

Pesticide Safety for the Applicator

2009



UNIVERSITY of NEW HAMPSHIRE
Cooperative Extension

How Do We Measure Risk?

It is a function of:

Toxicity x Exposure

**Toxicity – capability of a
substance to cause injury or
death**

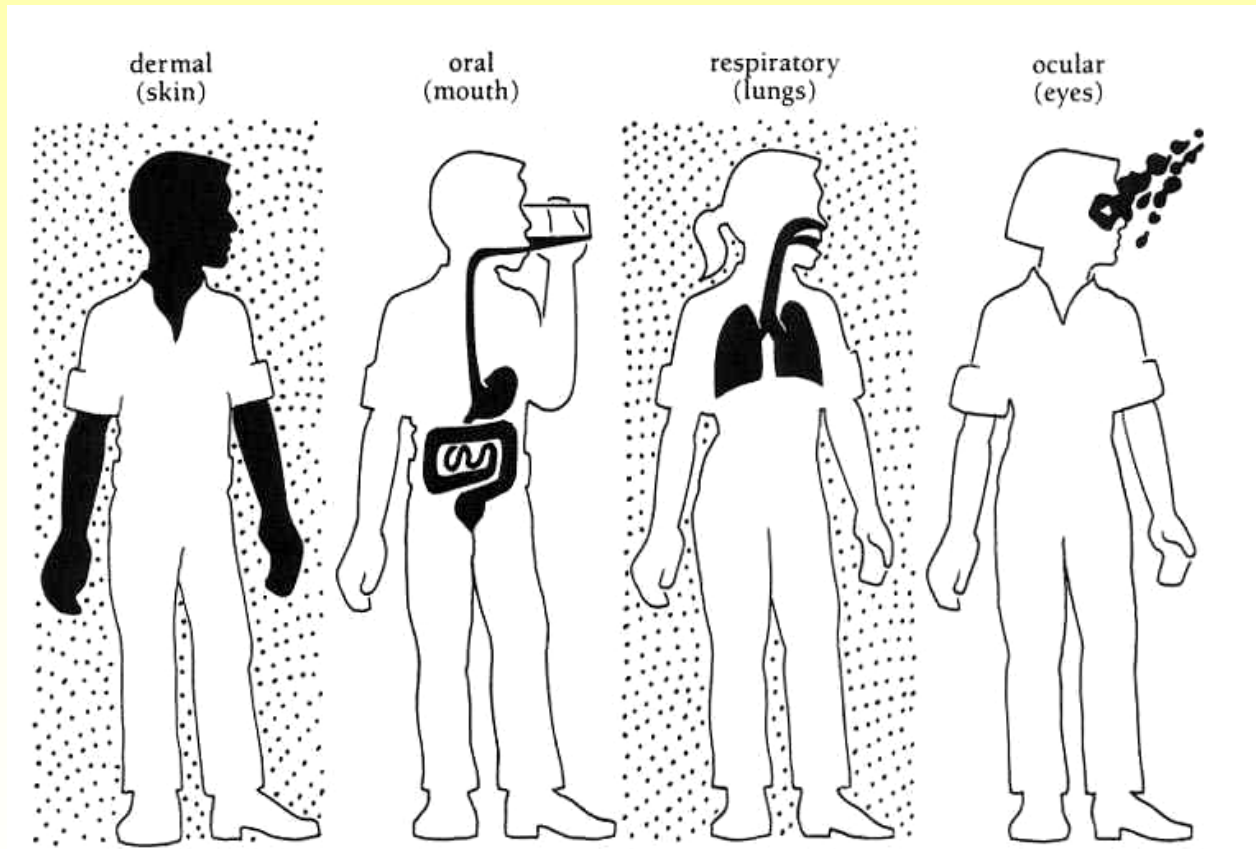


Types of formulations

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



Routes of Exposure



Acute and Chronic Toxicity

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



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**

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**

CAPTURE® 2 EC INSECTICIDE/MITICIDE

This document has been prepared to meet the requirements of the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200; the EU Directive, 91/155/EEU, and other regulatory requirements. The information contained herein is for the concentrate as packaged, unless otherwise noted.

