



# **BEST MANAGEMENT PRACTICE FOR THE SELECTION OF PROTECTIVE CLOTHING FOR BREWERY WORKERS**

PREPARED BY THE BREWERS ASSOCIATION SAFETY SUBCOMMITTEE

Brewers Association  
[www.BrewersAssociation.org](http://www.BrewersAssociation.org)



# TABLE OF CONTENTS

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Purpose .....	3
Summary .....	3
Frequently Asked Questions .....	4
Protective Clothing Recommendations .....	7
Appendix - Hazard Assessment Procedure .....	11



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## PURPOSE

The purpose of this document is to provide a helpful, consistent guideline for Brewers Association (BA) members to use when specifying brewery uniforms and protective clothing.

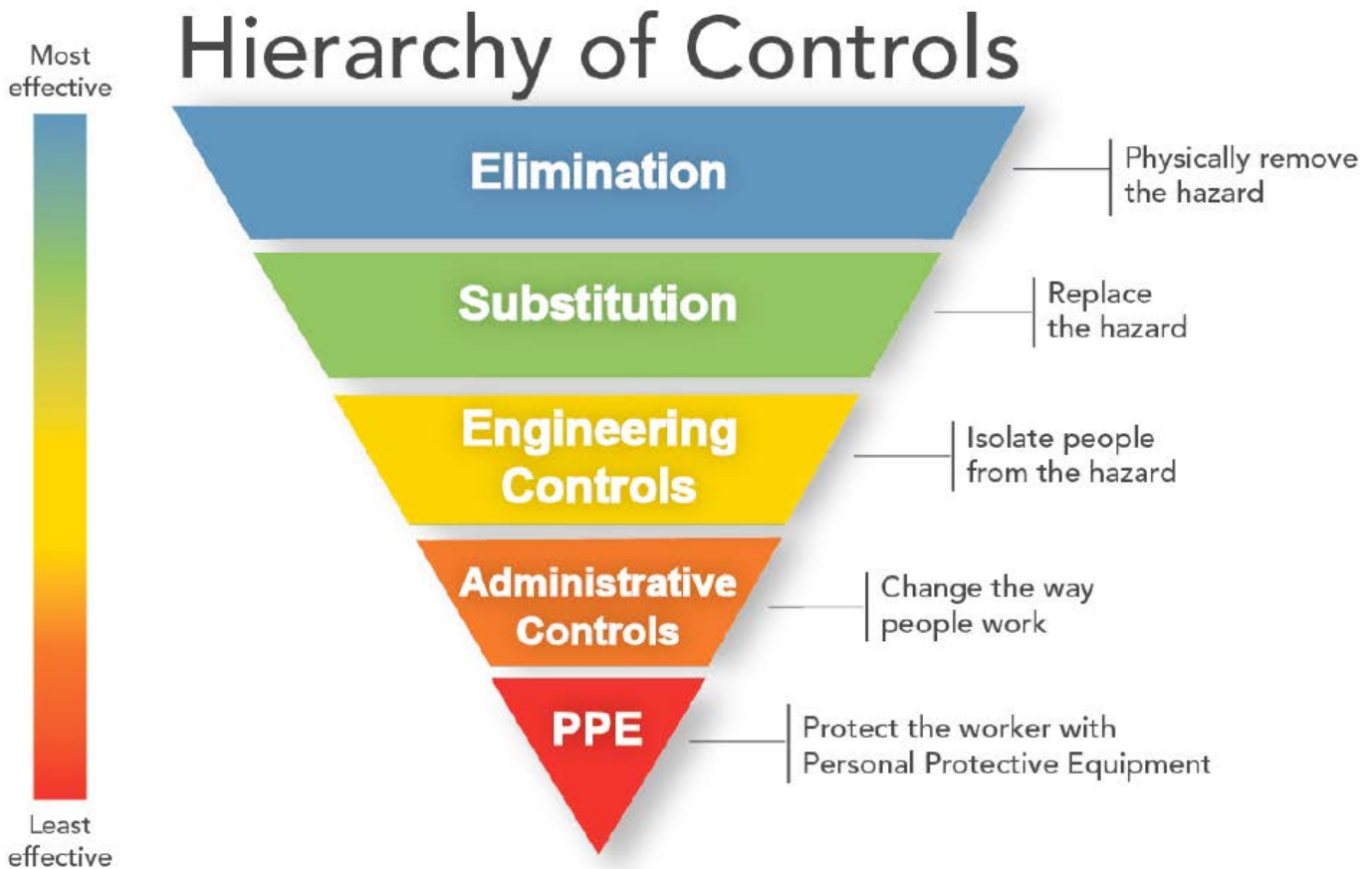
Employers and employees must work together to assure a safe workplace. Employers need to perform workplace hazard assessments in order to determine necessary protective clothing, adequate engineering controls, and safe work practices as well as provide training and equipment. Employees have the responsibility to conduct themselves in a safe manner according to the equipment and training they have received.

