



CHEMICALS AND HAND PROTECTION

Hands and fingers are subject to an army of hazards on the when you work with any type of chemical. When working with cleaning chemicals, it is most often our hands that come into DIRECT CONTACT with the chemical if Personal Protective Equipment is not used or the CORRECT protection is not used. There are several hazards associated with exposure to chemicals. Generally,

- **EXPOSURE** means contact through the skin or respiratory system, and ingestion.
- Once exposed, the person could be affected adversely by developing skin dermatitis or a burn from a corrosive chemical.
- Chemical can also be absorbed through the skin and into the body, causing a reaction that can lead to acute poisoning.

General symptoms often associated with mild exposure to chemicals include:

- **HEADACHE**
- **FATIGUE**
- **DIZZINESS**
- **LOSS OF APPETITE**
- **STOMACH CRAMPS**
- **DIARRHEA**
- Severe exposure to highly toxic compounds can lead to loss of coordination, **seizures**, and unconsciousness.

When working with chemicals, **NO SINGLE GLOVE WILL PROTECT YOUR HANDS COMPLETELY**. Gloves made from polymers and other materials have their strengths and weaknesses in terms of preventing resistance and physical properties like resistance to tearing and abrasion.

- Since no protect-all polymer exists, selecting the right glove for the job is imperative to your safety.

SELECTION

The selection of the proper chemical-resistant glove begins with an evaluation of the job **application**. Factors that influence this selection are:

- **The type of chemicals to be handled** (or used)
- **Frequency and length of duration** of chemical contact
- **Nature of contact** (total immersion or splash only)
- **Concentration of chemicals**
- **temperature** & thermal protection of chemicals
- **Abrasion/resistance requirements**
- **Dexterity requirements & grip requirements** (dry grip, wet grip, oily)



- Size and comfort requirements
- Price

The type of chemical being used is the key factor for choosing of what material the glove should be made. When possible use the specific chemical as the basis for the selection.

Some of the more common glove materials are:

- **Butyl** - a synthetic rubber with good resistance to weathering and a wide variety of chemicals
- **Rubber** - a highly flexible and conforming material made from a liquid tapped from rubber plants
- **Neoprene** - a synthetic rubber having chemical and wear-resistance properties superior to those of natural rubber
- **Nitrile** - a copolymer available in a wide range of acrylonitrile (propane nitrile) content; chemical resistance and stiffness increase with higher acrylonitrile content
- **Polyethylene** - a fairly chemical-resistant material used as a freestanding film or a fabric coating
- **Polyvinyl alcohol** - a water-soluble polymer that exhibits exceptional resistance to many organic solvents that rapidly permeate most rubbers
- **Polyvinyl chloride** - a stiff polymer that is made softer and more suitable for protective clothing applications by the addition of plasticizers
- **Polyurethane** - an abrasion-resistant rubber that is either coated into fabrics or formed into gloves or boots
- **Server Shield** - a registered trademark of North Hand Protection, it is highly chemical-resistant to many different class of chemicals
- **Viton®** - a registered trademark of DuPont, it is a highly chemical-resistant but expensive synthetic elastomer

For a given thickness, the type of polymer selected has the greatest influence on the level of chemical protection. For a given polymer an increase in thickness will result in a higher level of protection.

- A rule of thumb is that double the thickness will quadruple the breakthrough time.

Physical performance may be a more critical factor in some cases than chemical resistance.



- If a job application involves **handling heavy, rough, or sharp objects then the glove must have high resistance to abrasion, cuts, snags, etc.**
- **A hole in a glove can provide much greater chemical exposure potential than molecular permeation.**

Use the following steps in selecting the proper gloves when handling chemicals:

- **Refer to manufacturer's Chemical Resistance Guide** and Physical Performance Chart and select the glove type with the highest rating for the chemical and physical conditions.
- **Refer to the chemical label and the Material Safety Data Sheet (MSDS),** which may recommend a specific glove type.
- **Select a palm finish to provide the grip needed for the job-smooth, dipped, or embossed.**
- **Choose the glove length by the depth to which the arm will be immersed** and by allowing for protection against chemical splash.
- **Select thin-gauge gloves for jobs demanding sensitive touch** and high flexibility. If greater protection or durability is wanted, choose a heavy-duty style. But always choose the correct size.

USE AND CARE

Always inspect your gloves before using them. Of principal concern are cuts, tears and punctures. **Discoloration or stiffness may indicate non-uniformities in the rubber or plastic or chemical attack resulting from previous use.**

- **Visual inspection should be done every time you use the gloves** to detect pinholes or other defects.
- **Dispose of gloves that have been damaged or show signs of chemical degradation.**
- **It is extremely important to avoid secondary exposure to the chemical after application.**
- **Before removing the gloves, thoroughly wash gloves with soap and water, or a detergent and water, and then rinse with a lot of running water.** The gloves may now be removed.
- **As the gloves dry in a decontaminated area, thoroughly wash your hands with soap and water.** Make this a strict practice!

REUSE

Once absorbed, some chemicals will continue to diffuse through the material toward the inside EVEN AFTER the surface has been DECONTAMINATED.



Some gloves can be re-used if the chemical does not permeate the outer layer. If this is at all possible, then re-use is a bad idea.

- For highly resistant chemical gloves, the **amount reaching the inside may be insignificant.**
- But for moderately performing materials, **significant amounts of chemicals reach the inside.**
- The disposal of gloves on a regular and frequent basis is advisable.