Personal Protective Equipment (PPE)

Chapter 6

National Pesticide Applicator Certification
Core Manual
Personal Protective Equipment (PPE)

This module will help you:

- Understand PPE selection
- Understand PPE care, storage, and disposal
Required PPE is determined by...

- The toxicity of the pesticide
- The formulation of the pesticide
- The activity you are performing
  - Measuring, mixing and loading
  - Applying
  - Maintenance operations
Read the label!!

- Follow directions for PPE
  - Handlers
  - Applicators
  - Early entry workers
- *Minimum* requirements are given – can wear more
Chemical-resistant Materials

- Read the label
- What clothing is specifically required

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Some materials that are Chemical-resistant to this product are listed below. If you want more options, follow the instructions for category F on an EPA chemical resistance category selection chart.

Applicators and other handlers must wear:  
A) Long-sleeved shirt; 
B) Long pants; 
C) Chemical-resistant gloves such as Barrier Laminate, Butyl Rubber, Nitrile Rubber or Viton; 
D) Shoes plus socks.

Follow manufacturer’s instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.
Chemical-Resistant Clothing

- Prevents most chemicals from reaching the skin
- PVC plastic, rubber, non-woven coated fabrics

- Rubber
- Nitrile
- PVC
- Barrier Laminate
Chemical-resistant Materials

- Watch for signs of wearing and degrading:
  - color change
  - spongy
  - swollen
  - jelly-like
  - cracked
  - brittle
Cotton, Denim, Leather: Not recommended for most pesticide applications!
Personal Protective Equipment (PPE)

- Minimum:
  - Long-sleeved shirt
  - Long trousers or coveralls
  - Gloves
  - Shoes plus socks
  - Hat

Protect Yourself!
Coveralls

- Wear loosely over clothing
- Zippers should be covered
- Two-piece: top should extend well below the waist and remain untucked
Chemical-resistant Suits

- Offers the most protection
- Wears out with chemical contact over time
- Made of rubber or plastic
- May be too warm
- Drink plenty of water!
- Take frequent breaks!
Chemical-Resistant Aprons

- Use when:
  - mixing and loading
  - cleaning equipment
- From neck to knees
- **WARNING:** aprons can get caught in machinery!
Use Gloves!

- **Especially during mixing & loading**
- **Unlined and waterproof**
- **Check for holes**
- **If spraying overhead, tuck sleeves inside gloves**…

… and fold the cuffs up
What is wrong with these gloves?

Lining can absorb pesticide!
NEVER use cotton gloves when applying pesticides…

unless the label requires them
Gloves reduce dermal exposure by 99% when mixing, loading, and applying.

**Exception:** Methyl bromide and other fumigant gases can become trapped inside gloves and cause burns.
No gloves??

Fluorescent dye shows how much pesticide can get on the hands while handling it
What is wrong with this picture?

Wear long-sleeved shirts!
Check the label to determine if you need specific chemical-resistant gloves, and what kind.

Personal Protective Equipment:

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category C on an EPA chemical resistance category selection chart.

Applicators and other handlers must wear: Long-sleeved shirt and long pants; Chemical-resistant gloves; such as Barrier Laminate or Butyl Rubber, or Nitrile Rubber or Neoprene Rubber or Polyvinyl Chloride or Viton; Shoes plus socks; Protective eyewear when mixing or loading, when performing maintenance or repairs (such as repairing/replacing hoses, cleaning, replacing or unplugging nozzles) on contaminated equipment or equipment containing residual carbofuran, or when cleaning the equipment or vehicle containing, or contaminated with carbofuran. For exposure in enclosed areas: A respirator with either an organic vapor-removing cartridge with a prefilter approved for pesticides (MSHA/NIOSH approval number prefix TC-23C), or a canister approved for pesticides (MSHA/NIOSH approval number prefix TC-14G), or a NIOSH approved respirator with an organic vapor (OV) cartridge or canister with any R, P or HE prefilter; For exposures outdoors: Dust/mist filtering respirator (MSHA/NIOSH approval number prefix TC-21C), or a NIOSH approved respirator with any R, P or HE filter.
Footwear

- No sandals!
- Consider wearing unlined, rubber boots... even if not required
- Hang pant legs outside the boots!
Hats & Hoods

- Liquid-proof with a wide brim
- No absorbent materials!
- Chemical-resistant hoods on jackets
Protect your eyes when mixing concentrates or handling dusts or toxic sprays

Eyewear should have shields on all sides!
If goggles are required, so is access to an eyewash dispenser!

