GLOVE SELECTION CHART

Do you know if the glove you are using is right for the tasks you do?

Choosing the Right Glove

First: Determine the Hazard

What is the main hazard? Are you concerned with protection from hazardous chemicals, biological materials, radioactive materials, sharp objects, or a combination of these? Also, consider the length of exposure.

Second: Glove Selection

In general ***latex*** and ***nitrile*** gloves are by far the most common gloves used in research laboratories on campus. Standard latex exam gloves are cheap and do provide protection for biological and aqueous radioactive hazards. However, you probably won't find them listed in chemical glove selection guides, so, if your main concern is chemical protection then this is not the glove for you. While disposable nitrile gloves are slightly more expensive than latex, you can find glove selection data for some of them.

1. **Chemical Hazard**

   Look at glove selection guides in catalogs or websites of various scientific and safety suppliers. Gloves are rated for degradation, breakthrough, and permeation rates. Choose a glove that provides the best resistance to the chemical being used. For some hazards double gloving may be needed. *(For example, now the recommended gloves for dimethyl mercury are a highly resistant laminate glove (Silver-Shield or 4H), which has no abrasion/cut resistance, worn under a pair of long cuffed unsupported neoprene, nitrile, or similar heavy-duty glove.)*

2. **Biological Hazards**

   Protection from biological hazards may be simple or complex dependent on whether the biological material is immersed in something other than water.

3. **Radioactive Hazards**

   Gloves provide a necessary personal protection barrier and help prevent scatter contamination. Glove selection is based on the carrier material (i.e. water, toluene, etc.). (Radioiodination procedures require double gloving.)

4. **Sharps Hazards**

   Chemical compatibility guides may not indicate susceptibility to abrasion or cuts. You will need to check Manufacturer or Supplier for this information.

5. **Combination Hazard**

   Selection guides normally list gloves by the protection they provide from one "pure" chemical, not a combination. In this case selection should be based on the component with the shortest breakthrough time.

The following guide is a general guide for glove selection in relation to chemicals handled. The information presented here is believed to be accurate; however, we cannot guarantee its accuracy. Many factors affect the breakthrough times of glove materials including, but not limited to:

1. Thickness of glove material
2. Concentration of the chemical worked with
3. Amount of chemical the glove comes in contact with
4. Length of time which the glove is exposed to the chemical
5. Temperature at which the work is done
6. Possibility of abrasion or puncture.

Some Common Sense Rules for Glove Use

(Source - http://www.allsafetyproducts.biz/site/323655/page/74172)

- Select gloves which are resistant to the chemicals you may be exposed to. Consult the relevant Safety Data Sheet (SDS) which may recommend a particular glove material.
- Select gloves of the correct size and fitting; gloves that are too small are uncomfortable and may tear whereas overlarge gloves may interfere with dexterity. In some cases, such as use of HF, it may be advisable to select gloves that can be removed very rapidly in an emergency.
- Before use, check gloves (even new ones) for physical damage such as swelling, shrinking, cracking, discoloration, tears or pin holes and for previous chemical damage: this is especially important when dealing with dangerous materials such as HF. Always check out the expiration date and never use expired gloves.
- When working, it may be advisable to wash the external surface of the gloves frequently with water.
- Some gloves, especially lightweight disposables, may be flammable: keep hands well away from naked flames or other high temperature heat sources.
- When removing gloves, do so in a way that avoids the contaminated exterior contacting the skin.
- Wash hands after removing gloves.
- Dispose of contaminated gloves properly.
- Do not attempt to re-use disposable gloves.
- Never wear possibly contaminated gloves outside of the laboratory or to handle telephones, computer keyboards, *etc*.

This information is provided as a guide to proper glove material selection. Glove performance varies between manufacturers, so always give yourself extra time and do not push glove strength to the estimated limits and consult a certified safety consultant when in doubt to make sure you have the right glove for your application.

Selection Key:

4	Excellent, breakthrough times generally greater than 8 hours.
3	Good, breakthrough times generally greater than 4 hours.
2	Fair, breakthrough times generally greater than 1 hour.
1	Not Recommended, breakthrough times generally less than 1 hour.
?	Not Tested or Information unknown. Use known tested glove type.

GLOVE SELECTION GUIDE

	Natural Rubber	Neoprene	Butyl	PVC	Nitrile	Viton®
Chemical						
Organic Acids						
Acetic acid	2	3	4	2	1	4
Formic acid	2	3	4	3	2	2
Lactic Acid	4	4	4	3	4	4
Maleic acid	3	3	2	3	3	4
Oxalic acid	4	4	4	4	4	4

	Natural Rubber	Neoprene	Butyl	PVC	Nitrile	Viton®
Inorganic acids						
Chromic acid up to 70%	1	1	4	3	3	4
Hydrochloric acid up to 37%	3	3	4	3	3	3
Hydrofluoric acid up to 70%	2	2	3	1	1	?
Nitric acid 70+ %	?	1	2	?	1	4
Perchloric acid up to 70%	4	4	3	4	4	4
Phosphoric acid 70+ %	4	4	4	4	4	4
Sulfuric acid 70+ %	1	2	4	2	1	2
	Natural Rubber	Neoprene	Butyl	PVC	Nitrile	Viton®
Alkalis						
Ammonium hydroxide up to 70%	1	3	4	2	3	?
Potassium hydroxide up to 70%	4	4	4	4	4	4
Sodium hydroxide 70+ %	4	4	4	4	3	3

