

Pesticide use and your personal protective equipment (PPE)



The label is the law!

When using pesticide products, the requirements for PPE on the product label are your main source of information.

The Environmental Protection Agency (EPA) has labeling requirements for pesticide products. Pesticide labels must have signal words, which describe the acute (short-term) toxicity of the formulated pesticide product.

The signal word can be one of the following:

DANGER/POISON, DANGER, WARNING, or CAUTION. Products with the DANGER/POISON signal words are the most toxic. Products with the signal word CAUTION are comparatively less toxic. All products must be handled with care. Manufacturers must provide information about what PPE a handler must wear when mixing, loading, handling, and applying pesticides. Some of this information may be confusing. For instance, what does the label mean when it specifies “chemical-resistant” protective clothing?

Chemical-resistant materials prevent the measurable movement of certain chemicals through the material to your protected skin *for a limited period of use or time*. No material claims to be chemical proof. If the label refers to a chemical-resistance category (A – H), choose the category of resistance level that best matches the length of time you will be handling the pesticide or change (into a new pair of gloves, for instance) before you reach the resistance time limit for the material. (See the chart on Page 3). The resistance categories are based on the solvents used in the pesticides, not the active ingredients. Different formulations of the same pesticide may require PPE from different chemical-resistance categories.

Chemical-resistant coveralls – A one- or two-piece suit that *the manufacturer specifies* to be resistant to certain chemicals. Suits made of butyl rubber, neoprene, PVC, or one of the newer coated and laminated polyethylene fabrics may be appropriate. Generally, greater material thickness, bound or sealed seams, and covered zippers and vent holes will increase the protection offered. These garments are often elasticized at the wrist and ankle. Some are reusable if properly cleaned, and some must be disposed of after a single use. You will be safest and most comfortable in protective clothing that fits. Do not use coveralls made from fabrics such as cotton, polyester, or uncoated, non-woven olefin unless the label specifies “long-sleeved shirt and long pants” or “coverall worn over long-sleeved shirt and long pants.”



Polyvinyl chloride (reusable)

Characteristics of some commonly-used pesticide coveralls (Consult manufacturers for more information)

Material	Particulate Protection Class*	Splash Protection Class*	Liquid proof?	Liquid chemical protection?	Breathable?	Relative cost
Tempro®	IV	(none)	NO	NO	YES	LOW
ProShield2®	I	III	NO	YES	YES	LOW
Tyvek®	I	III	NO	NO	YES	LOW
Tyvek® QC / sewn seams	I	II	NO	YES	NO	LOW
Tyvek® QC / sealed seams	I	II	YES	YES	NO	Moderate
Kleenguard® LP	I	III	NO	NO	YES	LOW
Tychem® SL / surged seams	I	I	NO	YES	NO	Moderate
Tychem® SL / sealed seams	I	I	YES	YES	NO	HIGH
PVC coverall	I	I	YES	YES	NO	HIGH
PVC suit	I	I	YES	YES	NO	Moderate

* **Protection Class** is determined by the “Signal Word” on the pesticide label:

Class I = Signal words “DANGER” or “DANGER/ POISON” (highly toxic)

Class III = Signal word “CAUTION” (less toxic)

Class II = Signal word “WARNING” (toxic)

Class IV = Signal word “CAUTION” (least toxic)

NOTE: The equipment depicted in images and any brand names mentioned in this document are for illustrative purposes and should not be construed as an endorsement for a particular product.

Chemical-resistant gloves — Often, the pesticide label will provide recommendations for a type of glove in the PPE section. In addition, if the label specifies chemical-resistance categories A through H, use the table below to help you decide what type to provide.

(Note the reference to a standard glove thickness of at least 14 mils.)