A portable eyewash is recommended for people in the field without access to a stationary eyewash.
Respirators

Prevent pesticide exposure through the respiratory system
When should a respirator be used?

- When the label requires it
- When exposed to spray mist
- When working in confined spaces
- When using dusts, gases, vapors, or fumigants
Air-purifying

Mechanical filter respirators (dust masks)

Chemical cartridge respirators

Gas masks
Chemical cartridge and canister respirators

- Both half-face mask and full-face mask styles
- Get cartridges that are right for the chemicals you are using!
Air-Supplying

- Use an air-supplying respirator when
  - oxygen level is low
  - when applying fumigants in enclosed areas such as grain bins
- Self-contained breathing apparatus
Which type of respirator is this? Air-purifying or air-supplying?
Always select equipment approved by:

- National Institute of Occupational Safety and Health (NIOSH)
- Make sure the cartridge or filter is rated for the pesticide you are using
- Read the label
Use and Care of Respirators

- Fit-check and make sure it works before every use
- MUST have tight seal!
- Make sure valves are in proper working order
- Replace filters
  - Taste, smell, breathe
  - State regulations
  - Manufacturer recommendations
Fit test your respirators...

- Physician check up
- Prior to initial use
- Whenever a different facepiece is used
- *At least* every year thereafter
- States may have regulations
Qualitative Fit Test

- With the respirator on, the wearer is exposed to an odorant, irritant, or taste agent.
- The wearer then breathes, moves head from side to side, up and down, grimaces, bends at the waist, and talks.
- The wearer reports any noticeable odor or taste agent that leaks into the mask.

Wand with irritant is placed inside area with respiratory user.
Quantitative Fit Test

- A special instrument compares the dust particle concentration in the surrounding air with the concentration inside the respirator.
- The ratio of these concentrations is called the fit factor.
- Wearer performs same movements as in the qualitative test, and the device continues to measure the concentration of particles.
Fit check before each use!

- **Positive pressure check:**
  Put hand over exhalation valve and **exhale gently.** If there is pressure in the mask, it’s a good fit.
Fit check before each use!

- **Negative pressure check:** Cover cartridges with hands, **inhale** gently, and hold breath for 10 seconds. If the facepiece exhibits no leakage, the respirator fits properly.

- Facial hair does not allow a respirator to seal!
After each use, remove filters and wash the facepiece.

Store in a tightly-sealed bag in a clean, dry location, not the pesticide storage areas.
Get to Fresh Air Immediately if...

- You smell or taste contaminants
- Your eyes, nose or throat become irritated
- Your breathing becomes difficult
- The air you are breathing becomes uncomfortably warm
- You become nauseous or dizzy
Clean Up!

- Discard disposables and worn-out items!
- Wash at the end of each day, including gloves and all PPE
- Launder pesticide clothing
Separate from family clothing

Wash contaminated clothing in hot water with detergent
Laundering Pesticide Contaminated Clothing

- Use **heavy-duty liquid detergent** for ECs
- Use **2 cycles** for moderate to heavy contamination
- Rinse the washer with an “empty load”
Line dry clothing if possible!
Keep all PPE separate from pesticides in storage!!
PPE Use

- Wear adequate PPE
  - When mixing
  - When applying
  - When doing equipment maintenance
PPE Use

- If a nozzle becomes plugged during an application...
  - Do not remove your PPE!
  - Use an old toothbrush to clean the nozzle. Never try to blow it out with your mouth
Summary

- Use PPE
- Use chemical-resistant PPE if necessary
- Wear, clean, store, & dispose of PPE properly
- Use eyewear & respirator according to the label
- Fit test respirators yearly and fit check them before every use
- Follow the label instructions -- and then some!
Q1. Who must legally follow Personal Protective Equipment instructions on the pesticide label?

1. applicators
2. mixers/loaders
3. early-entry agricultural workers
4. hand-picking harvest crew

A. 1 only  
B. 1 and 2 only  
C. 1, 2, and 3 only  
D. 1, 2, 3, and 4
Q2. A pesticide label may require a respirator be worn for personal protection when handling the pesticide product. Which of the following are types of air-purifying respirators?

1. Chemical cartridge respirators
2. Gas masks
3. Self-contained breathing apparatus
4. Supplied-air respirators

A. 1 and 2 only  
B. 2 and 3 only  
C. 3 and 4 only  
D. 2 and 4 only
Q3. Where does most pesticide exposure occur for pesticide handlers?

A. Eyes  
B. Hands  
C. Forearms  
D. Feet
CHAPTER 6

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