In This Chapter

After learning the information in this chapter, you will be able to:
1. Identify the purpose of protective clothing and personal protective equipment for each step of pesticide use.
2. Choose the items to wear from reading a pesticide label.
3. Describe how to wear protective items properly.
4. Describe how to remove, clean and store your protective clothing and personal protective equipment properly.

Keywords

chemical resistant gloves, respirator, personal hygiene

Protect Yourself and Your Workers

You can reduce the hazards of using pesticides by wearing protective clothing and personal protective equipment. Protective clothing and personal protective equipment can help you avoid direct contact with pesticides. What you need to wear depends on the pesticide and the application. Planting treated seed also involves handling pesticide and requires personal protective equipment. All workers need to be trained in the proper use of protective clothing and personal protective equipment and that training needs to be reviewed periodically.

What to Wear

When you handle ANY pesticide, you should ALWAYS wear:

- a water repellent hat (hard hat, hood, or rain hat)
- long-sleeved shirt and pants or coveralls
- chemical resistant gloves, unlined, elbow length
- chemical resistant boots, unlined, tall
Do You Need Extra Protection?

In some situations, you will need more protection. When mixing and loading, or when using a highly toxic or volatile product, you may need to wear extra protective clothing and personal protective equipment such as:

- a respirator
- a water repellent suit (rainsuit)
- a chemical resistant apron
- goggles, or
- a face shield.

Decide What You Need

Read the Label

The section on the label called Precautions will help you decide what protective clothing and personal protective equipment you need. For example:

<table>
<thead>
<tr>
<th>If the label says</th>
<th>You should wear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoid contact with skin.</td>
<td>chemical resistant gloves, coveralls, boots and a water repellent hat</td>
</tr>
<tr>
<td>May cause eye irritation.</td>
<td>goggles</td>
</tr>
<tr>
<td>Avoid breathing spray mist.</td>
<td>respirator</td>
</tr>
</tbody>
</table>

The statements in the Precautions section will be different for each pesticide. Always read the label carefully before deciding what protective clothing and personal protective equipment to wear. Never assume that the precaution statements will be the same for each pesticide.

Consider the Job

The protective clothing and personal protective equipment you need depends on the job you are doing. Each spray operation is different. Consider what you need for each stage of the job.

The spray operation can be divided into four stages:

- Preparation
- Mixing and Loading
- Application
- After Application

Each step requires different degrees of protection. You may also need protection if you have to repair equipment while in the field.
Preparation
Before measuring, mixing or loading a pesticide, check the label to find out what protective clothing and personal protective equipment you need. Make sure that all equipment is in good condition so that it does the job. Have plenty of soap and water available in case of an accident.

Mixing and Loading
Protective clothing and personal protective equipment are very important during mixing and loading because the pesticide is in a concentrated form and is more dangerous. A spill or splash can do more damage. Always make sure your skin is covered. Wear a long sleeved shirt and pants (or coveralls), gloves and boots. An apron will provide extra protection to the front of your body. The apron should be long enough to extend past the tops of your boots and the apron ties should not dangle loosely. Consider using goggles and a respirator even if the label does not suggest them.

Application
Protection during application will vary with the operation. If you will not come in contact with the spray, you may not need much protection. However, a person spraying an orchard with an air blast sprayer will need more equipment - gloves, boots, rainsuit with a hood, goggles, and a respirator - to give adequate protection. If you are using a backpack sprayer, consider wearing a backpack spray vest to protect your shoulders and back from leaks. Spray chaps are also available to protect your legs while you work with pesticides.

Machinery Repair
Extra protection may also be needed if machinery needs repairing. Keep gloves, boots, aprons and goggles available while in the field. If repairs are needed, use the extra protective clothing and personal protective equipment. A small brush conveniently located can help unclog spray nozzles.

