Dress for Success!

Some Things to Know About Personal Protective Equipment BEFORE You Handle a Pesticide

Always read and follow label directions before buying or using a pesticide.
Follow all appropriate federal, state, tribal, and local regulations concerning the use of pesticides and personal protective equipment.

This brochure focuses on ***some*** of the basics of personal protective equipment (PPE), but does NOT substitute for following the pesticide product label, the PPE user instructions, and all applicable government regulations. To reduce exposure, the required PPE must be handled properly from purchase through disposal, whether you apply a pesticide at home, or work in an agricultural or non-agricultural occupation.

When purchasing and prior to using a pesticide product, it is essential that you read ***and understand*** all portions of the pesticide product label. You are legally obligated to follow the instructions and requirements on the label. The label is the law, AND it contains vital information about the use, safety and handling of the product. Carefully review the signal word, precautionary statements, personal protective equipment requirements, entry restriction statements, emergency first aid measures, and directions for use – they are included to protect you, others, and the environment.

Different pesticide products require different personal protective equipment. Remember that any product that contains a pesticide – including baits, aerosols, fertilizers, seed, "natural" products, etc. – must be handled using the required PPE, in the correct way. In addition, there are basic PPE principles and practices that must be understood to protect the health and safety of everyone involved in handling a pesticide.

What is Personal Protective Equipment?

Personal Protective Equipment is apparel and devices worn to protect the body from contact with pesticides or pesticide residues, including aprons, chemical-resistant suits, coveralls, footwear, gloves, headgear, protective eyewear and respirators. While the following attire is not defined as PPE, the pesticide label may require pesticide handlers or early-entry workers to wear regular work clothes for some tasks: long and short sleeved shirts, long and short pants, shoes and socks.

The required PPE will be listed on the pesticide label, and may be different ***for different tasks***. PPE may be required during pesticide mixing, loading, application, repair, cleanup, and/or early entry into a treated area.

The required PPE will be different ***for different pesticide products***, because products differ in their potential health impacts via skin (dermal), mouth (oral), breathing (inhalation), and eye contact. Skin contact can occur on any part of the body, but the hands and forearms are where exposure is most common. Inhalation can result by breathing in fine sprays, mists, dusts and vapors.

Formulation type, application equipment type, and other factors may impact the required PPE, so it is critical to read and follow the PPE section on ***every*** product carefully, even if the brand name is the same. For example, a liquid and dry formulation of the same product may require different PPE, and a liquid formulation may require different PPE when applied with a handheld versus a mechanized sprayer.

Why the Pesticide Product Label Specifies Personal Protective Equipment

The US Environmental Protection Agency (EPA) requires studies to determine if a pesticide can be registered and how it can be used without impacting health or the environment. To help protect pesticide handlers and early entry workers, the PPE specified on the label must be selected and used correctly, and all other directions and precautions must be followed.

How Personal Protective Equipment Relates to Signal Words on the Pesticide Product Label

A Caution, Warning, or Danger signal word will appear on the pesticide product label and is based on the acute (single exposure) toxicity and irritation potential of the pesticide product, including the active ingredient(s) and the other ingredients in the formulation (particularly solvents). The signal word selected for a pesticide formulation reflects the most toxic category resulting from dermal, oral, inhalation or eye contact. Caution indicates that the pesticide formulation is slightly toxic by any of these four ways of contact. Warning indicates that at least one of the ways of contact is moderately toxic. Danger indicates that at least one of the ways of contact is highly toxic.

The signal word is an indicator of the overall acute toxicity of a pesticide formulation, but is not the only consideration when defining PPE requirements.

The Worker Protection Standard and PPE

The Worker Protection Standard (WPS) protects agricultural workers and pesticide handlers on farms, or in forests, nurseries and greenhouses, from occupational exposure to pesticides used to treat agricultural plants grown for commercial or research purposes.

Employers ***and*** employees must ensure that they are familiar with their responsibilities and rights under the WPS, including PPE for handling pesticides and early entry into pesticide-treated areas.

Employers must provide the PPE required on the pesticide label for the specific work task. Employers are also responsible for ensuring that the PPE fits correctly, and that reusable PPE is properly cleaned, maintained, replaced, and stored.

Employers must ensure that employees have attended all required safety training and refresher programs, which include PPE training. The employer is responsible for ensuring that PPE required on the pesticide label is worn. Some federal and state employee protection regulations require medical clearance and monitoring when respirators are used. In case of an accidental pesticide exposure requiring emergency assistance, the employer must provide immediate transportation to a medical care facility and information about the pesticide.

If your employer has not complied with their responsibilities under the WPS, contact your state's pesticide regulatory agency.

PPE requirements are based not only on protecting the user from acute toxicity concerns but also from other toxicity concerns, such as repeated exposures and how the person would be exposed during mixing, loading and application.

