

# Glove Selection for Working with Pesticides

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Pesticides can enter the body in four main ways: by mouth, by inhalation, by contact with the skin or eyes. In most pesticide handling situations, the skin is the part of the body most likely to receive exposure. About 97% of human exposure to pesticides during application of liquid sprays occurs through contact with the skin. To prevent exposure, pesticide applicators should wear protective clothing and personal protective equipment (PPE). The use of gloves while handling pesticides can go a long way in reducing dermal exposure.

## SPECIFIC INFORMATION

Every pesticide product label contains specific information about necessary clothing and equipment to be worn while mixing, loading, and applying that product. The information may be found in the "Precautionary Statements" section of the label (Figure 1). Remember, the label is the law. Read it and wear the appropriate equipment. More detailed information

about chemical and physical hazards associated with a specific pesticide may be found by reading the products Material Safety Data Sheet (MSDS). The MSDS is available from the pesticide dealer. For guidance in understanding the MSDS, refer to EDIS Document PI-35, Understanding Material Safety Data Sheet Language <http://edis.ifas.ufl.edu/PI072>.

Pesticide labels frequently specify use of either waterproof or chemical-resistant gloves. Keep in mind that waterproof materials are not necessarily chemical-resistant. Gloves used for handling pesticides should be unlined and not made of cotton, leather, canvas, or other absorbent materials.

Polymers used for chemical-resistant gloves include barrier laminate (Figure 2), butyl rubber (Figure 3), nitrile rubber (Figure 4), neoprene rubber (Figure 5), natural rubber (Figure 6), polyethylene plastics, polyvinyl chloride (Figure 7), and Viton®. These materials are used

either individually or in various combinations in commercially available gloves.

Some labels will refer to the EPA resistance chart. Refer to Table 1 when the PPE section of the pesticide label specifies chemical-resistance categories A through H. The table refers you to several PPE materials from which to choose for each category. It also tells how long you can expect the material to be resistant to the pesticide you are using. For example, the label may state: "If you want more options, follow the instructions for category C on an EPA chemical resistance category selection chart." This means gloves made of either barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, polyvinyl chloride, or Viton® would be the better choice compared to natural rubber or polyethylene. Since those six materials are rated as "High" in their level of chemical resistance, they would be expected to maintain their integrity for the entire day while working with that product.

Table 1. EPA chemical resistance\* categories.

Category	Barrier laminate	Butyl rubber	Nitrile rubber	Neoprene rubber	Natural rubber	Polyethylene	Polyvinyl chloride	Viton® > 14 mils
A	High	High	High	High	High	High	High	High
B	High	High	Slight	Slight	None	Slight	Slight	Slight
C	High	High	High	High	Moderate	Moderate	High	High
D	High	High	Moderate	Moderate	None	None	None	Slight
E	High	Slight	High	High	Slight	None	Moderate	High
F	High	High	High	Moderate	Slight	None	Slight	High
G	High	Slight	Slight	Slight	None	None	None	High
H	High	Slight	Slight	Slight	None	None	None	High

\***HIGH:** Highly chemical-resistant. Clean or replace PPE at end of each day's work period. Rinse off pesticides at rest breaks.

**MODERATE:** Moderately chemical-resistant. Clean or replace PPE within an hour or two of contact.

**SLIGHT:** Slightly chemical-resistant. Clean or replace PPE within 10 minutes of contact.

**NONE:** Not chemical-resistant. Do not wear this type of material as PPE when contact is possible.



Nitrile rubber gloves



Natural rubber gloves



Polyvinyl chloride gloves

## GLOVE CONSTRUCTION

Chemical-resistant gloves are fabricated in two forms. One is that of the hand silhouette. This glove is made by die cutting a two-dimensional outline of a hand from a plastic film. Two of these flat hand forms are welded around the edges to form a glove. Most gloves made from polyethylene are constructed in this manner. The hand silhouette gloves may be undesirable because of poor fit, loss of dexterity, and difficulty in keeping the gloves on the hand. The second and more common type of chemical-resistant glove is made by dip molding, that is, by dipping a hand mold into a polymer-containing liquid. Dipped gloves are right- and left-handed and are sized. These gloves provide both a better fit and improved dexterity. Some of the dipped gloves come with curved fingers, which provide additional comfort.

## GLOVE THICKNESS

Glove thickness is described in units of mils (1 mil = 0.001 inch). In general, barrier effectiveness and resistance to tear and puncture increases with thickness. Commercially available gloves range in thickness from 1 to 60 mils. The most commonly used chemical-resistant gloves range from 12 to 22 mils.

## SIZING GLOVES

Gloves are sized either numerically or qualitatively. A numerical scale ranges from men's sizes 7 to 12. The size designation refers to the circumference of the hand, in inches, measured around the palm and below the knuckles. Gloves sized qualitatively may carry labels such as "large," "men's size," or "one size fits all." Gloves are manufactured in a variety of lengths, measured

from the tip of the middle finger to the edge of the cuff. Longer gloves that extend to the upper arm area are available.

## GLOVE LINERS

Separable glove liners are separate glove-like hand coverings, made of lightweight material, with or without fingers. Work gloves made from lightweight cotton or poly-type material are considered to be glove liners, if worn beneath chemical-resistant gloves. Unless the pesticide product labeling specifically prohibits their use, separable glove liners may be worn beneath chemical-resistant gloves, provided the liners do not extend outside the chemical-resistant gloves that are worn over them. If glove liners are used in applying pesticides that are under the jurisdiction of the Worker Protection Standard, once they are used for handling or early entry activities, the liners must be discarded immediately, after a total of 10 hours of use, or within 24 hours of first use, whichever occurs first. The liners must be replaced immediately if they come into direct contact with pesticides.

## ADDITIONAL INFORMATION

Acquavella, J. et al. 2004. Glyphosate Biomonitoring for Farmer-Applicators and Their Families: Results from the Farm Family Exposure Study. Environ. Health Perspect:112:321-326. <http://www.farmfamilyexposure.org/index.html>.

Dean, T.W. 2003. Pesticide Applicator Update: Choosing Suitable Personal Protective Equipment. UF/IFAS EDIS Document PI-28. <http://edis.ifas.ufl.edu/PI061>.

Fishel, F.M. 2005. Interpreting Pesticide Label Wording. UF/IFAS EDIS Document PI-34. <http://edis.ifas.ufl.edu/PI071>.

Fishel, F.M. 2005. Understanding Material Safety Data Sheet Language. UF/IFAS EDIS Document PI-35. <http://edis.ifas.ufl.edu/PI072>.

Fishel, F.M. 2006. Worker Protection Standard: Personal Protective Equipment (PPE). UF/IFAS EDIS Document PI-156. <http://edis.ifas.ufl.edu/PI119>.

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# PRECAUTIONARY STATEMENTS

- ☐ Hazards to humans and domestic animals

## CAUTIONS

- ☐ Harmful if swallowed or absorbed through skin.
- ☐ Avoid contact with skin, eyes or clothing.
- ☐ Applicators and other handlers must wear:
  - Long-sleeved shirt and long pants
  - Chemical resistant gloves made of any waterproof material such as barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, natural rubber, polyethylene plastics, polyvinyl chloride (PVC), and Viton®.
  - Shoes plus socks.
- ☐ Follow manufacturer's instructions for cleaning/maintaining personal protective equipment (PPE). If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

Butyl rubber gloves



Neoprene rubber gloves in two styles — the upper has a textured surface for better gripping



Barrier laminate gloves