After Application
Even though the spraying has been completed, the spray operation is not done until after the clean-up. Exposure can occur during clean up just as easily as during any other time in the spray operation. The rinse solutions can easily splash while the spray tank is being rinsed. Remember to wear a long sleeved shirt, pants, gloves, boots, and an apron during clean up.
What to Choose and How to Use It

Gloves

Your hands almost always become contaminated when handling pesticides. To protect them, wear unlined, elbow length gloves that are resistant to chemicals. Suitable gloves may be made from neoprene, nitrile, polyvinylchloride or barrier laminate. The most suitable glove material depends on the type of pesticide handled.

Never wear lined gloves, or gloves made from leather, and except when handling some fumigants, gloves should not be made of cloth. These materials absorb the pesticide and keep it in contact with your skin.

For the best protection while wearing gloves, fold down the top of the gloves to make a cuff. The cuff will stop the pesticide from running down the glove and onto your arm when your hands are raised above the shoulder. Wear the sleeves of your coveralls or shirt over the top of the gloves. This will stop pesticides from rolling down the sleeve and into the glove.

Replace gloves on a regular basis. No one knows for certain how long gloves will last when they are in contact with pesticides. Pesticides will weaken any glove material over time.

Always check gloves for leaks before using them. Gloves that leak do not give any protection. In fact, they help to increase absorption by keeping the pesticide in contact with your skin. Throw out gloves that have even small leaks.

Check Your Gloves For Leaks

You can test gloves quickly using the following method:

1. Hold the glove by the cuff, as shown, with thumbs inside the cuff. Stretch the cuff a little.
2. Trap air inside the glove by swinging the glove outward and back toward your body, two or three times.

3. Hold the cuff closed with one hand and squeeze the inflated part of the glove with the other. This will expand the glove and magnify any small holes or tears.

Adapted from information provided by Canadian Centre for Occupational Health and Safety (CCOHS), 250 Main Street East, Hamilton ON L8N 1H6; 1-800-263-8466

**Body Covering**

To protect your body, wear a long-sleeved shirt and pants. Coveralls, worn over regular work clothes, give good protection. You may prefer to wear a size larger than usual to help prevent stretching or tearing at the seams. Keep one pair of coveralls to wear only when you are spraying pesticides.

You can also wear disposable coveralls designed for pesticide use. Make sure that the disposable coveralls you purchase are the right ones. The coveralls should provide splash protection against chemicals. Disposable coveralls designed to protect against dust and dirt will not protect you against pesticides.

Disposable coveralls specifically designed for pesticide use include:

- **KleenGuard® A70** - chemical spray protection coveralls made by Kimberly Clark
- **TYCHEM® QC** - a polyethylene coated TYVEK® coverall made by Dupont Canada Inc.
- **TYCHEM® SL** - a TYVEK® coverall laminated with Saranex® 23P, (a film from the Dow Chemical Company) made by Dupont Canada Inc.

The coveralls that have been laminated are suitable for handling undiluted and highly toxic pesticides. Be sure to dispose of the disposable coveralls safely. Put them in a plastic bag and take them to a landfill site.
Boots

Your feet can easily be contaminated if you walk through spills, enter treated areas, test spray nozzles or spray close to your body.

Do not tuck your pants into the boots. Pant legs worn outside stop pesticides from getting into the boot. If the pesticide does get inside, wash and change your boots and socks immediately.

Do not wear canvas or leather shoes or boots. These materials absorb the pesticide. Wear unlined boots for protection. The cloth lining absorbs the pesticide and cannot be washed out.

Headgear

Wear a waterproof hat to protect your head. A wide brimmed rain hat provides the best protection. Some rain suits have hoods attached and these provide good protection for the head and neck areas. If you cannot find a rain hat, try using a hard hat. A hard hat will protect you in most spray situations.

Avoid wearing baseball caps or hats with cloth or leather sweat bands. These materials absorb the pesticide and provide little protection.

