

Gloves

Appropriate hand protection is required when the hands are exposed to hazards from severe cuts, lacerations, abrasions, punctures, chemical or thermal burns, harmful temperature extremes, and skin absorption of harmful substances. Gloves should be replaced immediately if they are contaminated or torn.

A careful evaluation of the hazard must be made due to the enormous variety of gloves on the market. There are no ANSI standards for gloves. Glove selection will be based on performance characteristics of the gloves, conditions, duration of use, and hazards present. One type of glove will not work in all situations. Gloves should be carefully selected for their degradation and permeation characteristics to provide proper protection.

In selecting gloves for use against chemicals, the exact chemicals encountered needs to be determined. Labels and [SDS](#) can provide this information. All glove materials are eventually permeated by chemicals. They can be used safely for a limited time. If using extremely hazardous chemicals, double disposable gloves or special materials gloves are recommended. The thin, latex, vinyl, or nitrile gloves, popular for their dexterity, are not appropriate for highly toxic chemicals or solvents. A manufacturer's glove selection guide is the best reference when selecting gloves. EH&S can assist in determining the specific type of glove material that should be worn for particular chemicals.

Latex gloves should be avoided due to the possibility of latex allergies. Studies have revealed that 8 to 12 percent of health-care workers regularly exposed to latex are sensitized. The National Institute for Occupational Safety and Health (NIOSH) recommends the selection of products that reduce the risk of allergic reactions. For general laboratory use, disposable nitrile gloves are an excellent latex substitute. In addition to reducing the risk of sensitization, nitrile gloves offer superior chemical resistance over latex to many chemical substances.

Gloves should never be worn in situations when the glove could be caught in rotating or moving parts. Employees should not wear gloves when operating drill presses, lathes, or other equipment with exposed moving parts. Gloves will need to be inspected daily and disposed of immediately if there is any damaged observed (i.e. hole, tear, puncture, cut, change in textured, embedded object, etc.).

Selection Guidelines for Hand and Arm Protection

If a workplace hazard assessment reveals that employees face potential injury to hands and arms that cannot be eliminated through engineering and work practice controls, supervisors must ensure that employees wear appropriate protection. Potential hazards include skin absorption of harmful substances, chemical or thermal burns, electrical dangers, bruises, abrasions, cuts, punctures, fractures and amputations. Protective equipment includes gloves, finger guards and arm coverings or elbow-length gloves.

Explore all possible engineering and work practice controls to eliminate hazards and use PPE to provide additional protection against hazards that cannot be completely eliminated through other means. For example, machine guards may eliminate a hazard. Installing a barrier to prevent workers from placing their hands at the point of contact between a table saw blade and the item being cut is another method.

Types of Protective Gloves

There are many types of gloves available today to protect against a wide variety of hazards. The nature of the hazard and the operation involved will affect the selection of gloves. The variety of potential occupational hand injuries makes selecting the right pair of gloves challenging. It is essential that employees use gloves specifically designed for the hazards and tasks found in their workplace because

gloves designed for one function may not protect against a different function even though they may appear to be an appropriate protective device.

The following are examples of some factors that may influence the selection of protective gloves for a workplace:

- Type of chemicals handled.
- Nature of contact (total immersion, splash, etc.).
- Duration of contact.
- Area requiring protection (hand only, forearm, arm).
- Grip requirements (dry, wet, oily).
- Thermal protection.
- Size and comfort.
- Abrasion/resistance requirements.

Gloves made from a wide variety of materials are designed for many types of workplace hazards. In general, gloves fall into four groups:

- Leather, canvas or metal mesh gloves

Sturdy gloves made from metal mesh, leather or canvas provide protection against cuts and burns. Leather or canvas gloves also protect against sustained heat.

- **Leather gloves** protect against sparks, moderate heat, blows, chips and rough objects.
- **Aluminized gloves** provide reflective and insulating protection against heat and require an insert made of synthetic materials to protect against heat and cold.
- **Aramid fiber gloves** protect against heat and cold, are cut - and abrasive - resistant and wear well.
- **Synthetic gloves** of various materials offer protection against heat and cold, are cut - and abrasive - resistant and may withstand some diluted acids. These materials do not stand up against alkalis and solvents.

- Fabric and coated fabric gloves

Fabric and coated fabric gloves are made of cotton or other fabric to provide varying degrees of protection.

