

Guidelines for the Selection of Chemical-Resistant Gloves

SafetyNet #: 50

The most common injury in the workplace is dermatitis, an inflammation of the skin often resulting from contact with chemicals. The choice of proper gloves is an essential step in protecting skin from contact with chemicals. However, no glove material is absolutely impermeable. Gloves should not be used as a substitute for procedural changes that remove your hands from the area of potential contamination. Chemicals may **penetrate** glove materials through seams, tears, or imperfections in the glove material. The glove material can absorb chemicals resulting in skin contact. When selecting a glove, some of the factors you should consider are:

- Type of chemicals
- Concentration of the chemicals
- Temperature of the chemicals
- Frequency and duration of contact with chemicals
- Abrasion resistance
- Dexterity/grip characteristics of glove
- Length of body area to be protected (hand, forearm, arm)

GLOVE MATERIALS

Chemically resistant gloves are available in a variety of materials including natural rubber or latex, butyl, neoprene, nitrile, polyethylene, polyvinyl chloride, and combinations of these materials. Significant differences exist between various manufacturers' formulations of the same base material that can affect how their gloves will perform. The form of the material may also affect performance. For example, molded neoprene can have significantly different properties from those of coated neoprene.

Physical integrity of the glove is also important. A glove that provides excellent chemical resistance without adequate resistance to tears, punctures, or abrasions is of little value. Generally, for a given material, the thicker the film of protective material, the better. However, a thicker material can impair dexterity. Likewise, gloves that are too small can restrict circulation, causing hand fatigue, while gloves that are too large can be uncomfortable and hard to use.

Generally, the types of chemicals used will be the primary factor in selecting the appropriate glove material; however, all factors should be considered in making the final selection.

Because of the differences that exist between manufacturers' products and the testing methods that are used to rate a material's resistance to a chemical, most manufacturers or vendors include disclaimers with their lists stating that the data is intended for guidance only. Be aware that even a glove with an "excellent" rating is not impervious indefinitely. By following these guidelines and the manufacturer's recommendations, skin contact with chemicals can be kept to a minimum.

- Conduct your own test. Turn a glove inside out, fill it with the test solution, and suspend it over a basin. (If the test solution is volatile, conduct the test in a fume hood.) Check periodically for cracking, softening, dripping, or deterioration. The time it takes for signs of degradation to occur is an indication of the ability of the glove to protect your skin.
- Thin vinyl or latex gloves available from the Storehouse are effective only against water-based or other relatively polar solutions--not organic solvents. Neoprene gloves, also available from the Storehouse, provide better protection against many organic substances.
- If you are working with a mixture of chemicals, check the glove material for resistance to each component of the mixture.
- Before you put on protective gloves (even new ones), check them for holes, tears, and other defects, such as softening or deformation, which indicate that physical or chemical degradation has occurred. Latex gloves are extremely sensitive to storage conditions (e.g. high temperatures and ozone). A damaged glove is worse than no glove at all--it can leak chemicals and trap them next to your skin.
- The glove recommended as the best choice may be bulky, stiff, or have other properties that limit its use for detail work. If sensitivity of touch is required, it may be better to use remote handling techniques plus a lightweight pair of disposable gloves, changed frequently.
- Make sure that all open wounds, abrasions, or other breaks in the skin are covered before putting on protective gloves. Some chemicals that do not affect the skin may have severe toxicological effects internally.
- Before reusing gloves, test them again for resistance. Chemicals may have permeated the glove material even though the gloves have been thoroughly rinsed or cleaned.
- Review the Safety Data Sheet (SDS) for the chemicals or products of interest. SDSs are available in your department office.

The following manufacturers provide on-line glove selection information:

Ansell: <http://www.ansellpro.com/> [1]

Best: <http://www.bestglove.com/> [2]

MAPA: <http://www.mapa-pro.com/> [3]

North Safety Products: <http://www.northsafety.com/> [4]

SafeSkin (Kimberly-Clark): <http://www.safeskin.com/> [5]

Contact

Research Safety

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More information

<http://safetyservices.ucdavis.edu/research-safety-staff-listing> [6]

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Links

[1] <http://www.ansellpro.com/>

[2] <http://www.bestglove.com/>

[3] <http://www.mapa-pro.com/>

[4] <http://www.northsafety.com/>

[5] <http://www.safeskin.com/>

[6] <http://safetyservices.ucdavis.edu/research-safety-staff-listing>