Goggles

Your eyes are the most sensitive part of your body - give them special protection. Some pesticides cause eye irritation and may cause severe damage if they contact your eyes. Eyes absorb pesticide quickly and completely.

Protect your eyes by wearing goggles. Prescription eye glasses do not provide complete protection. Goggles will fit easily and comfortably over the top of normal eye glasses. Do not wear contact lenses when handling pesticides. Lenses absorb the pesticide and keep it in contact with your eyes.

Face Shields

You can protect your whole face with a full face shield. Face shields provide protection from any spills or splashes that happen during mixing and loading. Face shields are comfortable to wear and fit easily over goggles. Some types attach to hard hats.
Respirators

A respirator is a unit that covers your mouth and nose to prevent spray droplets, small particles, and vapours from getting into your lungs. A dust mask is not a substitute for a pesticide respirator.

Air Purifying Respirators

There are two kinds of air purifying respirators, the half mask chemical cartridge respirator and the canister gas mask. Make sure that the cartridge or canister you use has a safety-approved sticker that says NIOSH (National Institute for Occupational Safety and Health) or MSHA (Mine Safety and Health Administration) or BHSE (British Health & Safety Executive).

1. The half-mask chemical cartridge respirator is the most common air purifying respirator. It consists of pre-filters to remove dusts, small particles and spray droplets, and cartridges containing activated charcoal to remove vapours. Special cartridges and pre-filters are needed for protection against pesticides. Make sure you use a respirator equipped with cartridges that protect against organic vapours and pre-filters with a N-95, R-95 P-95 or HE filter rating.

   Change the pre-filters after each use. Change the organic vapour cartridges whenever you can smell or taste pesticides. More often is best practice. Change the cartridges regularly as their continuing effectiveness varies depending on use conditions. It is important to use the pre-filters and the cartridges together to properly protect yourself. Using one without the other is not safe.

2. The canister gas mask is another type of air purifying respirator. It is a full-face mask respirator that covers the eyes, mouth, and nose. It is often used in areas where there is a high concentration of pesticide vapours. You must wear at least a full face canister gas mask when applying a fumigant.

How to Fit an Air-Purifying Respirator

Air-purifying respirators come in different sizes to fit different shaped faces. When you buy a respirator, make sure it fits the person who is going to use it.

To test the fit, do a negative fit check. Cover the cartridges with your hands and breathe in. The mask will draw tightly to your face if there are no air leaks. A beard, sideburns, or even a day’s growth of whiskers may prevent a proper fit. Make sure that each time you use a respirator you have a good seal. Do a fit check every time.
Tractor Cab Cartridges

Organic Vapour Cartridges for tractor cabs are now available. Tractor cab cartridges work the same way as an air purifying respirator. The cartridges must be replaced regularly to provide continued protection.

Powered Air Purifiers

In some situations you may want breathing protection that is more comfortable. One example is when spraying pesticides inside a greenhouse. Powered air purifiers (like the helmet system) provide comfortable protection. The helmet system has a motor-blower which forces air through the cartridges into the helmet. Breathing is easy because no effort is needed to draw air through the cartridges. The helmet system also protects your head and neck against exposure.

Supplied Air Respirators

Supplied air respirators supply air to a headpiece through a tube from an air tank on your back. They are designed for use when the air outside the headpiece would be dangerous to breathe. This kind of respirator would be used in an emergency such as a fire in a pesticide storage, or when applying fumigants in an enclosed area. The Self-Contained Breathing Apparatus (SCBA) is the most common type.
After you have finished working with pesticides, clean all protective clothing and personal protective equipment.

**Clean Up Procedure**

1. Wash the outside of your chemical resistant gloves with warm soapy water before removing your protective clothing and PPE.

2. Leave your gloves on and remove your protective clothing and personal protective equipment. Always remove protective clothing and PPE outdoors.
   - If a granular pesticide was used, shake the clothing outdoors in a safe place, emptying pockets and cuffs.
   - If clothing has been contaminated by spills of a highly toxic or concentrated pesticide, throw it out. Place this clothing in a plastic bag and take it to a landfill site.

