

Glove Selection

According to OSHA's hand protection standard (29 CFR 1910.138), employers must select and require employees to use appropriate hand protection when employee's hands are exposed to hazards such as hazardous chemicals. Employee's must know when gloves are necessary, what type of gloves are necessary, how to properly put on, take off, adjust and wear them, glove limitations, and their proper care, maintenance, useful life, and disposal. Gloves made of rubber (latex, nitrile, or butyl), plastic, or synthetic rubber-like materials such as neoprene can protect workers from chemical hazards and also reduces the risk of exposure to blood and other potentially infectious materials.

Four Basic Factors to Consider

When selecting protective gloves, there are four basic factors to consider:

- How toxic is the material if absorbed through the skin?
- How will the glove be used?
- Using manufacturer test data for glove selection.
- Cost considerations.

How toxic is the material if absorbed through the skin?

Information pertaining to a specific chemical can be obtained from Material Safety Data Sheets (MSDS), Lab Chemical Safety Summaries for common lab chemicals, [NIOSH Pocket Guide to Chemical Hazards](#), ACGIH Exposure Limits, and toxicology studies. Key words are "S" or skin, dermal, [LD50 dermal](#), or skin vapor hazard. If the LD50 value for dermal studies for a particular chemical is below 5 mg/kg careful attention should be paid to glove selection.

How will the glove be used?

What is the anticipated contact with the chemical? Are there any dexterity or durability needs to consider? Are disposable or reusable glove needed?

Contact with Material

Is direct contact with the material expected or will gloves be used as a precaution for accidental contact? Are other chemicals that are easily absorbed through the skin or are carriers being used with the toxic material? Carriers are used intentionally to allow beneficial drugs such as prescription ointments to pass through the skin. Consider whether you are also using skin-absorbing chemicals such as DMSO that could intentionally increase skin exposure potential to toxic chemicals. If so, ensure that you are protected for all chemicals used.

Dexterity and Durability Needs

Will you be handling small containers, test tubes, or larger bulky items? Generally, higher resistance to chemical absorption is achieved with thicker gloves or gloves that are less flexible. If the ability to feel and handle smaller, breakable containers is required wearing a tight fitting, thin, flexible glove over the less flexible glove may improve dexterity. Will the gloves be used for handling sharp or rough objects? Degradation testing information will provide an indication of how gloves hold up physically and whether they develop pinholes or tear easily.

Disposable versus Reusable Gloves

How will reusable gloves be decontaminated and stored safely between uses. When gloves are put on and taken off frequently, the use of disposable gloves versus reusable gloves avoids the need for

decontamination between uses. Remember both types of gloves will ultimately need to be disposed of in a safe manner.

Using Manufacturer Test Data for Glove Selection

Manufacturers test gloves by immersing the glove in a particular chemical and checking three factors called degradation, permeation, and permeation rate. Degradation tests provide information about how the glove responds physically, e.g., how easily do pinholes or tears develop? Permeability tests provide information on chemical break-through time or how long it takes for the chemical to move through the glove material. Permeability rate tests show how fast the chemical continues to pass through the glove once it has initially broken through. Knowing the permeation rate of a particular type of glove can be an important factor to consider when working with highly toxic skin absorbers that may not cause pain or otherwise warn the user that break-through or chemical contact has occurred.

What if no test data is available? Consider how the chemical could be handled differently to avoid direct skin contact. Speak to the glove manufacturer about their recommendation to see if testing is ongoing or planned.

Cost Considerations

Safety, not cost, is the primary factor in selecting gloves, but sometimes cost can be reduced while still selecting gloves that are adequate for their intended use. For example, if the gloves will be used for short times periods, such as 15 minutes, you do not necessarily need a glove that has been tested for 240 or 480 minutes – the 60-minute glove may be adequate.

General Characteristics for Some Commonly Used Gloves

Butyl Rubber Gloves

These gloves protect against nitric acid, sulfuric acid, hydrofluoric acid, red fuming nitric acid, and peroxide. Butyl rubber gloves are highly impermeable to gases, chemicals, and water vapor. In addition, they resist abrasion and remain flexible at low temperatures.

Natural Latex or Rubber Gloves

These gloves protect worker's hand from most water solutions of acids, alkalis, salts, and ketones. They are not recommended for working with non-water solution hazardous chemicals. They are frequently used to protect against contact with blood or other potentially infectious materials.

Latex gloves have caused allergic reactions in some individuals. Hypoallergenic gloves, glove liners, and powderless gloves are possible alternatives for individuals who are allergic to latex gloves. Contact the Occupational Health Services at ext. 4157 for more information about latex glove allergies.

Neoprene Gloves

Neoprene gloves provide protection against a broad range of corrosives chemicals. They are resistant to oils, greases, alcohols, resins, alkalis, organic acids, and many solvents. Neoprene has poor resistance to chlorinated aromatic solvents, phenols, and ketones. These gloves have good pliability, finger dexterity, high density, and tear resistance.

Nitrile Gloves (Nitrile-Butadiene Rubber (NBR) marketed as Sol-Vex or Nitrile)

Nitrile gloves are a good choice if work involves aromatic petroleum, and chlorinated solvents such as trichloroethylene and perchloroethylene. Nitrile gloves stand up to heavy use even though they are designed for work where dexterity and sensitivity are required. They are generally resistant to abrasions, punctures, snags, and tears.

Silvershield or 4H Gloves

These gloves provide excellent chemical resistant, but are stiff and have poor grip and fit. They are commonly used of HazMat work and are a good choice for universal spill kit gloves.

Online Resources for Glove Selection

Always check the specific manufacturer's glove test data prior to purchasing and using a specific type of glove. Though glove materials are similar, glove thickness, lining, and other features may vary that can affect test results and chemical resistance.

[Ansell](#)

[Arbill Glove and Safety Products](#)

[DuPont Kevlar](#)

[Honeywell Safety Products](#)

[Kimberly-Clark Professional](#)

[Marigold Industrial](#)

[MCR Safety](#)

[North Safety Products](#)

[QRP Gloves & Fingercots](#)

[Showa](#)