## SUMMARY

The recommendations herein are based on the experiences and expertise of BA Safety Subcommittee (SSC) members, contributing BA members, best

practices utilized in trades with hazards similar to those found in breweries and other resources including the Occupational Safety and Health Administration (OSHA), trade journals, and safety professionals. This BMP is not itself a regulation, but is designed to lead breweries towards the development of their own standard operating procedures (SOPs) related to the selection, inspection, maintenance, and replacement of protective clothing appropriate for brewing-related tasks at their breweries.

The SSC and the BA believe the recommendations in this BMP are appropriate and essential for protecting the health and safety of the craft beer industry's hardworking, dedicated employees. Those who specify and purchase protective clothing for their workforce are solely responsible for selecting suitable goods based on their own hazard assessments, and do so at their own risk. The BA makes no endorsement of specific products or clothing manufacturers.



## FREQUENTLY ASKED QUESTIONS

### 1. Why should brewery workers wear specific articles of clothing when performing routine jobs such as brewing, cellar transfers, cleaning, packaging, and material handling?

These jobs involve being in close proximity to thermal, chemical, and physical hazards. Correctly chosen protective clothing can increase worker protection and lessen potential injury from these hazards.

### 2. What specific articles of clothing and personal protective equipment (PPE) are recognized as increasing worker protection for brewery workers?

- a. Work boots that protect against corrosive chemicals, hot fluids, and physical injury, such as crushing or ankle twisting.
- b. Work clothes that cover the torso, legs, and arms with material that can reduce injuries from thermal, chemical, or physical hazards.
- c. Eye protection that reduces the likelihood of injury due to splashes, flying objects, and poking.
- d. Other protective clothing and equipment based on the task being performed. Examples include: chemical protective apron, chemical or thermal protective gloves, hearing protection, and respiratory protection.

### 3. How does one know what protective clothing is appropriate for a certain brewery task?

Every task, routine or unusual, should be subject to a hazard assessment by the employer. By considering each possible hazard associated with a task, one can realize what protective and preventative measures should be taken. Protective clothing is one strategy among many that can help reduce or eliminate injuries. OSHA has developed "Non-mandatory Compliance Guidelines for Hazard Assessment and Personal Protective Equipment Selection," which is appended to this BMP.

### 4. What do safety regulatory agencies, such as OSHA, have to say on the subject of protective clothing?

- a. OSHA has published an occupational safety and health (OSH) standard entitled "Personal Protective Equipment" in 29 CFR § 1910.132. Paragraph (a) states:

*Protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, shall be provided, used, and maintained in a sanitary and reliable*

*condition wherever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact.*

- b. OSHA also enforces The General Duty Clause written into the original OSH Act of 1970, 29 USC 654, which states:

*(a) Each employer --*

*(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;*

*(2) shall comply with occupational safety and health standards promulgated under this Act.*

*(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.*

- c. Certain classes of Personal Protective Equipment (PPE) are subject to more extensive regulations. These include: eye and face protection (29 CFR 1910.133), respiratory protection (1910.134), head protection (1910.135), foot protection (1910.136), electrical protective devices (1910.137), hand protection (1910.138), and hearing protection in the occupational noise exposure rules (1910.95).
- d. Some states or local jurisdictions are authorized to manage their own OSH regulations. These rules cannot be less stringent than federal OSHA regulations. Every brewery should know what agency has jurisdiction of OSH rules in their locality. To find out if you are in a State or Federal program state click <https://www.osha.gov/dcsp/osp/faq.html>.

### 5. Who has authority to specify protective clothing in the workplace and who is responsible in case of an injury?

- a. The employer can and should specify which protective clothing is to be worn during specific tasks. Complying with protective clothing policies should be a condition of employment. It is important to recognize employees who properly protect themselves and coworkers.