3. Place coveralls and other spray clothing in a plastic bag and keep them separate from the other laundry. You must wash these clothes separately from other clothes.

4. With your hands still protected by gloves, wash your protective equipment. Wash goggles, hat, boots, and any water repellent clothing in warm soapy water, rinse well and let them air-dry.
   - It is best to wash equipment outdoors.
   - If you do not have an outside clean-up area, keep certain buckets just for equipment clean-up. Label them and keep them separate from household cleaning supplies.

5. Remove the cartridges and pre-filters from the respirator. Place them in clean, sealed plastic bags. Wash the respirator in warm soapy water. Rinse well and let it air-dry. Air-drying prevents damage to the inlet and outlet valves.

6. Wash the outside of your gloves with warm soapy water again. Rinse well, remove them and hang them to dry.

7. Place dry articles in a clean storage area until next use. Do not store inside your pesticide storage area where items could be contaminated.
How to Wash Your Spray Clothes

All clothing used for spraying must be washed separately from other clothing. Wash them after each use. **Remember: use chemical resistant gloves to handle clothing.**

- Pre-soak clothing before washing. Use one of three methods:
  - hose off garments outdoors
  - soak in separate tub or pail
  - use the prewash cycle in automatic washer.

- Place clothing directly into the washing machine. Wash only a few garments at a time. **Do not wash with other family clothes.**

- Use a heavy duty setting on the washer: hot water, highest water level, longest cycle and with heavy duty detergent. Wash as you would for heavily soiled clothing.

- Wash clothing again.

- After washing, hang outside (preferably in bright sunlight) until completely dry. Do not use the clothes dryer.

- Clean the washing machine. Run the washing machine through one complete cycle using only detergent and hot water. No clothing.

Personal Hygiene

When you are finished for the day, take a bath or shower as soon as possible. The longer a pesticide remains on your skin, the greater the risk that it will be absorbed into your body.

Always shower before eating, drinking, or smoking. Wash your hair and under your fingernails. Shower with lots of soap and water.

Always change into clean clothes.

Wear clean work clothes every day. A small spill on yesterday’s clothes may seem unimportant, but wearing the same clothing again without washing it prolongs the exposure and increases your risk.
1. You should wear your chemical resistant gloves:

   a) over the sleeves of your coveralls, without a cuff at the top.
   b) over the sleeves of your coveralls, with a cuff at the top.
   c) under the sleeves of your coveralls, with a cuff at the top.
   d) under the sleeves of your coveralls, without a cuff at the top.

2. Why do you need extra protection when you mix and load pesticides?

3. Leather work boots are the best choice for foot protection when working with pesticides.

   TRUE          FALSE

4. Why is it important to wear pant legs outside of boots rather than tucking them inside?

5. How often should you change the charcoal cartridges on a half mask chemical cartridge respirator?

6. To be sure that a respirator fits properly:

   a) change the paper filter and cartridges frequently.
   b) adjust the head and neck straps as tightly as possible.
   c) do a negative fit check to make sure there are no air leaks around the seal.
   d) buy a respirator that is labeled as ‘one size fits all’.
7. What type of headgear should you **not** wear when spraying? Why?

_________________________________________________________________________________________

_________________________________________________________________________________________

8. What type of hat should you wear when you spray?

_________________________________________________________________________________________

9. Which section of the pesticide label will help you decide what protective clothing and personal protective equipment to wear while using a specific pesticide?

_________________________________________________________________________________________

10. Always consider each pesticide separately. The statements in the **Precautions** section of the label may be very different for each product. Never assume that the precaution statements will be the same for each pesticide.

    TRUE    FALSE

11. Protective clothing and personal protective equipment should be cleaned:

    a) at the end of each spray season.
    b) once a week.
    c) after three consecutive uses.
    d) after each use.