PPE Selection Guide

The information provided here is to be used only as a guide in selection of the proper glove. Due to the differences in glove performance between manufacturers before you work with any toxic or highly toxic materials always consult the manufacturer to ensure that the glove selected is correct for your application. At the end of this document are links to various glove manufacturing or suppliers and their respective glove compatibility or chemical resistance charts. Please use these charts to ensure the gloves being used to handle chemicals are providing adequate protection to the wearer.

It is important to note that all chemicals will not be listed on these charts. It is also essential to note that two similar gloves supplied by two separate manufacturers may not provide the same level of protection to a specific chemical. Therefore, it will necessary to consult the manufacturer’s specific compatibility chart for the brand of gloves being used.

Understanding terms used in glove compatibility charts:

Breakthrough time:  Time it takes for the chemical to travel through the glove material. This is only recorded at the detectable level on the inside surface of the glove.

Permeation Rate:  Time it takes for the chemical to pass through the glove once breakthrough has occurred. This involves the absorption of the chemical into the glove material, migration of the chemical through the material, and then deabsorption once it is inside the glove.

Degradation rating:  This is the physical change that will happen to the glove material as it is affected by the chemical. This includes, but is not limited to swelling, shrinking, hardening, cracking, etc. of the glove material.

Abrasion Resistance rating:  This is a measurement of glove abrasion resistance based on the number of cycles of a 500 gram load for ratings 0 to 3 and a 1000 gram load for ratings 4 to 6. (ANSI / ISEA 105-2005 Mechanical Ratings)

Cut Resistance rating:  This is a measurement of the cut resistance of a glove based on the amount of weight needed to cut through the material with 25 mm of blade travel for ratings 0 through 6. (ANSI / ISEA 105-2005 Mechanical Ratings)

Puncture Resistance rating:  This is a measurement of glove puncture resistance based on the force in Newtons required to puncture the glove material using a specifically designed stylus for ratings 0 through 6. (ANSI / ISEA 105-2005 Mechanical Ratings)

Factors that affect given breakthrough times for glove materials are glove thickness, concentration of chemical, amount of chemical in contact with glove material, length of time glove material is exposed to chemical, temperature and or abrasion or puncture resistance of glove material.
No glove may be used as protection from all chemicals. A glove may protect against a specific chemical, but it may not protect the wearer from another. If a glove protects the wearer, it will not protect the wearer forever, as the glove material will deteriorate. Therefore, the following must be considered when choosing which gloves are to be worn to protect against chemical exposures.

Factors to consider when choosing gloves:

Chemical to be used: Consult the compatibility charts to ensure that the gloves will protect you.

Chemical use is very small amounts for a short period of time. (Incidental Contact) (ie micro scale usage)

Chemical use is large amounts for extended periods of time. (Extended Contact) (ie large scale usage)

Dexterity needed: The thicker the glove, typically the better the chemical protection, as the glove will be more resistant to physical damage, like tears and cracks, but it will harder be to handle and feel the work.

Extent of the protection required: Determine if a wrist length glove provides adequate protection, or will a glove that extends further up the arm be required.

Type of work to be done: gloves are specific to the task. Ensure the correct glove is chosen to avoid injuries. Examples: A nylon cryogenic glove will be damaged if a hot item is handled, where as a “hot mitt” will not protect the wearer when liquid nitrogen is used, as it may be too porous.

GENERAL SAFETY PROCEDURES FOR GLOVE USE

Make sure glove material is resistance and compatible with the chemicals you will be using.

Inspect gloves for holes or tears prior to use. Replace gloves periodically based on signs of permeation and or degradation.

Wash disposable gloves prior to removing them or placing them in normal trash receptacles. Disposable gloves are considered one use only once removed.

Certain biologically contaminated gloves must be sterilized prior to disposal.

Certain chemically contaminated gloves must be placed into a sealable plastic bag as hazardous waste.

Remove gloves prior to leaving your work area or the laboratory.

Remember the “designated area rule” where “science” does not mix with personal space (one’s desk or lunch space).

Gloves used in research are considered “science”.

If gloves are needed to transport anything, wear one glove to handle the transported item.

The free hand is then used to touch door knobs, elevator buttons, etc.
If you are wearing gloves to “protect your sample from you” and are in the hall, no one else understands this and will be concerned about the items you have contaminated with those gloves.

Reusable gloves must be washed and dried as needed, and then inspected for tears and holes prior to reuse.

Double glove if additional precautions are needed. If for any reason a glove fails, and chemicals come into contact with skin, consider it an exposure and seek medical attention. Wash your hands after removing and discarding gloves.

GENERAL SAFETY NOTES REGARDING LATEX OR “NATURAL RUBBER” GLOVE USE

The use of latex gloves is NOT RECOMMENDED, and the use of powdered latex gloves is PROHIBITED. All latex gloves, regardless of manufacturer present a risk of irritation, sensitization or allergic reaction in susceptible individuals. These symptoms can develop immediately or over time with increased use or contact. Although this risk is reduced in gloves with lower levels of latex protein and process chemicals there use is still not recommended. Powdered latex gloves carry additional risk for those sensitized individuals, because the latex protein leaches into the powder and becomes airborne when gloves are removed, additionally this powder may be carried on an individual’s clothing thus subjecting others to come into contact with latex proteins. If latex gloves are the only appropriate glove for the task, then a superior quality, powder free glove with < 100 μ grams / gram of extractable or leachable latex protein should be selected for use.

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