



**Pesticide Safety for the
Applicator**

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**How Do We
Measure Risk?**


It is a function of:
Toxicity x Exposure

Toxicity – capability of a
substance to cause injury or
death

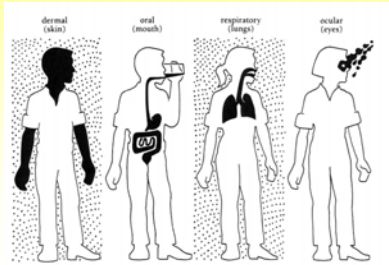
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Types of formulations

- **Wet**
 - More easily absorbed
- **Dry**
 - More easily inhaled

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Routes of Exposure



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Acute and Chronic Toxicity

- **Acute Exposure**
 - Immediate effects of a single, short term dose
 - All routes are considered during testing
 - Dermal
 - Oral
 - Eye
 - Inhalation



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Chronic Toxicity

- **The delayed effects of repeated exposures over a long period of time.**
- **Effects evaluated in the lab include**
 - Potential tumors
 - Birth defects
 - Reproductive effects

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Material Safety Data Sheets



- Provide details on both acute and chronic exposures
- Provides basis for protective gear (PPE)
- WWW.greenbook.net
- Remember – in the event of a suspected pesticide poisoning, the label and MSDS sheets need to be taken to the health provider

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**CAPTURE® 2 EC
INSECTICIDE/MITICIDE**

And it is often on the label as well

liquid of vapors may result in contact dermatitis and irritation of the mucous membranes.

Chronic Effects From Overexposure: No data available for Capture 2 EC. In studies with laboratory animals, bifenthrin did not cause reproductive toxicity or teratogenicity. Tremors were associated with repeated exposure of laboratory animals to bifenthrin. In life-time feeding studies conducted with rodents, a slight increase in the incidence of urinary bladder tumors at the highest dose in male mice was considered to be an equivocal response, not evidence of a clear compound related effect. An overall absence of genotoxicity has been demonstrated in mutagenicity tests with bifenthrin. Chronic exposure to aromatic hydrocarbons may cause headaches, dizziness, loss of sensations or feelings (such as numbness), and liver and kidney damage. Inhalation of xylene vapors at high doses has also resulted in an increased incidence of malformations and decreases in fetal weight in laboratory animals. Damage from xylene may be potentiated by alcohol. Disturbances in hearing and balance have been reported in workers exposed to butanol vapors.

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Other Label Information

Agricultural Use Requirements

REI's

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It is on the label!

Personal Protective Equipment (PPE):
 Applicators and other handlers must wear:

- Coveralls over long-sleeved shirt and long pants
- Waterproof gloves
- Chemical-resistant footwear plus socks
- Protective eyewear
- Chemical-resistant headgear for overhead exposure
- Chemical-resistant apron when cleaning equipment, mixing, or loading
- 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).

Discard clothing and other absorbent materials that have been heavily contaminated with this product. Do not reuse them.

Follow manufacturer's instructions for cleaning/maintaining Personal Protective Equipment. If no such instructions for washables, use detergent and hot water. Keep and wash Personal Protective Equipment separately from other laundry.

When handlers use closed systems or enclosed cabs, in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides (40 CFR 170.240 (d) (4-6)), the handler PPE requirements may be reduced or modified as specified in the WPS.

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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

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Read the Label!!

What protective gear 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.

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Personal Protective Equipment (PPE)

- **Minimum:**
(Even if not on label)

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

Protect Yourself!



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Chemical-Resistant Clothing

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



Rubber



Nitrile



PVC



Barrier Laminate

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Material

- **Nitrile** – Good overall protection, \$
- **Neoprene** – Softer, better dexterity - \$
- **Natural Rubber** – Use only on dry or water based formulations - \$\$
- **Butyl** – For High Toxicity Pesticides - \$\$
- **PVC** – Anhydrous ammonia - \$
- **Viton** – Superior Protection but \$\$\$\$\$

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Gloves

- Want unlined gloves
- Do Not Wear Leather Gloves
- Do Not Wear exam gloves
- Check for holes often
- Want 14 mils or thicker



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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-21G), or a NIOSH approved respirator with any R,P or HE filter.