- b. The OSH regulatory agency with jurisdiction will have rules that directly require workplace hazard assessment and protective clothing. Generally, if an employer failed to conduct a hazard assessment or failed to provide protective clothing and training on its use, the employer is liable to be cited. However, if the employer's actions have satisfied the standard, but the employee did not wear the appropriate protection, and this fact was appropriately documented by the employer, the employer may be treated leniently. For these reasons, employers need to work closely with their employees to achieve compliance.

**6. Breweries vary in the amount of risk posed to employees based on such things as production capacity, technology, extent of automation, and so on. How do I know what PPE should be used at my brewery?**

Conduct a hazard assessment and choose protective clothing that protects against the hazards identified. It is a good idea to seek assistance from PPE manufacturers, technical resources online, and safety experts.

**7. What role do comfort and fashion play in the selection of protective clothing?**

- a. The main comfort factors for protective clothing are thermal and tactile. Heavier fabrics can increase heat stress and for some tasks may provide more physical protection than is necessary. Clothes, gloves and boots that move easily with the wearer and do not cause chafing are preferred over stiffer materials that reduce movement, can make precise work more difficult and are irritating to the skin. If the clothing specified increases the body heat of the wearer, heat stress can be prevented with hydration, electrolyte replacement, and rest periods in a cool area.
- b. Fashion considerations of protective clothing include appearance, style, color, and appropriateness for the body's form. Studies have shown that PPE compliance improves when the components better agree with the wearer's fashion sense. PPE choices should also consider the wearer's physique and gender.

**EYE PROTECTION** pg. 9

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**HEARING PROTECTION** pg. 10

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**CLOTHING - SHIRTS** pg. 7

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**HAND PROTECTION** pg. 8

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**CLOTHING - PANTS** pg. 7

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**FOOTWEAR** pg. 7

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## PROTECTIVE CLOTHING RECOMMENDATIONS

These recommendations should be advised by each brewery's own hazard assessments.

### 1. Clothing

#### a. *Pants, Overalls, Coveralls*

- i. Composition / Fabric
  - 1) Cotton, cotton duck, or polyester blend
  - 2) Light/breathable
  - 3) Easily washable
  - 4) Water and chemical repellent
- ii. Construction
  - 1) Reinforced stress points that stay dry
    - a) Knees
    - b) Seat bottom
    - c) Cuffs
    - d) Belt loops
  - 2) Long legged
    - a) Fitted boot cut
    - b) May have bib, overall, or coverall construction
  - 3) Garments with rips or tears are promptly repaired or replaced
- iii. Features
  - 1) Absence of sharp rivets that can scratch equipment
  - 2) Small tool pockets if closeable
  - 3) Absence of large tool loops that can catch on valve handles and other protruding devices

#### b. *Shirts*

- i. Fabric
  - 1) Cotton, cotton duck, or polyester blend
  - 2) Light/breathable
  - 3) Easily washable

- 4) Water and chemical repellent

#### ii. Construction

- 1) Durable
- 2) Button closures could fall off and should be avoided
- 3) Sleeve length
  - a) Short sleeves may be worn if appropriate to task hazards
  - b) Long sleeves can be easily rolled up and secured
  - c) May be part of overall or coverall construction
- 4) Garments with rips or tears are promptly repaired or replaced

#### iii. Features

- 1) Breast pocket(s) with button or zippered closure is optional
- 2) Professional appearance

### 2. Footwear



#### a. *Waterproof/Chemical Resistant Boots*

- i. Composition / Fabric
  - 1) Solid rubber or rubber impregnated fabric substrate
  - 2) Waterproof
  - 3) Slip resistant
  - 4) Chemical resistant (all components)
  - 5) Leather deteriorates with corrosives, has poor waterproofing capabilities and is heavy. Leather is not advised in brewery, cellar, or packaging areas, but

may be appropriate in shipping and receiving.

ii. Construction

- 1) Steel toe at a minimum; steel toe/steel shank preferred
- 2) Minimum height reaches over the ankle; maximum height to below knees
- 3) Knee-high boots should be lined with soft material to reduce chafing
- 4) Reinforced stress and wear points
  - a) Toe cup
  - b) Tread
- 5) Boots with rips or punctures are promptly replaced
- 6) Should conform to American Society of Testing Materials (ASTM) F2412-05 Standard Test Methods for Foot Protection and F2413-05 Standard Specification for Performance Requirements for Protective Footwear (supercedes American National Standard for Personal Protection - Protective Footwear (ANSI Z41-1999 and Z41-1991))

iii. Other

- 1) Close fitting over ankle or calf to reduce chance of liquid entering the boot
- 2) Pant legs are worn over the boot to direct splashes away from entering the boot
- 3) Provide regular drying facilities for boots at the end of each shift