Environmental Protection Agency chemical resistance categories for selected personal protective materials

Selection category listed on pesticide label	Type of personal protective material							
	Barrier laminate	Butyl rubber ≥14 mils	Nitrile rubber ≥14 mils	Neoprene rubber* ≥14 mils	Natural rubber ≥14 mils	Polyethylene	Polyvinyl chloride (PVC) ≥14 mils	Viton ≥14 mils
A (dry and water-based)	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

* Includes natural rubber blends and laminates.

Key: **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 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.

Remember that waterproof gloves are not necessarily chemical resistant.

Chemical-resistant gloves with non-separate liners (i.e., flocking) are prohibited. You may wear shorter cotton gloves underneath the chemical-resistant ones, but they must be disposed of immediately upon contact with liquid. In addition, the cotton liners must be disposed of after 10 hours of use or within 24 hours from when they are first worn.

Never wear cotton, leather, or canvas gloves unless the label specifies that this type is required (e.g., aluminum phosphide fumigants).

Chemical-resistant footwear — Can be one-piece, pull-on boots made of natural rubber, which may be coated with polyurethane, PVC, or blends, or you may use disposable or reusable shoe covers. Either way, pant legs should be worn outside of the boots to prevent pesticides from entering the footwear. Leather boots or canvas-leather sports shoes should never be worn when handling pesticides. Change shoes when you are finished spraying. Leave your contaminated footwear at work.

Chemical-resistant hood or wide-brimmed hat — Hats must be a rubber-, PVC-, or plastic-coated safari-style, or wide-brimmed hat. Hoods must be rubber-, plastic-, or other barrier-coated hood. A full hood or helmet that is part of a respirator, like a PAPR, is also acceptable. Avoid cloth hats or liners that will absorb chemicals.

Chemical-resistant apron — May be required for mixing and loading pesticide spray tanks or for cleaning equipment. Aprons should be coated on both sides with the resistant material with edges sealed to prevent pesticide absorption and wicking. They should provide full protection of the front of the body from the neck to the knees. A chemical-resistant spray suit may be worn instead of an apron.



A chemical-resistant apron



Safety glasses and a face shield

Eye protection – Use the appropriate eye protection level when the label specifies the following:

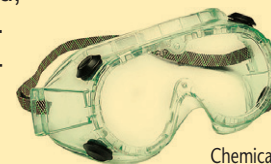
Protective eyewear – Use safety glasses with brow, front, and temple protection; or a face shield; or fully-enclosed goggles; or a full-face respirator.

Goggles – Use fully-enclosed, chemical-splash-resistant goggles or a full-face respirator.

Full-Face Respirator – You must use a tight-fitting, full-face respirator.



Safety glasses



Chemical Goggles



A full-face respirator

Eyewear must meet or exceed the current impact-resistance specification of the American National Standards Institute (ANSI Z87.1). Polycarbonate is lightweight and provides strong impact resistance and good chemical splash resistance.

Wrap-around safety glasses are not acceptable for protection when spraying.

Note: *Special goggles are made to wear over prescription glasses. Goggles must not interfere with the seal of a tight-fitting respirator. If you use a half-mask respirator, use goggles designed to fit over the nose-piece of your respirator.*

How do I clean reusable personal protective equipment?

- Check the PPE manufacturer's instructions. If there are no instructions, wash the PPE thoroughly with **hot** water and detergent. PPE should be washed before reuse, preferably at the end of the day.
- If you can, hang washed PPE, except respirators, out in the sun to dry. It will help to further break down pesticide residue.



Read before washing clothing worn while applying pesticides



All clothing worn while handling or applying pesticides is contaminated!

- ✓ Wash clothing before wearing again.
- ✓ Handle clothing with water-proof gloves.
- ✓ Rinse or soak first, using a hose or a bucket.
- ✓ Wash work clothes separately from family wash.
- ✓ Use detergent and hot water.
- ✓ Wash a few items at a time.
- ✓ Use highest water level.
- ✓ Use longest wash time.
- ✓ Line-dry in the sun, when possible.
- ✓ Throw away clothing that won't wash clean.

