

# Master Brewers Safety Toolbox Talk

## Level 2



## Personal Protective Equipment: An In-Depth Guide

### Overview

Personal Protective Equipment (PPE) is a critical part of every brewery's safety infrastructure, providing an immediate barrier between a hazard and the body of an employee or visitor. Master Brewers has published several Toolbox Talks on this subject, each offering a short overview of different aspects of PPE, which are linked at the end of this document. This Toolbox Talk will provide a broad look at the equipment options for seven hazard categories.

Regardless of the situation, the first step is always to conduct a hazard assessment to determine what hazards are present and what level of PPE is required. When working with chemicals and compressed gases, the relevant Safety Data Sheets (SDS) should always be referenced for PPE guidance. Brewery staff should also evaluate methods of exposure: in many cases, there will be more than one risk factor that will need to be controlled.

Personal Protective Equipment requirements should be reviewed on a regular basis in order to remain up to date. At minimum, a PPE review should take place annually. Including this reevaluation step in a formal Change Review process is a useful technique when new materials, equipment, or procedures are introduced.

### Chemical Hazards

Breweries work with a variety of corrosive compounds, and employees interact with both chemical concentrates and working-strength solutions. In order to protect against eye and skin exposure, the type of PPE needs to be appropriate to the risk level. For example, standard safety glasses are mainly geared toward protection from flying objects, but they are suitable for protecting against incidental contact in the brewery. These glasses provide a basic level of protection for brewery staff and visitors moving through production spaces and should have integrated side shields. When working with concentrated corrosives, however, these safety glasses don't offer enough protection against potential splash damage. Splash-proof goggles are designed to fit securely against the face, while face shields offer even

greater protection. Both of these options are required when pouring, handling, and transporting concentrated corrosives. They are also the appropriate level of protection when working with foaming and/or spray applications where there is an increased risk of splash-back.

Skin protection involves a similar difference between risk levels. Single-use gloves made from nitrile or latex compounds are common throughout every brewery and work well for general use in the brewery. They offer protection against skin irritation from working-strength sanitizers and cleaning agents, but they are entirely inadequate against concentrated corrosives. Single-use gloves don't cover skin beyond the wrist, are easily torn, and can even be dissolved by concentrates, exposing the employee to chemical burns. The more appropriate choice for handling corrosive materials are heavy-duty, chemical resistant gloves that extend at least to the mid-forearm. Chemical resistance also varies across gloves: be sure that the gloves are rated for the actual chemicals used in the brewery.

When working in regular contact with chemicals, such as manual keg cleaning or using a chemical spray-foamer, protective clothing becomes important. Day-to-day clothing offers limited protection, so a chemical-resistant apron or coverall will provide more coverage. Wet environments will benefit from rubberized boots. If tall boots are selected, it is important that pants are not tucked into the boots in order to prevent liquids from entering the footbed.

### Impact, Penetration, and Compression Hazards

In addition to chemical exposure, safety glasses offer protection from airborne impacts. The classic example is metal or other fragments during maintenance or construction work, but broken glass is a risk on bottling lines. Operating near compressed gases is another risk area: in addition to a catastrophic equipment failure, compressed gas can inadvertently blow debris into the air and into people's eyes.

Protecting feet while working around kegs, pallets, and forklifts is important to prevent serious crush injuries. A full half-barrel of beer weighs 162 pounds (73.5 kg), a pallet of malt comes in at roughly 2,000 pounds (910 kg), and forklifts are several multiples heavier yet. Steel-toe boots are the most common example of PPE for impact and compression protection. The classic version is the leather work boot, but many safety boots use fabric or rubberized materials and sneaker-style safety shoes are also available. The impact protection can come from a steel cap, but composite versions exist that meet the ANSI standard. Strap-on toe guards or metatarsal guards are also viable options in some cases.

Feet are not the only body part at risk from impacts. When tools are being used on elevated platforms, the best practice is to establish an exclusion zone below the work area and require the use of tool lanyards, but hard hats may be required if staff must be in the affected area. Working in tightly constrained areas with overhead piping or equipment can also lead to head injuries, although bump caps may provide sufficient protection for this application.

Cut-resistant gloves may be warranted for certain applications to prevent penetration injuries, depending on the results of the hazard analysis. When working with cutting tools like box cutters, preventive measures are generally preferable, but protective gloves are helpful when clearing broken glass or performing maintenance work around exposed metal edges. Such gloves can be standard mechanics gloves, leather, or even Kevlar models.