Personal Protective Equipment Requirements on the Pesticide Product Label are Revised Frequently

Pesticide product labels undergo scheduled reevaluations, and can also be changed at any time due to new research and/or regulatory requirements. So read the entire label every time you purchase a pesticide product. The same applies to any PPE instructions that accompany the PPE – read them carefully every time you purchase the PPE, even if you purchased the same brand and model before.

When to Use Personal Protective Equipment

The PPE requirements on the pesticide product label must ***always*** be followed, and may change depending on the type of handling task being performed. For example, the PPE required for someone mixing or loading a pesticide usually differs from that required for someone applying the same pesticide. If handling more than one pesticide product, choose the most protective PPE from the product labels.

PPE must be used to protect workers when other means of protection are not feasible. For example, closed spray tank loading systems, enclosed tractor cabs, pre-weighed pesticides in water-soluble packages, and closed container rinsing systems can greatly reduce the risk of exposure and therefore may reduce or even eliminate the requirements for PPE.

What to Consider When Selecting Different Types of Personal Protective Equipment

Correct selection of PPE is the first critical step. Follow the ***pesticide product label*** carefully when certain types of gloves, respirators, and/or other PPE are specified. For example, a specific type of glove material may be highly chemical-resistant to some pesticide products but not others. A respirator suitable for one task may not be suitable for another. A "water-resistant" material is different than a "chemical-resistant" material.

"Chemical-resistant" PPE is "material that allows no measureable movement of the pesticide being used through the material during use". ***However, "chemical-resistant" aprons, coveralls, eye protection, footwear, gloves, and headgear are not equally resistant to all pesticides, under all conditions, and for the same length of time.***

Read the ***PPE user instructions*** carefully to ensure that the PPE meets the specifications on the particular pesticide product label. If in doubt about what PPE to use, call the pesticide product manufacturer, the PPE manufacturer, your county agent, or your state's pesticide safety education program. Pesticide labels, PPE instructions and safety equipment catalogs contain phone numbers, and PPE manufacturer websites often contain detailed information on their products.

More is not necessarily better in the case of PPE – select the PPE required by the label.

Make Sure PPE is Working Properly

It is very important to select the correct PPE. ***Just as important***, the PPE must be working correctly every time you use it, either alone or in combination with other PPE. When several pieces of PPE are used together, they must not interfere with each other. For example, protective goggles must not interfere with the operation of a respirator.

Read the PPE user instructions carefully before every use, and seek assistance if needed.

Before and after every use, check for any type of deterioration of or damage to all the components, seams, etc. of the specific re-usable PPE and, if necessary, dispose of properly.

Aprons, when required, must be made of chemical-resistant material and cover the front of the body from mid-chest to the knees. It is a good idea to wear an apron whenever mixing or loading chemicals or cleaning spray equipment, even when not required on the pesticide label.

Coveralls are loose-fitting one- or two-piece garments that cover, at a minimum, the entire body except the head, neck, hands and feet. The pesticide label may specify that the coveralls be worn over a layer of clothing. Most coveralls are made of fabric such as cotton or a cotton-polyester blend and are not chemical-resistant. There are laminated or coated materials that provide water resistance and protection from some solvents, but no US certification currently exists. Chemical-resistant clothing is rarely required and usually not encouraged due to heat stress concerns.

Eye protection requirements may be shielded safety glasses, goggles, a face shield, or a full-face respirator. Shielded safety glasses have a brow cover and side shields. Special goggles are needed when wearing a half-mask respirator or prescription glasses. Straps on eye protection equipment should be worn under any required protective headgear. Goggles and safety glasses having directly vented air holes are not totally protective against splashes.

Footwear includes water-proof boots, or chemical-resistant boots or shoe coverings, worn over regular shoes or boots. Ensure that the footwear chosen will not absorb the spray. Always wear the pant legs ***outside*** the footwear to prevent spray from running down the leg into the footwear.

Duct tape can be used to temporarily seal the area where boots meet the pants. Exposed footwear should be cleaned after each day's use, and never worn indoors.

Glove materials differ in their protective ability and the length of time they are protective after contact with the specific pesticide. The level of protection also varies depending on whether diluted sprays, concentrated product splashes, granules, or powders contact the gloves.

Pay careful attention to the glove types specified on the pesticide label; they are based on the different solvents in the formulation. Barrier laminate gloves are highly protective for all solvents that have been approved for use in pesticide formulations. Nitrile gloves are highly protective for many but not all formulations. Waterproof gloves are highly protective only for dry and water-based formulations. ***Pesticide labels will usually list "examples" of suitable glove types – use the examples listed unless you are willing to do the research to ensure that other types meet the same chemical-resistance requirements.***

Always wear unlined gloves, and never wear canvas, leather, cotton, or other fabric gloves unless specified on the pesticide product label. Even highly chemical-resistant gloves must be rinsed off at breaks if pesticide contact occurs.

