Oregon OSHA

Personal Protective Equipment:

Selecting the Right PPE for Pesticide Use

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About this guide

Personal Protective Equipment: Selecting the Right PPE for Pesticide Use is an Oregon OSHA Standards and Technical Resources publication.

Piracy notice

Oregon OSHA

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When selecting personal protective equipment (PPE) for yourself or your employees who are applying pesticides, the label on the pesticide is your main source of information. Unlike most other types of product labels, pesticide labels are legally enforceable. In other words, the label is the law!

The Environmental Protection Agency controls labeling requirements for pesticide products. Manufacturers must provide personal protective equipment guidance for handlers to ensure their safety when mixing, loading, applying, or otherwise handling 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 skin for a limited period of time. Although material can be *chemical-resistant*, there isn't a material that is entirely *chemical proof*. If the label refers to a chemical-resistance category (A – H), choose the material that best matches the length of time you will be handling the pesticide or the time before you 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 personal protective equipment from different chemical-resistance categories.

Environmental Protection Agency's chemical resistance categories for personal protective materials

Type of personal protective material								
Selection category listed on pesticide label	**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

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

* Includes natural rubber blends and laminates.

Resistance time limit 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**.

Chemical-resistant gloves

The pesticide label will often provide recommendations for a type of glove in the PPE section. If the label specifies chemical-resistance categories A through H, use the table on Page 3 to help you decide what type to provide.

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 specifically requires that type (for example, for aluminum phosphide fumigants).

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 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."

Pesticide labels must have signal words, which describe the acute (short-term) toxicity of the formulated pesticide product. The signal word will 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.

Polyvinyl chloride (reusable)

Characteristics of some commonly-used pesticide coveralls

Consult product manufacturer 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 II** Signal word WARNING (toxic)
- **Class III** Signal word CAUTION (less toxic)
- **Class IV** Signal word CAUTION (least toxic)

Note: The equipment depicted in images and any brand names mentioned in this document are for illustration only and are not an endorsement for any particular product.

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 rubber-, PVC-, or plastic-coated, either safari-style or wide-brimmed. Hoods must be rubber-, plastic-, or other barrier-coated. A full hood or helmet that is part of a respirator, like a powered air purifying respirator, is also acceptable if made of chemical-resistant material. Avoid cloth hats or liners that will absorb chemicals.

Chemical-resistant apron

May be required when mixing and loading pesticide spray tanks or when 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

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; a face shield; 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