- **Fabric gloves** protect against dirt, slivers, chafing and abrasions. They do not provide sufficient protection for use with rough, sharp or heavy materials. Adding a plastic coating will strengthen some fabric gloves.
- **Coated fabric gloves** are normally made from cotton flannel with napping on one side. By coating the un-napped side with plastic, fabric gloves are transformed into general-purpose hand protection offering slip-resistant qualities. These gloves are used for tasks ranging from handling bricks and wire to chemical laboratory containers. When selecting gloves to protect against chemical exposure hazards, always check with the manufacturer or review the manufacturer's product literature to determine the gloves' effectiveness against specific workplace chemicals and conditions.

- Chemical and liquid resistant gloves

Chemical-resistant gloves are made with different kinds of rubber: natural, butyl, neoprene, nitrile and fluorocarbon (viton); or various kinds of plastic: polyvinyl chloride (PVC), polyvinyl alcohol and polyethylene. These materials can be blended or laminated for better performance. As a general rule, the thicker the glove material, the greater the chemical resistance but thick gloves may impair grip and dexterity, having a negative impact on safety.

Some examples of chemical-resistant gloves include:

- **Butyl gloves** are made of a synthetic rubber and protect against a wide variety of chemicals, such as peroxide, rocket fuels, highly corrosive acids (nitric acid, sulfuric acid, hydrofluoric acid and red-fuming nitric acid), strong bases, alcohols, aldehydes, ketones, esters and nitro compounds. Butyl gloves also resist oxidation, ozone corrosion and abrasion, and remain flexible at low temperatures. Butyl rubber does not perform well with aliphatic and aromatic hydrocarbons and halogenated solvents.
- **Natural (latex) rubber gloves** are comfortable to wear, which makes them a popular general-purpose glove. They feature outstanding tensile strength, elasticity and temperature resistance. In addition to resisting abrasions caused by grinding and polishing, these gloves protect workers' hands from most water solutions of acids, alkalis, salts and ketones. Latex gloves have caused allergic reactions in some individuals and may not be appropriate for all employees. Hypoallergenic gloves, glove liners and powderless gloves are possible alternatives for workers who are allergic to latex gloves.
- **Neoprene gloves** are made of synthetic rubber and offer good pliability, finger dexterity, high density and tear resistance. They protect against hydraulic fluids, gasoline, alcohols, organic acids and alkalis. They generally have chemical and wear resistance properties superior to those made of natural rubber.
- **Nitrile gloves** are made of a copolymer and provide protection from chlorinated solvents such as trichloroethylene and perchloroethylene. Although intended for jobs requiring dexterity and sensitivity, nitrile gloves stand up to heavy use even after prolonged exposure to substances that cause other gloves to deteriorate. They offer protection when working with oils, greases, acids, caustics and alcohols but are generally not recommended for use with strong oxidizing agents, aromatic solvents, ketones and acetates.
- Insulating rubber gloves (See [Electrical Safety](#) program for information on voltage rated gloves and electrical protective equipment for detailed requirements on the selection, use and care of insulating rubber gloves).

Care of Protective Gloves

Protective gloves should be inspected before each use to ensure that they are not torn, punctured or made ineffective in any way. A visual inspection will help detect cuts or tears but a more thorough inspection by filling the gloves with water and tightly rolling the cuff towards the fingers will help reveal any pinhole leaks. Gloves that are discolored or stiff may also indicate deficiencies caused by excessive use or degradation from chemical exposure.

Any gloves with impaired protective ability should be discarded and replaced. Reuse of chemical-resistant gloves should be evaluated carefully, taking into consideration the absorptive qualities of the

gloves. A decision to reuse chemically-exposed gloves should take into consideration the toxicity of the chemicals involved and factors such as duration of exposure, storage and temperature.

Additional Information and Resources

- Glove Selection Charts
 - [Center for Disease Control and Prevention](#)
 - [Cole Parmer](#)
 - [MAPA Professional](#)
 - [Bestglove](#)
 - [Microflex](#)
 - [Grainger](#)
 - [All Safety Products](#)
- Puncture and Cut Resistant Gloves
 - [Kent Scientific](#)
 - [AnsellPro](#)
 - [Lab Safety](#)
- [Compatibility of Reusable Gloves](#)
- [Glove Types and Breakthrough Times](#)
- [Overview of Glove Selection](#)
- [Nine Myths of Disposable Gloves](#)