1. Company and Product Identification

MANUFACTURER

FMC CORPORATION
Agricultural Products Group
1735 Market Street
Philadelphia, PA 19103 U.S.A.
EMERGENCY TELEPHONE NUMBERS:
CHEMTREC
(800)424-9300 (U.S.A. & Canada)
(202)483-7818 (All Other Countries)
FMC CORPORATION
(800)331-3148 (U.S.A. & Canada)
(716)735-3765 (All Other Countries—reverse charges)
Code Number: 777

And it is often on the label as well

Name	CAS #	Number	PEL/TLV	Class
Silberthrin (25.1%)	82057-04-3	None	None	None
Aromatic Hydrocarbons (<21.9%)	64742-95-5	650-001-00-0	100 ppm (suppler)	None
1,2,4-trimethylbenzene (<11.3%)	95-63-6	None	25 ppm	None
Xylene (<7.1%)	1330-20-7	601-022-00-9	100 ppm 150 ppm STEL	R11-20/21-38
Surfactant Blend (<6.9%)	None	None	None	None
Diethylbenzene (<1.1%)	100-41-4	601-023-00-4	100 ppm 125 ppm STEL	R11-20
Carbene (<0.7%)	98-82-8	601-024-00-3	50 ppm (skin)	R10-37
1-butanol (<0.6%)	71-36-3	603-004-00-6	50 ppm (skin) (ceiling)	R10-20

3. Hazards Identification

Emergency Overview:

- Amber liquid with an aromatic hydrocarbon odor.
- Moderately combustible. May support combustion if heated above the product's flash point (42.2°C/108°F).
- Thermal decomposition and burning may form toxic by-products.
- For large exposures or fire, wear personal protective equipment.
- Highly toxic to fish and aquatic organisms. Keep out of drains and water courses.
- Moderate oral toxicity.
- Potential Health Effects:** Effects from overexposure result from swallowing or coming into contact with the skin. Symptoms of overexposure include, tremors, convulsions, incoordination, decreased locomotion, and nasal discharge. Contact with bifenthrin may occasionally produce skin sensations such as numbing, burning, or tingling. These skin sensations are reversible and usually subside within 12 hours.

Medical Conditions Aggravated by Exposure: None presently known.

4. First Aid Measures

Eyes: Flush with water for at least 15 minutes. If irritation occurs and persists, obtain medical attention.

Skin: Wash with plenty of soap and water.
Inhalation: Remove to fresh air. If breathing difficulty or discomfort occurs and persists, obtain medical attention.

Ingestion: Rinse mouth with water or 2 glasses of water. Do not induce vomiting unless advised by a medical doctor immediately.

Note to Medical Doctor: Captoral, and low dermal and inhalation irritant to the eyes and nose. This product contains light aromatic hydrocarbons which can produce a severe pneumonitis if aspirated. Considerable gastric lavage with an endotracheal tube may be necessary. Ordinary skin salves have been found to be ineffective. Treatment is otherwise of exposure followed by symptomatic care.

5. Physical and Chemical Properties

Appearance: Amber liquid.
Boiling Point: (108°F) (36°C)
Flash Point: 42.2°C (108°F)
Specific Gravity: 0.85 (at 20°C)
Evaporation Rate: 0.1 (at 20°C)

6. Accidental Release Measures

Isolate and post spill area. Wear and personal protective equipment as required by Section 8, "Exposure Controls/Personal Protection." Keep unprotected persons and animals out of streams and fine spill and absorb with a non-combustible absorbent such as clay, sand, or soil. Vacuum into a drum and label container. To clean and neutralize spill at least, wash with a suitable detergent and an appropriate alcohol (e.g., isopropanol). Follow this by soap and water solution. Absorbent liquid and add to the drum collected. Repeat if necessary. Dispose according to the method "Disposal Considerations."

7. Handling and Storage

Store in a cool, dry, well-ventilated area. Do not store near heat, open flame, or original containers only. Keep out of reach of children and animals. Do not freeze. Do not use if crystals are observed. Store at 15°C (60°F) by room heating and source of heat for warming control periodically to redissolve crystals. Do not mix with other pesticides, fertilizers, or other chemicals.

8. Exposure Controls/Personal Protection

Personal protective equipment recommended for individuals whose work is not guided by the product label. Use local exhaust ventilation where vapor or mist may be present. Use all transport vehicles prior to use.

9. Environmental Hazards

Do not contaminate water, food, or feed. Do not apply directly to animals. Do not apply to crops or plants intended for human consumption. Do not apply to ornamental plants or lawns. Do not apply to lawns or lawns intended for human consumption.