Wear sleeves outside the gloves if spraying below the shoulders. If spraying overhead, gloves should be outside the sleeves. If spraying both overhead and below the shoulders, duct tape can be used to temporarily seal the area where the gloves meet the sleeves. Elbow length gloves are more protective and are required for some activities.

Headgear includes chemical-resistant hoods and chemical-resistant hats with a wide brim. Some labels require headgear – ensure that the headgear chosen will not absorb the spray.

Respirator requirements on pesticide labels are very specific when required for pesticide handling tasks. Generally, the label will require either a dust/mist filtering (particulate-removing) respirator, or a respirator with an organic-vapor cartridge or canister fitted with a prefilter. Use only respirators certified by the National Institute for Occupational Safety and Health (NIOSH).

If you are required by the pesticide label to use a respirator (or if you choose to use one), an initial medical evaluation is strongly advised even if not required by law.

Self-contained, canister and cartridge style respirators require a tight seal to the face and must be ***fit tested*** before use. Fit testing is also required annually, ***or*** when the type of respirator changes, ***or*** when there are significant changes in weight or facial features.

Only a trained person or safety professional should conduct the fit testing, according to the instructions included with the respirator or other fit test protocols specific to the model. Tight-sealing respirators cannot be worn by persons having even minimal facial hair, jewelry, or other obstructions where the respirator contacts the face.

A respirator ***seal check*** (also known as a pressure check or fit check) is a very different procedure than a fit test. A seal check determines the effectiveness of the seal between the respirator and the skin, and must be done EVERY time the respirator is worn. Follow the PPE instructions to conduct a proper seal check.

Replace filters, canisters, cartridges, etc. according to the pesticide label or PPE instructions (whichever is more frequent), ***and*** whenever there is equipment damage, breathing resistance, odor, taste, irritation, or soiling. Following the PPE instructions for replacement is critical, because other indicators are not always dependable. For example, the ability to detect an odor depends on the product, the person, and the weather conditions, and the mere presence of an odor does not indicate that harm can result.

For PPE having multiple components as well as associated PPE (for example, respirators and filtration media), be sure to review the assembly, parts, ***and*** filtration media instructions.

All "dust masks" are ***not*** the same. Some dust masks having a particulate prefilter are approved for some types of applications (for example, a "dust/mist NIOSH-approved respirator with any N, R, P, or HE filter") while other dust masks are not protective nor approved.

Cleaning, Maintenance, Storage, and Disposal of Personal Protective Equipment

Cleaning and maintenance instructions from the PPE manufacturer must be followed for ***reusable*** PPE. Never reuse any type of disposable (one-time use) PPE equipment, because you can be exposed to residues remaining on the PPE from the previous use, or to product moving through damaged or deteriorated PPE during reuse.

Note that reusable or limited-use PPE must be discarded if not cleaned and maintained properly, because there is a significant risk of pesticide exposure. For example, pesticide exposure can occur from residues remaining from the previous use, damaged seals in the respirator, small holes or tears in gloves or clothing, or degradation of the chemical-resistant PPE.

Remove PPE as soon as you complete the tasks where you were exposed to the pesticide. Wash disposable OR reusable gloves with soap and water, and then remove other PPE while still wearing the gloves. Then wash the gloves again with soap and water before removing them. Clean reusable PPE according to the PPE instructions, without causing contamination to yourself.

Wash regular work clothes that have been exposed to pesticides ***as soon as possible*** to ensure maximum pesticide residue removal. Wash them separately from other laundry using detergent and hot water. Using an outdoor clothesline rather than a dryer may help break down any remaining pesticide residues. If no PPE is required on the pesticide label, it is still wise to wash clothes promptly.

Always obtain replacement parts for half- and full-face respirators from the original manufacturer and repair PPE in accordance with manufacturer instructions. Respirator component parts are NOT interchangeable between different manufacturers.

Storage instructions from the PPE manufacturer must be followed for both reusable and disposable PPE. Most PPE must be protected from chemicals, sunlight, extreme temperatures, excessive humidity, and moisture, or the specified shelf-life will be reduced. Disposable, reusable or limited-use PPE must be discarded if not stored properly.

Keep PPE in its sealed package until use, and never store PPE with pesticides or personal clothing.

Disposal is the critical last step in handling PPE. Ensure that you remove and discard PPE without causing contamination to yourself, garbage collectors, or the environment.

PPE may have an expiration date, while other PPE requires careful inspection – read the PPE manufacturer directions and be diligent about disposal of PPE that will no longer provide protection.

Clean disposable, washable items with soap and water prior to disposal, to remove pesticide residues. Properly cleaned PPE can be disposed as regular garbage.