### 3. Hand Protection



a. *Chemical Handling Gloves*

i. Composition

- 1) Typically nitrile, neoprene, or butyl rubber. Choose synthetic chemical protective material compatible with hazardous chemicals being used by consulting Safety Data Sheet (SDS) and/or glove manufacturer's compatibility charts.
- 2) Do not use latex, vinyl, or partially coated fabric gloves with chemicals

ii. Construction

- 1) Seamless, molded glove
- 2) Medium to long gauntlet should extend well past the wrist
- 3) Gloves with rips, punctures, discoloration, or cracks are promptly replaced
- 4) Should conform to ANSI/ISEA 105-2011, American National Standard for Hand Protection Selection Criteria

iii. Other

- 1) Wear glove size appropriate for hand size
- 2) Roll back the gauntlet to create a cuff that prevents liquid from running onto the unprotected arm
- 3) Provide regular drying facilities for gloves at the end of each use
- 4) Gloves assigned to a specific chemical task or to a specific worker should be clearly labeled with a permanent marker
- 5) Gloves to be rinsed free of chemical residue after each use
- 6) Gloves have a useful life based on chemical exposure, duration, and activity, and should be inspected prior to each use
- 7) Replace damaged gloves regularly; keep spare gloves available



b. *Non-Chemical Gloves*

i. Composition

- 1) Leather, canvas, or woven fabric with partial rubber coating
- 2) Washable or disposable

ii. Construction

- 1) Sewn or woven construction
- 2) Reinforced wear areas
- 3) Gloves with rips, punctures, discoloration, or cracks are promptly replaced

iii. Other

- 1) Wear glove size appropriate for hand size
- 2) Gloves assigned to a specific task or to a specific worker should be clearly labeled with a permanent marker

**4. Eye Protection**

a. *Eye Protection: Safety Glasses*



i. Composition

- 1) Impact resistant plastic or tempered glass

ii. Construction

- 1) Side shields or wrap-around design
- 2) May be tinted, but avoid mirror or dark tinted finishes (other employees cannot determine if they are being seen by the wearer)
- 3) Promptly replace glasses that are scratched, cracked, or coated with residue
- 4) Should conform to ANSI Z87.1-2010 American National Standard Practice for

Occupational and Educational Eye and Face Protection consensus standards.

- 5) Most prescription eyewear does not conform to the Z87.1 standard and should only be worn beneath approved safety glasses. Prescription safety glasses must be of adequate size and shape to cover the eyes and provide appropriate protection during work tasks, and have side protection for the full height of the eye. A lens and side shield height of 1 3/4" is recommended.

iii. Other

- 1) Wash and dry glasses after use
- 2) Reduce fogging by purchasing anti-fog glasses or applying an anti-fog surface coating
- 3) Select a comfortable product

b. *Eye Protection: Safety Goggles*



i. Composition

- 1) Impact resistant plastic

ii. Construction

- 1) Face-fitting shield around all sides, indirectly vented
- 2) May be tinted
- 3) Promptly replace goggles that are scratched, cracked, or coated with residue
- 4) Should conform to ANSI Z87.1-2003-6.2.1 American National Standard Practice for Occupational and Educational Eye and Face Protection consensus standards.

iii. Other

- 1) Wash and dry goggles after use

- 2) Reduce fogging by purchasing anti-fog goggles or applying an anti-fog surface coating

c. *Eye Protection: Face Shield*

i. Composition

- 1) polycarbonate, propionate, acetate, or PETG (polyethylene terephthalate glycol)

ii. Construction

- 1) Face-covering shield; may or may not have hinged attachment to headband or hardhat mount
- 2) Promptly replace face shields that are scratched, cracked, or coated with residue
- 3) Should conform to ANSI Z87.1-2010 American National Standard Practice for Occupational and Educational Eye and Face Protection consensus standards. Impact resistant face shields are indicated with "+" mark.

iii. Other

- 1) Wear safety glasses beneath face shield
- 2) Wash and dry face shield after use