10. Regulatory Information

Work Clothing: Depending upon concentrations encountered, wear coveralls or long-sleeved uniform and

head covering. For larger exposures as in the case of spills, wear full body cover barrier suit, such as a rubber rain suit. Leather items — such as shoes, belts, and watchbands — that become contaminated should be removed and destroyed. Launder all work clothing before reuse (separately from household laundry).
Eye Protection: For splash, mist, or spray exposure, wear chemical protective goggles or a face shield.

liquid or 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 lifetime 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

Specimen Label



*Trademark of DowElanco

For control of various insects infesting certain fruit and vegetable crops.

Active Ingredient:
chlorpyrifos: O,O-diethyl
O-(3,5,6-trichloro-2-pyridinyl)
phosphorothioate..

Inert Ingredients

Total

U.S. Patent 4,380,537

EPA Reg. No. 62719-34

Precautionary Statements

Hazards to Humans and Domestic Animals
Keep Out of Reach of Children

CAUTION PRECAUCION

Si usted no entiende la etiqueta, busque a alguien para que se la explique en detalle. (If you do not understand the label, find someone to tell you in detail.)

Harmful if Swallowed • Causes Eye Irritation

Avoid contact with eyes, skin, and clothing. Avoid breathing dust.

Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining PPE. If instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco or the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

First Aid

Organophosphate

If swallowed: Call a physician or Poison Control Center. Drink 1 or 2 glasses of water and induce vomiting by touching back of throat with finger.

Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours.

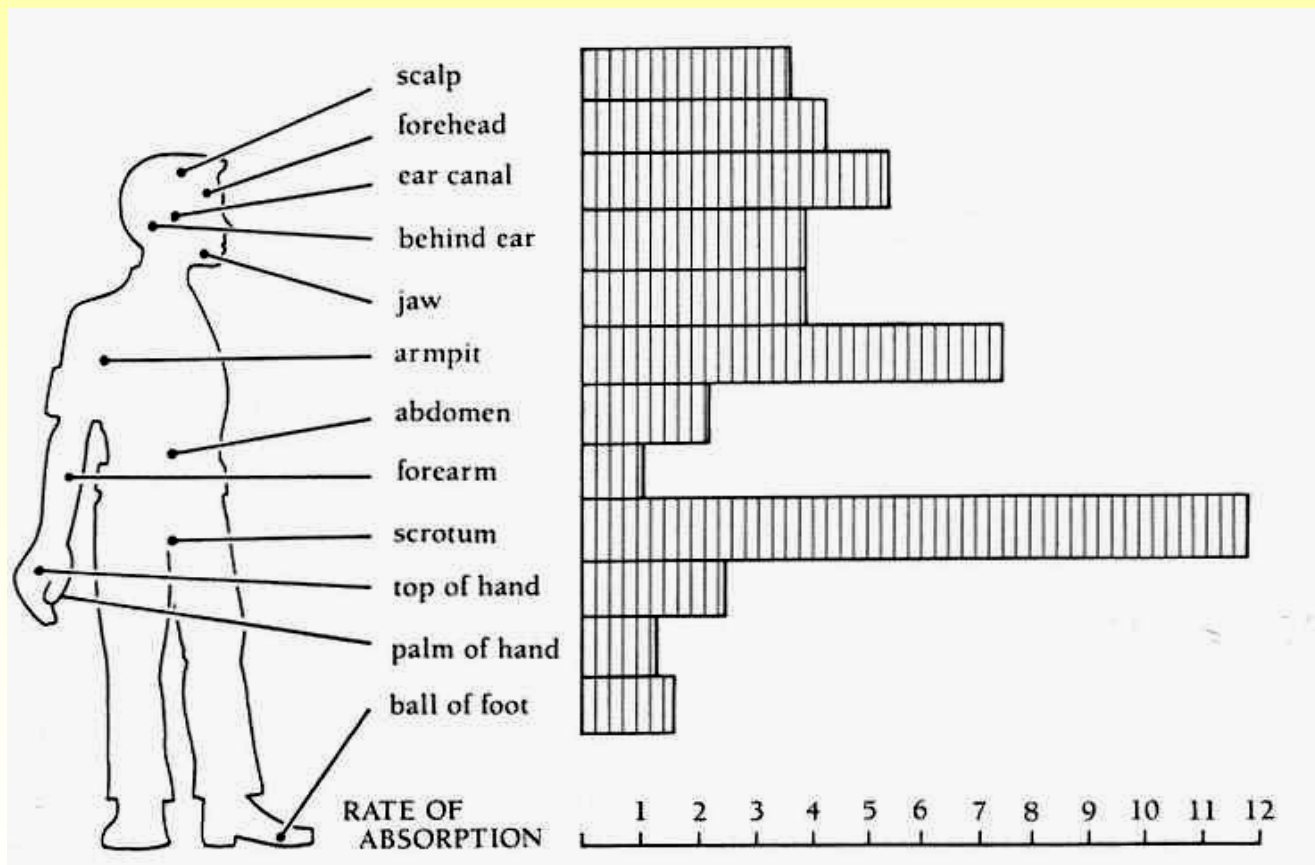
Exception: If the product is soil-injected or soil-incorporated, the Worker Protection Standard, under certain circumstances, allows workers to enter the treated area if there will be no contact with anything that has been treated.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Shoes plus socks
- Waterproof gloves