PPE that is contaminated with a pesticide must be disposed of according to directions on the pesticide product label and all federal, state, and local regulations. In the absence of specific label directions or government regulations, dispose of contaminated PPE as household hazardous waste, which can be taken to an appropriate waste collection event or disposal site.

If all PPE instructions for cleaning, maintenance, storage, and disposal are not followed carefully, PPE can become ineffective or even increase exposure to a pesticide. If in doubt, dispose of the PPE or PPE component.

Limitations of Personal Protective Equipment

PPE does not substitute for following ***all*** other pesticide product label directions and precautions necessary to protect family, farmworkers, bystanders, non-target organisms, sensitive sites, the community, and the environment.

PPE must be selected according to the pesticide product label and must be used, maintained, cleaned, and stored according to the PPE instructions. If you still have questions after reading both the pesticide product label ***and*** the PPE instructions, call the pesticide product manufacturer, the PPE manufacturer, your county agent, or your state's pesticide safety education program.

What to Do if You Don't Have the PPE Required on the Pesticide Label

If you don't have the PPE that is required on the pesticide label, ***don't*** apply the pesticide.

What to Do if Instructions are Not with the Personal Protective Equipment

If PPE equipment is available without instructions for use, three good options exist – 1) check the PPE manufacturer's website for downloadable instructions *for the particular model*, 2) call the PPE manufacturer to obtain a copy of the instructions, or 3) purchase new PPE equipment containing the instructions.

What to Do if Personal Protective Equipment is Uncomfortable

Sometimes PPE is uncomfortable, particularly when working in hot weather. However, hot weather is NEVER a good excuse for not using the required PPE. Attempt to work outdoors during the coolest periods of the day. If workload or other label precautions sometimes prevent this, take all necessary steps to avoid heat stress, including frequent rest breaks in shaded areas, drinking plenty of water (not caffeinated drinks), and not working alone. Know the signs of heat stress and how to treat it.

Face-sealing respirators may be uncomfortable if they have not been properly fit tested or are worn for long periods of time. In addition, physical activity can sometimes affect the seal between the respirator and the face. These and other conditions that cause discomfort and/or possibly reduce protection must be resolved in a way that does not cause a health hazard.

Determine if other measures can be taken to reduce the need for PPE for certain tasks, as permitted on the pesticide label. Examples include the use of a closed cab tractor for pesticide application, a closed spray tank loading system, and pesticide products, formulations, or packaging (for example, water-soluble pre-weighed packs) that may require less PPE. In some cases, discomfort can be reduced simply by reducing the length of time spent on a task requiring PPE.

What to Do if an Accident Results in Pesticide Exposure

If an accident results in exposure, the label indicates what to do in the First Aid section. The proper first aid varies based on the product and type of exposure, so it is critical that the label is always immediately available to the pesticide user – and it is the law!

Follow the first aid instructions immediately after exposure to the pesticide product, whether or not you have any immediate symptoms.

The Bottom Line

The personal protective equipment specified on the pesticide label is essential to protect everyone who handles a pesticide. The PPE requirements will vary widely, depending on the task, pesticide, formulation, application method and equipment, and other factors. When questions remain after reading the pesticide label and the PPE instructions, do not use the pesticide product until you have contacted an expert and resolved your questions. Your personal safety is of the utmost importance, and is an essential part of proper and safe pesticide use.

Some Additional Resources

There are many educational resources and organizations that can provide information on PPE. Only a few are listed here. ***PPE options, recommendations and regulations can change at any time***, so contact the pesticide product manufacturer, the PPE manufacturer, your county agent, or your state's pesticide safety education program if you have questions.

- The Worker Protection Standard for Agricultural Pesticides – **epa.gov/agriculture/twor.html**
- US Dept. of Labor, Occupational Safety and Health Administration – Personal Protective Equipment – **osha.gov/SLTC/personalprotectiveequipment**
- Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health – eye safety, heat stress, protective clothing, respirators – **cdc.gov/niosh/topics**
- County Extension Offices – **nifa.usda.gov/Extension**
- State and Territory Pesticide Safety Education Program Coordinators – **nifa.usda.gov/nea/pest/part/pesticides_part_psep.html**
- State and Territory Pesticide Regulatory Agencies – **aapco.org**
- State Departments of Agriculture – **nasda.org**

We gratefully acknowledge the National Pesticide PPE Training Solutions Committee for its significant work on this brochure.
Outdoor Photos Courtesy of USDA Natural Resources Conservation Service
PPE Photos Courtesy of Virginia Tech Pesticide Programs and PesticidePics.org

This publication can be downloaded or ordered at the following websites:
National Association of County Agricultural Agents: **nacaa.com**
Syngenta Environmental Stewardship: **syngentacropprotection.com/Env_Stewardship**
Pesticide Environmental Stewardship (PES): **pesticidestewardship.org**