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Gloves



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Inside Or Outside?

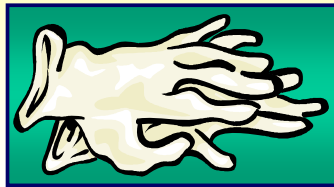


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Chemical-resistant Materials

- Watch for signs of wearing and degrading:
 - color change
 - spongy
 - swollen
 - jelly-like
 - cracked
 - brittle



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Coveralls

- For Toxicity Class III or IV – Cotton (tight weave), Kleenguard® coveralls
- For Toxicity Class (II) – Possibly cotton, Tyvek.
- For Toxicity Class I – PVC, Nitrile, Tychem®, sealed or serged seams.



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Coveralls

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



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Chemical-resistant Suit

- 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!



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Injuries – Mixing and Loading

- 60% of injuries
- Application makes up less than 1/2 (38%)
- Over 1/2 (57%) of injuries are systemic.
- About 25% are eye injuries



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Chemical-Resistant Aprons

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



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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



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Footwear

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



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Hats & Hoods

- Liquid-proof with a wide brim
- No absorbent materials!
- Chemical-resistant hoods on jackets



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Protect your eyes when mixing concentrates or handling dusts or toxic sprays



Eyewear should have shields on all sides!

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If goggles are required, so is access to an eyewash dispenser!



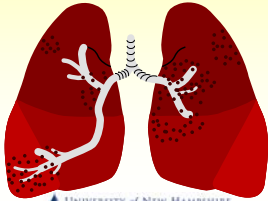
A portable eyewash is recommended for people in the field without access to a stationary eyewash


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Respirators

**Prevent pesticide exposure
through the respiratory system**



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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



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Air-Purifying Respirators



- Must be rated for pesticides you are using
- Facial hair may be an issue
- Full face masks preferable to nose/mouth only masks

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Helmet Style

- Come with battery pack or 12 v. adapter
- Offer comfort along with safety



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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



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Clean Up!

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



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Separate from family clothing



Wash contaminated clothing
in hot water with detergent

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Line dry clothing if possible!



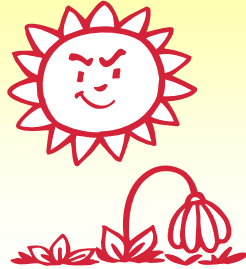
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Heat Stress While Spraying Pesticides

- **Pesticide users are at higher risk...**

- More clothing
- Toxic environments
- Other stress factors
 - Hard work
 - More exposed to sun
 - Difficult to drink water



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Heat Exhaustion

- **Overheating of the body due to excessive loss of water or, in rare cases, salt depletion.**
- **Symptoms include:**
 - Thirst, headache, Dizziness
 - Pallor
 - Possibly nausea or vomiting
 - In severe cases, your heart may race and you may feel disoriented

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Preventing Heat Injuries



- **Drink water (1 quart per hour when hot!)**
- **Eat to replace electrolytes**
- **Rest breaks**
- **Acclimatize**
- **Watch for low humidity**
 - You may not appear to be sweating but it is evaporating
 - You become less cautious

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First Aid For Heat Exhaustion

- Stop what you are doing and get out of the sun-preferably into an air-conditioned building
- Drink water or, better still, a sports beverage, taking it slowly rather than gulping it down
- If you don't feel better within 30 minutes, go to a hospital emergency room
- Heat Stroke is generally not fatal but heat stroke can be!!

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Heat Injuries and Pesticide Poisoning Can Appear Similar

Heat Injuries

- Sweating
- Headache
- Fatigue
- Dry Membranes
- Dry Mouth
- No tears or spit
- Fast pulse
- Dilated pupils
- Confusion
- Loss of coordination

Pesticide Injuries

- Sweating
- Headache
- Fatigue
- Moist Membranes
- Salivation, spit, tears
- Slow pulse
- Pinpoint Pupils
- Confusion
- Loss of coordination

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