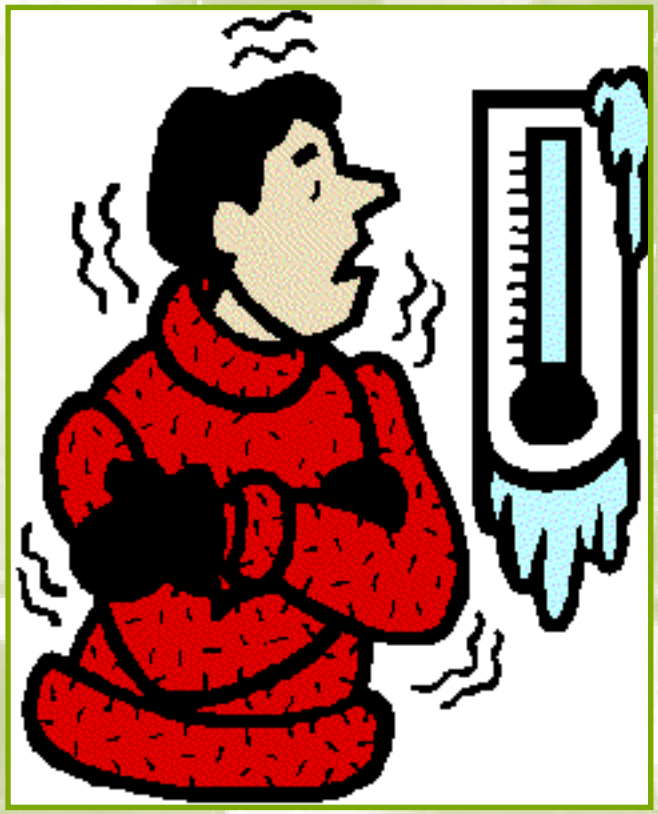
ANSI Z358.1-2004 Water Tempering

Delivered flushing fluid must be <u>tepid</u>

- “Moderately warm, lukewarm”
- Temperatures in excess of 100 degrees F, may harm eyes and enhance chemical interaction with eyes and skin
- CAL-OSHA: 85 degrees F maximum fluid delivery temperature

ANSI Z358.1-2004 Water Tempering

Prevent hypothermia and ensure that the affected person washes for the required amount of time.



Tepid Water Solution: Thermostatic Mixing Valves

Function: Blend hot and cold water to a specific outlet temperature

- Temperature is held constant if inlet temperatures change
- Temperature is controlled by a Thermostat
- Thermostat reacts to changing water temperatures and moves a mechanism which modulates the inlet flow of hot or cold water

Emergency Fixture Thermostatic Mixing Valves

Differences in Thermostatic Mixing Valves

- Regular TMV's are designed to restrict flow if hot or cold water is lost
- In an emergency cold water is better than no water
- Emergency thermostatic valves are designed with a cold water by-pass ensuring cold water will flow at all times

Water Tempering with Thermostatic Mixing Valves

Emergency Fixture TMV features:

- Built-in cold water by-pass
- Anti-scald protection
- Accurate control of temperature to ± 3° F
- Adjustable water temperature based on hazard and medical recommendations
- Thermometer on valve outlet to ensure proper temperature

Thermostatic Mixing Valves

Sizing Considerations

- Determine total flow rate of emergency fixture(s)
- Determine acceptable pressure drop for system
- Refer to manufactures technical information or sizing program to select proper valve for application

Thermostatic Mixing Valves: Installation

Point of use

- Valve is located next to the emergency fixture it will be used with
- Offers immediate tempered water with accurate temperature control
- Requires more units than remote installation serving multiple fixtures

Remote location

- Valve is located in an area to serve a group of emergency fixtures
- Multiple fixtures can be run off one valve
- Tempered water won't be immediately available to the fixture