	Natural Rubber	Neoprene	Butyl	PVC	Nitrile	Viton®
Salt Solutions						
Ammonium nitrate	4	4	4	4	4	4
Calcium hypochlorite	1	3	4	4	3	4
Ferric chloride	4	4	4	4	4	4
Mercuric chloride	3	3	4	3	3	4
Potassium cyanide	4	4	4	4	4	4
Potassium dichromate	4	4	4	4	4	4
Potassium permanganate	4	4	?	4	4	?
Sodium cyanide	4	4	4	4	4	4
Sodium thiosulfate	4	4	4	4	4	4
	Natural Rubber	Neoprene	Butyl	PVC	Nitrile	Viton®
A**romatic hydrocarbons**						
Benzene	1	1	1	1	1	3
Gasoline	1	1	1	1	4	4
Naphthalene	1	1	1	1	4	4
Toluene	1	1	1	1	1	4
Xylene	1	1	1	1	1	4

	Natural Rubber	Neoprene	Butyl	PVC	Nitrile	Viton®
Aliphatic hydrocarbons						
Diesel fuel	1	2	1	2	3	4
Hexanes	1	1	1	1	4	4
Kerosene	1	3	1	3	4	4
Naphtha	1	2	1	3	4	4
Pentane	1	1	1	1	3	4
Petroleum ether	1	1	1	2	3	4
Turpentine	1	1	1	1	2	4

	Natural Rubber	Neoprene	Butyl	PVC	Nitrile	Viton®
Halogenated hydrocarbons						
Carbon tetrachloride	1	1	1	1	1	4
Chloroform	1	1	1	1	1	4
Methylene chloride	1	1	1	1	2	3
Polychlorinated biphenyls (PCB's)	1	4	4	?	2	4
Perchloroethylene	1	1	1	1	2	4
Trichloroethylene	1	1	1	1	1	4

	Natural Rubber	Neoprene	Butyl	PVC	Nitrile	Viton®
Esters						
Ethyl acetate	1	1	3	1	1	1
Butyl acetate	1	1	2	1	1	1
Methyl acetate	1	1	4	1	1	1
Isobutyl acrylate	1	1	4	1	1	1
	Natural Rubber	Neoprene	Butyl	PVC	Nitrile	Viton®
Ethers/Glycols						
Diethyl ether	1	2	1	1	2	1
Ethylene glycol	1	2	4	1	2	4
Isopropyl ether	1	2	1	1	3	1
Propylene glycol	?	3	3	2	2	?
Tetrahydrofuran	1	1	2	1	1	1

	Natural Rubber	Neoprene	Butyl	PVC	Nitrile	Viton®
Aldehydes						
Acetaldehyde	1	1	4	1	1	1
Acrolein	1	1	4	1	1	1
Benzaldehyde	1	1	4	1	1	3
Butyraldehyde	1	1	4	1	1	1
Formaldehyde	1	2	4	2	4	4
Glutaraldehyde	?	4	4	2	?	4

	Natural Rubber	Neoprene	Butyl	PVC	Nitrile	Viton®
Ketones						
Acetone	1	1	4	1	1	1
Diisobutyl ketone	1	1	2	1	1	2
Methyl ethyl ketone	1	1	4	1	1	1

	Natural Rubber	Neoprene	Butyl	PVC	Nitrile	Viton®
Alcohols						
Allyl alcohol	1	1	4	1	4	3
Butyl alcohol	1	3	4	2	3	4
Ethyl alcohol	1	2	4	1	3	4
Isopropyl alcohol	1	3	4	2	4	4
Methyl alcohol	1	1	4	1	1	4

	Natural Rubber	Neoprene	Butyl	PVC	Nitrile	Viton®
Amines						
Aniline	1	1	4	1	1	2
Ethanolamine	2	4	4	3	4	4
Ethylamine	1	2	4	1	1	1
Methylamine	1	3	4	2	4	4
Triethanolamine	1	1	4	1	4	4

	Natural Rubber	Neoprene	Butyl	PVC	Nitrile	Viton®
Miscellaneous						
Acetic anhydride	1	2	4	1	1	1
Acetonitrile	1	1	4	1	1	1
Acrylamide	1	1	3	1	2	3
Carbon disulfide	1	1	1	1	1	4
Cresols	1	3	4	?	2	4
Cutting fluid	?	2	?	2	3	?
Dimethyl sulfoxide	1	4	4	1	1	1
Hydraulic oil	?	?	1	2	3	?
Hydrazine	2	4	4	4	4	1
Hydrogen Peroxide	4	2	4	3	4	4
Lubricating oil	3	3	?	?	4	3
Malathion	?	3	1	?	3	?
Nitrobenzene	1	1	4	1	1	4
Phenol	1	3	2	1	1	4
Photo solutions	3	4	?	3	4	?
Picric acid	1	2	3	1	2	4
Pyridine	1	1	4	1	1	1

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	Natural Rubber	Neoprene	Butyl	PVC	Nitrile	Viton®
Elements						
Bromine	1	2	1	?	1	4
Chlorine aqueous	?	1	2	?	1	4
Iodine	?	1	3	?	3	4
Mercury	?	4	4	?	4	4

If there are any questions concerning the material or chemical that you are handling and your selection of appropriate gloves for your work, contact the Chemical Safety Office at 1-2663.