**5. Other Protection**

a. *Hearing Protection*



i. Composition

- 1) Single Use: urethane foam or polyvinyl chloride
- 2) Reusable: silicone rubber
- 3) Ear muffs: hard plastic body with foam interior

ii. Other

- 1) Single use plugs should be disposed after one use
- 2) Reusable plugs and muffs should be cleaned regularly with warm water and mild detergent
- 3) Plugs may be worn in conjunction with muffs for greater protection
- 4) Consult 29 CFR 1910.95 for methods of determining which devices are best for specific occupational exposure
- 5) Install ear plugs in accordance with manufacturer instructions
- 6) High visibility hearing protection is recommended to visually assess whether coworkers are wearing protection

b. *Respiratory Protection*



- i. Respirator use is closely tied to OSHA's complex Respiratory Protection standard, 29 CFR 1910.134
- ii. Employees wearing respirators may be required to undergo medical surveillance, respirator fit testing, and training
- iii. Consult a safety professional or certified industrial hygienist if requiring respirators for certain job tasks.

## APPENDIX - HAZARD ASSESSMENT PROCEDURE

### *Non-mandatory Compliance Guidelines for Hazard Assessment and Personal Protective Equipment Selection*

This Appendix is taken from OSHA and is reproduced in an abridged manner here. It is intended to provide compliance assistance for employers and employees in implementing requirements for a hazard assessment and the selection of personal protective equipment.

1. *Controlling hazards.* PPE devices alone should not be relied on to provide protection against hazards, but should be used in conjunction with guards, engineering controls, and sound manufacturing practices.
2. *Assessment and selection.* It is necessary to consider certain general guidelines for assessing the foot, head, eye and face and hand hazard situations that exist in an occupational or educational operation or process and to match the protective devices to the particular hazard. It should be the responsibility of the safety officer to exercise common sense and appropriate expertise to accomplish these tasks.
3. *Assessment guidelines.* In order to assess the need for PPE the following steps should be taken:
  - a. *Survey.* Conduct a walk-through survey of the areas in question. The purpose of the survey is to identify sources of hazards to workers and co-workers. Consideration should be given to the basic hazard categories:
    - i. Impact
    - ii. Penetration
    - iii. Compression (roll-over)
    - iv. Chemical
    - v. Heat
    - vi. Harmful dust
    - vii. Light (optical) radiation
  - b. *Sources.* During the walk-through survey the safety officer should observe:
    - i. sources of motion; i.e., machinery or processes where any movement of tools, machine elements or particles could exist, or movement of personnel that could result in collision with stationary objects;
    - ii. sources of high temperatures that could result in burns, eye injury or ignition of protective equipment, etc.;
    - iii. types of chemical exposures;
    - iv. sources of harmful dust;
    - v. sources of light radiation, i.e., welding, brazing, cutting, furnaces, heat treating, high intensity lights, etc.;
    - vi. sources of falling objects or potential for dropping objects;
    - vii. sources of sharp objects which might pierce the feet or cut the hands;
    - viii. sources of rolling or pinching objects which could crush the feet;
    - ix. layout of workplace and location of co-workers; and
    - x. any electrical hazards. In addition, injury/accident data should be reviewed to help identify problem areas.
  - c. *Organize data.* Following the walk-through survey, it is necessary to organize the data and information for use in the assessment of hazards. The objective is to prepare for an analysis of the hazards in the environment to enable proper selection of protective equipment.
  - d. *Analyze data.* Having gathered and organized data on a workplace, an estimate of the potential for injuries should be made. Each of the basic hazards (paragraph 3.a.) should be reviewed and a determination made as to the type, level of risk, and seriousness of potential injury from each of the hazards found in the area. The possibility of exposure to several hazards simultaneously should be considered.
4. *Selection guidelines.* After completion of the procedures in paragraph 3, the general procedure for selection of protective equipment is to:
  - i. become familiar with the potential hazards and the type of protective equipment that is available, and what it can do; i.e., splash protection, impact protection, etc.;
  - ii. compare the hazards associated with the environment; i.e., impact velocities, masses, projectile shape, radiation intensities, with the capabilities of the available protective equipment;
  - iii. select the protective equipment which ensures a level of protection greater than the minimum required to protect employees from the hazards; and
  - iv. fit the user with the protective device and give instructions on care and use of the PPE. It is very important that end users be made aware of all warning labels for and limitations of their PPE.