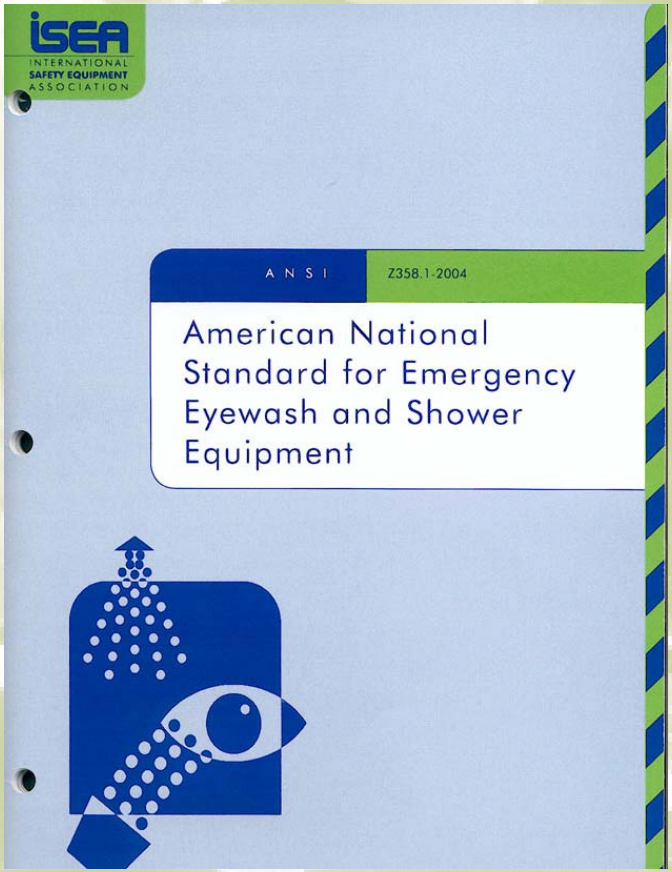
Recommended location is as close to emergency fixture as possible

Why Use Thermostatic Mixing Valves?

- Meets the requirements of tepid water
- Protect the workers exposed to hazardous materials
- Limit the owners liability

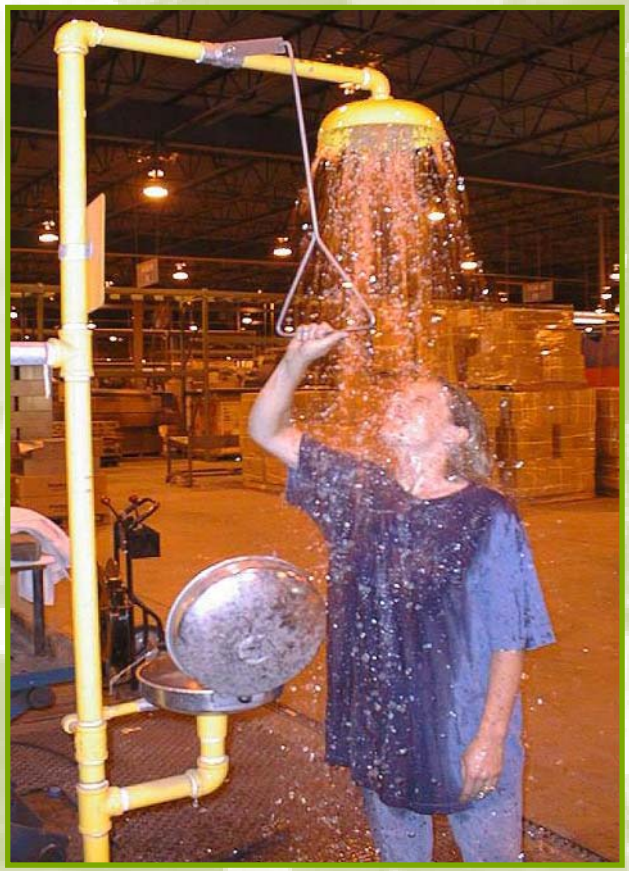
Program Summary

Understand regulations and practices for locating and specifying emergency eyewash and shower equipment



Program Summary

Understand use of emergency eyewash and shower equipment in the workplace and in teaching environments



Program Summary

Understand why thermostatic mixing valves are recommended for use with emergency eyewash and shower equipment

Resources

American National Standards Institute (ANSI): www.ansi.org

US Occupational Safety and Health Administration (OSHA): www.osha.gov

International Safety Equipment Association: www.safetyequipment.org

Laboratory Safety Institute: www.labsafety.org

Safety Equipment Institute (SEI): www.seinet.org

Scientific Equipment and Furniture Association (SEFA): www.sefalabs.com

This concludes our education presentation Emergency Eyewash and Shower Equipment: Designing for Safety.

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