After washing — run machine through a complete cycle with detergent.



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Respirators – Only use respirators approved by the National Institute of Occupational Safety and Health (NIOSH). When a pesticide label requires respirator use, it will commonly specify the NIOSH testing and certification (TC) number including the following types:

NIOSH TC number	Type of respirator	The pesticide label may specify this type of respirator for:
TC-84A-	Respirator with a particulate filter or with a combination chemical cartridge and particulate filter.	A pesticide product applied as a solid or a pesticide product in Toxicity Category I or II applied as a liquid with a vapor pressure lower than a certain value.
TC-23C-	<ul style="list-style-type: none"> Air-purifying respirator (APR) with a single type of chemical cartridge. Powered air-purifying respirator (PAPR) with chemical cartridge and particulate filter. 	A pesticide product in Toxicity Category I or II applied as a liquid with a vapor pressure greater than a certain value.
TC-21C-	Powered air-purifying respirator (PAPR) with particulate filter.	

Labels may also list which category of particulate filters (or pre-filters) can be used:

- “N” (not resistant to oil – use only when no oil is present)
- “R” (oil-resistant – can resist some oil, but only for a limited time)
- “P” (oil-proof – can be used when oil is present)

Remember oil may also be present in stickers or surfactants found in spray mixes.

Powered air-purifying respirators (PAPRs) – Protection is dependent on proper airflow. A flow meter monitors airflow to determine if the canister or cartridge has become clogged. Follow the manufacturer’s recommendations; do not use the respirator if the airflow is less than the minimum required, typically four cubic feet per minute (cfm) for tight-fitting face pieces and six cfm for hoods or loose-fitting helmets. Batteries must be maintained for these respirators to operate properly. See the NIOSH fact sheet about PAPR batteries on Oregon OSHA’s “[Respiratory protection](#)” topic page. Opened PAPR canisters or cartridges must be replaced according to the schedule in the product information, even if minimum airflow is acceptable. Always write the date you opened the canister or cartridge on the package. Sealed canisters or cartridges may also have expiration dates that must be followed even if they have never been opened.



TC-84A-type air-purifying respirator (APR): tight-fitting half mask with a combination Organic Vapor (OV) cartridge and N-95 particulate filter.



TC-23C-type air-purifying respirator (APR): tight-fitting half mask with Organic Vapor cartridge.



TC-23C- or TC-21C-type, Helmet-style, battery-powered, air-purifying respirator (PAPR) TC number depends on type of cartridge/canister used.

Filters, canisters, and cartridges

Air-purifying filters, canisters, and cartridges that are used more than once should always be stored separately from the other parts of the respirator and PPE to prevent contamination from pesticide residue.

The Worker Protection Standard (40 CFR 170) requires the following replacement schedule for respirator filters, canisters, and cartridges.

Replace filters used with particulate-filtering respirators:

- When you notice breathing resistance.
- When the filter element is physically damaged or torn.
- According to the respirator manufacturer's recommendations or the pesticide product's label instructions, whichever is more frequent.
- If there are no other instructions or indications of service life, at the end of each day's work period.

Replace canisters or cartridges used with gas- or vapor-filtering respirators:

- At the first indication of odor, taste, or irritation.
- According to the respirator manufacturer's recommendations or the pesticide product label instructions, whichever is more frequent.
- If there are no other instructions or indications of service life, at the end of each day's work period.

For more information, see "*The Air You Breathe: Oregon OSHA's Respiratory Protection Guide for Agricultural Employers.*"

How do I store personal protective equipment (PPE)?

PPE should never be stored inside a pesticide storage room with the pesticides or other chemicals.

- All PPE should be stored separately from personal clothing and other personal items.
- During lunchtime or breaks, used PPE must be hung up in a safe place until it is reclaimed for spraying. Do not put contaminated PPE back into a locker or anywhere where it might contaminate workplace surfaces, clean PPE, or personal items.

WRONG!



RIGHT!



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