5. *Fitting the device.* Careful consideration must be given to comfort and fit. PPE that fits poorly will not afford the necessary protection. Continued wearing of the device is more likely if it fits the wearer comfortably. Protective devices are generally available in a variety of sizes. Care should be taken to ensure that the right size is selected.
6. *Devices with adjustable features.* Adjustments should be made on an individual basis for a comfortable fit that will maintain the protective device in the proper position. Particular care should be taken in fitting devices for eye protection against dust and chemical splash to ensure that the devices are sealed to the face. In addition, proper fitting of helmets is important to ensure that it will not fall off during work operations. In some cases a chin strap may be necessary to keep the helmet on an employee's head. (Chin straps should break at a reasonably low force, however, so as to prevent a strangulation hazard). Where manufacturer's instructions are available, they should be followed carefully.
7. *Reassessment of hazards.* It is the responsibility of the safety officer to reassess the workplace hazard situation as necessary, by identifying and evaluating new equipment and processes, reviewing accident records, and reevaluating the suitability of previously selected PPE.
8. *Selection chart guidelines for eye and face protection.* The following chart provides general guidance for the proper selection of eye and face protection to protect against hazards associated with the listed hazard "source" operations.
9. *Selection guidelines for head protection.* All head protection (helmets) is designed to provide protection from impact and penetration hazards caused by falling objects. Head protection is also available which provides protection from electric shock and burn. When selecting head protection, knowledge of potential electrical hazards is important. Class A helmets, in addition to impact and penetration resistance, provide electrical protection from low-voltage conductors (they are proof tested to 2,200 volts). Class B helmets, in addition to impact and penetration resistance, provide electrical protection from high-voltage conductors (they are proof tested to 20,000 volts). Class C helmets provide impact and penetration resistance (they are usually made of aluminum which conducts electricity), and should not be used around electrical hazards. Where falling object hazards are present, helmets must be worn. Some examples include: working below other workers who are using tools and materials which could fall; working around or under conveyor belts which are carrying parts or materials; working below machinery or processes which might cause material or objects to fall; and working on exposed energized conductors. Type I designated helmets are designed to reduce the force of impact resulting from a blow only to the top of the head, while Type II designated helmets are designed to reduce the force of impact resulting from a blow to the top or sides of the head. Accordingly, if a hazard assessment indicates that lateral impact to the head is foreseeable, employers must select Type II helmets for their employees.
10. *Selection guidelines for foot protection.* Safety shoes and boots which meet the ANSI Z41-1991 Standard provide both impact and compression protection. Where necessary, safety shoes can be obtained which provide puncture protection. In some work situations, metatarsal protection should be provided. In other special situations electrical conductive or insulating safety shoes would be appropriate. Safety shoes or boots with impact protection would be required for carrying or handling materials such as packages, objects, parts or heavy tools, which could be dropped; and, for other activities where objects might fall onto the feet. Safety shoes or boots with compression protection would be required for work activities involving skid trucks (manual material handling carts) around bulk rolls (such as paper rolls) and around heavy pipes, all of which could potentially roll over an employee's feet. Safety shoes or boots with puncture protection would be required where sharp objects such as nails, wire, tacks, screws, large staples, scrap metal etc., could be stepped on by employees causing a foot injury.
11. *Selection guidelines for hand protection.* Gloves are often relied upon to prevent cuts, abrasions, burns, and skin contact with chemicals that are capable of causing local or systemic effects following dermal exposure. OSHA is unaware of any gloves that provide protection against all potential hand hazards, and commonly available glove materials provide only limited protection against many chemicals. Therefore, it is important to select the most appropriate glove for a particular application and to determine how long it can be worn, and whether it can be reused. It is also important to know the performance characteristics of gloves relative to the specific hazard anticipated; e.g., chemical hazards, cut hazards, flame hazards, etc. These performance characteristics should be assessed by using standard test procedures. Before purchasing gloves, the employer should request documentation from the manufacturer that the gloves meet the appropriate test standard(s) for the hazard(s) anticipated. Other factors to be considered for glove selection in general include:

## EYE AND FACE PROTECTION SELECTION CHART

Source	Assessment of Hazard	Protection
IMPACT -- Chipping, grinding machining, masonry work, woodworking, sawing, drilling, chiseling, powered fastening, riveting, and sanding	Flying fragments, objects, large chips, particles sand, dirt, etc	Spectacles with side protection, goggles, face shields. See notes (1), (3), (5), (6), (10). For severe exposure, use faceshield.
HEAT -- Furnace operations, pouring, casting, hot dipping, and welding	Hot sparks	Faceshields, goggles, spectacles with side protection. For severe exposure use faceshield. See notes (1), (2), (3).
	Splash from molten metals	Faceshields worn over goggles. See notes (1), (2), (3).
	High temperature exposure	Screen face shields, reflective face shields. See notes (1), (2), (3).
CHEMICALS -- Acid and chemicals handling, degreasing plating	Splash	Goggles, eyecup and cover types. For severe exposure, use face shield. See notes (3), (11).
	Irritating mists	Special-purpose goggles.
DUST -- Woodworking, buffing, general dusty conditions	Nuisance dust	Goggles, eyecup and cover types. See note (8).
LIGHT and/or RADIATION -- Welding: Electric arc	Optical radiation	Welding helmets or welding shields. Typical shades: 10-14. See notes (9), (12)
Welding: Gas	Optical radiation	Welding goggles or welding face shield. Typical shades: gas welding 4-8, cutting 3-6, brazing 3-4. See note (9)
Cutting, Torch brazing, Torch soldering	Optical radiation	Spectacles or welding face-shield. Typical shades, 1.5-3. See notes (3), (9)
Glare	Poor vision	Spectacles with shaded or special-purpose lenses, as suitable. See notes (9), (10).

(1) Care should be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest level of each of the hazards should be provided. Protective devices do not provide unlimited protection.

(2) Operations involving heat may also involve light radiation. As required by the standard, protection from both hazards must be provided.

(3) Faceshields should only be worn over primary eye protection (spectacles or goggles).

(4) As required by the standard, filter lenses must meet the requirements for shade designations in 1910.133(a)(5). Tinted and shaded lenses are not filter lenses unless they are marked or identified as such.

(5) As required by the standard, persons whose vision requires the use of prescription (Rx) lenses must wear either protective devices fitted with prescription (Rx) lenses or protective devices designed to be worn over regular prescription (Rx) eyewear.

(6) Wearers of contact lenses must also wear appropriate eye and face protection devices in a hazardous environment.

It should be recognized that dusty and/or chemical environments may represent an additional hazard to contact lens wearers.

(7) Caution should be exercised in the use of metal frame protective devices in electrical hazard areas.

(8) Atmospheric conditions and the restricted ventilation of the protector can cause lenses to fog. Frequent cleansing may be necessary.

(9) Welding helmets or faceshields should be used only over primary eye protection (spectacles or goggles).

(10) Non-sideshield spectacles are available for frontal protection only, but are not acceptable eye protection for the sources and operations listed for "impact."

(11) Ventilation should be adequate, but well protected from splash entry. Eye and face protection should be designed and used so that it provides both adequate ventilation and protects the wearer from splash entry.

(12) Protection from light radiation is directly related to filter lens density. See note (4). Select the darkest shade that allows task performance.

- a. As long as the performance characteristics are acceptable, in certain circumstances, it may be more cost effective to regularly change cheaper gloves than to reuse more expensive types; and,
- b. The work activities of the employee should be studied to determine the degree of dexterity required, the duration, frequency, and degree of exposure of the hazard, and the physical stresses that will be applied.

With respect to selection of gloves for protection against chemical hazards:

- a. The toxic properties of the chemical(s) must be determined; in particular, the ability of the chemical to cause local effects on the skin and/or to pass through the skin and cause systemic effects;
- b. Generally, any "chemical resistant" glove can be used for dry powders;
- c. For mixtures and formulated products (unless specific test data are available), a glove should be

selected on the basis of the chemical component with the shortest breakthrough time, since it is possible for solvents to carry active ingredients through polymeric materials; and,

- d. Employees must be able to remove the gloves in such a manner as to prevent skin contamination.

12. *Cleaning and maintenance.* It is important that all PPE be kept clean and properly maintained. Cleaning is particularly important for eye and face protection where dirty or fogged lenses could impair vision. For the purposes of compliance with 1910.132 (a) and (b), PPE should be inspected, cleaned, and maintained at regular intervals so that the PPE provides the requisite protection. It is also important to ensure that contaminated PPE, which cannot be decontaminated, is disposed of in a manner that protects employees from exposure to hazards.

*Source: [59 FR 16362, April 6, 1994; 74 FR 46357, Sept. 9, 2009]*