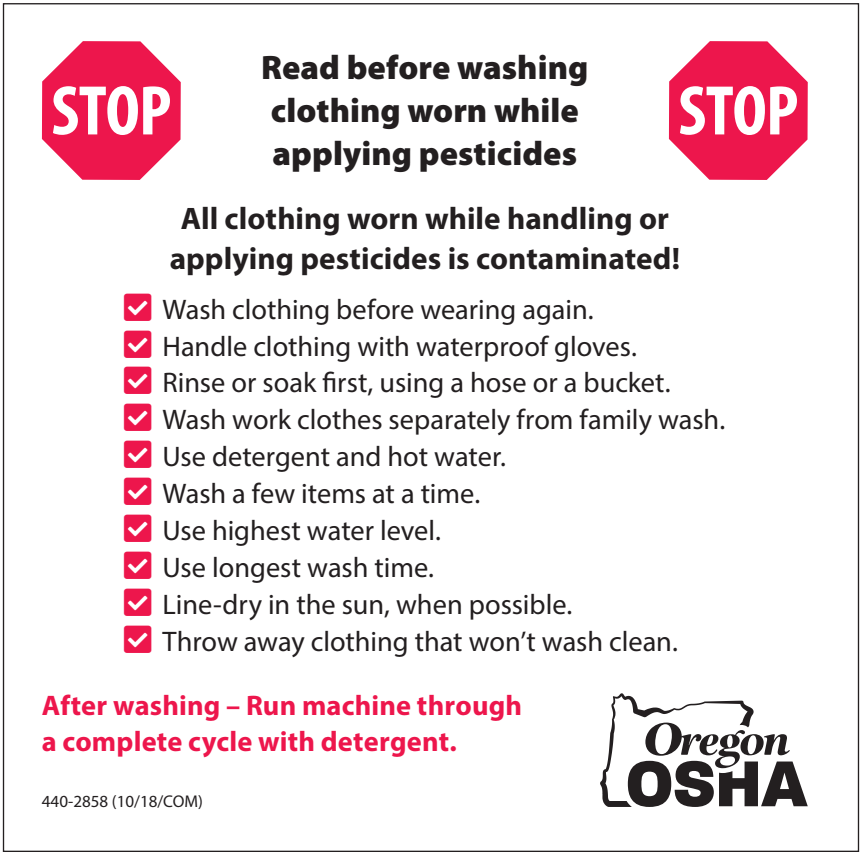
A full-face respirator

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.

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 to allow for overnight dry time.
- If you can, hang washed PPE (NOT respirators) out in the sun to dry. It will help to further break down pesticide residue.



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 types in this table:

NIOSH TC number	Type of respirator
TC-84A	Air-purifying respirator (APR) with a particulate filter or an APR with a combination chemical cartridge and a particulate filter.
TC-14G	Full-face gas mask APR with canister-type filter for a specific type of chemical contaminant – typically organic vapors.
TC-23C	Powered air-purifying respirator (PAPR) with a combination chemical cartridge and particulate filter.
TC-21C	PAPR with particulate filter only.

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 – highly resistant to oil; use when oil is present in the spray mix)

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

TC-84A Air purifying half-face (elastomeric) respirator *with P-100 particulate filters.*

TC-14G Air Purifying full-face respirator *(gas mask) with a canister specified for a type of chemical contaminant such as organic vapors.*

TC-23C Powered Air Purifying Respirator (PAPR) *with combination organic vapors and high-efficiency particulate filters.*

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.

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 breathing resistance becomes excessive.
- 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 eight hours of cumulative use.

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

- At the first indication of odor, taste, or irritation.
- When breathing resistance becomes excessive.
- 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 eight hours of cumulative use.

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

How do I store personal protective equipment?

- Respirators and clean PPE should never be stored inside a pesticide storage room with the pesticides or other chemicals.
- Used 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!

Notes

Oregon OSHA Services

Oregon OSHA offers a wide variety of safety and health services to employers and employees:

Enforcement

- **503-378-3272; 800-922-2689; enforce.web@oregon.gov**
- Offers pre-job conferences for mobile employers in industries such as logging and construction.
- Inspects places of employment for occupational safety and health hazards and investigates workplace complaints and accidents.
- Provides abatement assistance to employers who have received citations and provides compliance and technical assistance by phone.

Consultative Services

- **503-378-3272; 800-922-2689; consult.web@oregon.gov**
- Offers no-cost, on-site safety and health assistance to help Oregon employers recognize and correct workplace safety and health problems.
- Provides consultations in the areas of safety, industrial hygiene, ergonomics, occupational safety and health programs, assistance to new businesses, the Safety and Health Achievement Recognition Program (SHARP), and the Voluntary Protection Program (VPP).

Standards and Technical Resources

- **503-378-3272; 800-922-2689; tech.web@oregon.gov**
- Develops, interprets, and gives technical advice on Oregon OSHA's safety and health rules.
- Publishes safe-practices guides, pamphlets, and other materials for employers and employees.
- Manages the Oregon OSHA Resource Center, which offers safety videos, books, periodicals, and research assistance for employers and employees.

Appeals

- **503-947-7426; 800-922-2689; admin.web@oregon.gov**
- Provides the opportunity for employers to hold informal meetings with Oregon OSHA on concerns about workplace safety and health.
- Discusses Oregon OSHA's requirements and clarifies workplace safety or health violations.
- Discusses abatement dates and negotiates settlement agreements to resolve disputed citations.

Oregon OSHA Services

Conferences

- **503-378-3272; 888-292-5247, Option 1; oregon.conferences@oregon.gov**
- Co-hosts conferences throughout Oregon that enable employees and employers to learn and share ideas with local and nationally recognized safety and health professionals.

Public Education

- **503-947-7443; 888-292-5247, Option 2; ed.web@oregon.gov**
- Provides workshops and materials covering management of basic safety and health programs, safety committees, accident investigation, technical topics, and job safety analysis.

Need more information? Call your nearest Oregon OSHA office.

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