### Occupational Noise Hazards

Breweries have a wide variety of noise sources, ranging from packaging line machinery to malt conveyance to utilities such as air compressors. Noise exposure above an 85 dBA time-weighted average over 8 hours will require the implementation of a hearing conservation plan under U.S. federal OSHA regulations, but PPE measures are valuable even when they are not legally required. Disposable, single-use earplugs are a common choice, but need to be inserted correctly in order to achieve the rated noise reduction. Earmuffs are longer-lasting and less likely to be worn improperly, but some users find them awkward to wear with glasses.

### Respiratory Hazards

These hazards are best managed through environmental controls, such as dust collection systems, but PPE measures

still play a role. The most effective form of protection is a fit-tested respirator mask. Fit testing involves actually confirming that the mask seals firmly against the face and doesn't allow any air to leak through. Facial hair will automatically prevent a proper fit. These respirators also need to be stored properly to protect against damage and maintained in sanitary condition, rather than left hanging at the point of use.

Respirators also need to have filters appropriate to the task. Particulate filter cartridges will not protect against chemical fumes or vapors, so it's important to set the filter up properly. N95 dust masks skirt the technical definition of a fit-tested respirator and can help with grain dust, but they are limited in their capacity and may not provide adequate protection for materials such as filter media. As with chemical hazards, Safety Data Sheets should be referenced for PPE requirements.

### Fall Protection Hazards

In typical brewery environments, elevated work platforms will have safety railings that provide sufficient protection from falls. There are cases where fall prevention or fall arrest devices are needed. Examples include articulated boom lifts, silo ladders without safety cages, work near the edge of a roof, and being on top of an unprotected vessel or surface with more than a 4 ft drop to the next level.

Fall prevention devices are designed to restrict mobility, typically using a lanyard connecting the fall harness to a fixed attachment point that will keep the operator's center of mass from being able to reach a fall point. Fall arrest devices are more complicated and are intended to decelerate and limit the fall distance. Specific requirements will vary based on the situation, but in general fall prevention is preferable. Fall harnesses should be sized correctly, properly tightened and buckled, and inspected prior to use.

### Electrical Hazards

Breweries are wet environments, which leads to corrosion and degradation of electrical components. The National Fire Protection Association's (NFPA) 70E Arc Flash Standard calls for the use of Arc Flash Rated (AR) PPE for low-level circuits. (Level 0) requires cotton clothing with long sleeves/pant legs, safety glasses, and hearing protection. The next two levels—4 cal/cm<sup>2</sup> (Level 1) PPE—require AR Shirt/Pants, hard hat, 4 cal/cm<sup>2</sup> face shield, safety glasses, heavy-duty leather gloves, and hearing protection. The 8 cal/cm<sup>2</sup> (Level 2) PPE requires the face shield be replaced with a Balaclava/hood.

Note: Levels 1 and 2 would cover the most typical brewery applications, which are defined by arc flash rating of the electrical components. Beyond this, there are two more levels that require the same undergarments but now need AR Coveralls and a switching hood (Level 3) and for (Level 4) an addition of a double layer switching coat and head in place of the switching hood.

### Temperature Hazards

While temperature-appropriate clothing is important, this hazard category is geared towards protecting against extreme temperatures. Between wort, CIP solutions, and hot water, brewers regularly encounter surfaces hot enough to cause burns. Even when a surface isn't hot enough to burn the user, discomfort can lead to accidents or make it difficult to complete a task. Heat-resistant gloves should be worn with handling these materials. Waterproof aprons and boots can also help when splash-back or regular direct contact is involved.

Extreme cold can also cause serious burns. Leather gloves are recommended when changing liquid propane cylinders on forklifts and other equipment to protect against exposure from leaks. Handling cryogenic materials like liquid CO<sub>2</sub> or liquid nitrogen requires specialized protection and should not be taken lightly.

### Learn more!

#### Resources and Regulatory References

Federal OSHA PPE language

- [29 CFR §1910.132-140](#)

#### MBAA Toolbox Talks

- Personal Protective Equipment
- PPE Assessments
- Chemical Safety and Hazard Communication
- Compressed Gases
- Steel-toe Shoe Safety
- Hearing Conservation
- Protecting Your Hearing
- Dust Mask versus Respirators
- Fall Protection
- Walking-Working Surfaces
- Electrical Safety
- Qualified Electrical Safety

#### Brewers Association

- [Protective Clothing for Brewery Workers](#)

#### National Fire Protection Association

- [NFPA 70E Arc Flash Standard.](#)

FOR MORE INFORMATION ON BREWERY SAFETY,  
PLEASE VISIT THE MASTER BREWERS  
BREWERY SAFETY WEBSITE AT:  
[mbaa.com/brewresources/brewsafety](http://mbaa.com/brewresources/brewsafety)