Rates of Absorption



PPE

Protecting your Body!

- **Skin**
- **Eyes**
- **Ingestion**
- **Inhalation**



It is on the label!



Active Ingredient:	
terbufos: S-[[[(1,1-dimethylethyl)thio]methyl]	15.0%
0,0-diethyl phosphorodithioate	85.0%
Inert Ingredients:	85.0%
Total	100.0%

EPA Reg. No. 241-238

**KEEP OUT OF REACH
OF CHILDREN
DANGER/PELIGRO!**



Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand this label, find someone to explain it to you in detail.)

**STATEMENT OF PRACTICAL TREATMENT
Organophosphate
CALL A PHYSICIAN AT ONCE IN ALL CASES
OF SUSPECTED POISONING.**

If swallowed, drink one or two glasses of water and induce vomiting by touching back of throat with finger. Do not induce vomiting or give anything by mouth to an unconscious person. Avoid alcohol. Get medical attention.

If inhaled, remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Get medical attention.

If on skin, wash thoroughly with soap and water.

**PRECAUTIONARY STATEMENT
HAZARDS TO HUMAN
AND DOMESTIC ANIMALS
DANGER!**

Fatal if swallowed, inhaled, or absorbed through skin. Do not breathe dust. Do not get in eyes, on skin, or on clothing.

Do Not Breathe Dust
While emptying container into equipment, pour slowly to allow as little free fall as possible. Do not pour directly into equipment. Do not allow dust to reach the breathing zone.

Do Not Contaminate Food or Feed Products
Once a container has been opened, use it only for the purpose intended. See the STORAGE AND DISPOSAL statement for further information.

Keep Out of Reach of Domestic Animals.
Not For Use or Storage In or Around the Home.

WORK SAFETY RULES
REPEATED EXPOSURES TO CHOLINESTERASE INHIBITORS SUCH AS ARE CONTAINED IN THIS PRODUCT WITHOUT WARNING, CAUSE PROLONGED AND VERY SMALL DOSES OF ANY CHOLINESTERASE INHIBITOR.

Persons working with this product should have frequent blood tests of their cholinesterase levels. If the cholinesterase level falls below a critical point, no further exposure should be allowed until it has been determined by means of blood tests that the cholinesterase level has returned to normal. Before using this product, consult the National Pesticide Telecommunication Network for recommendations regarding such blood tests, poisoning management, emergency treatment, and other information regarding the toxicity of terbufos. The toll-free number for the National Pesticide Telecommunication Network is 1-800-858-7378.

If handled indoors, provide mechanical exhaust ventilation. Keep all unprotected persons, children, livestock, and pets away from treated areas or where there is danger of drift. Do not rub eyes or mouth with hands. If you feel sick in any way, STOP work and get medical attention. See Statement of Practical Treatment section.

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

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.





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!!

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.



Personal Protective Equipment (PPE)

- **Minimum:**
(Even if not on label)
 - Long-sleeved shirt
 - Long trousers or coveralls
 - Gloves
 - Shoes plus socks
 - Hat

Protect Yourself!





Chemical-Resistant Clothing

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



Rubber



Nitrile



PVC



**Barrier
Laminate**

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 \$\$\$\$\$



Gloves

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





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.

Gloves



18" length for added protection

Best 18", 22-mil
Unlined
Nitrile Gloves

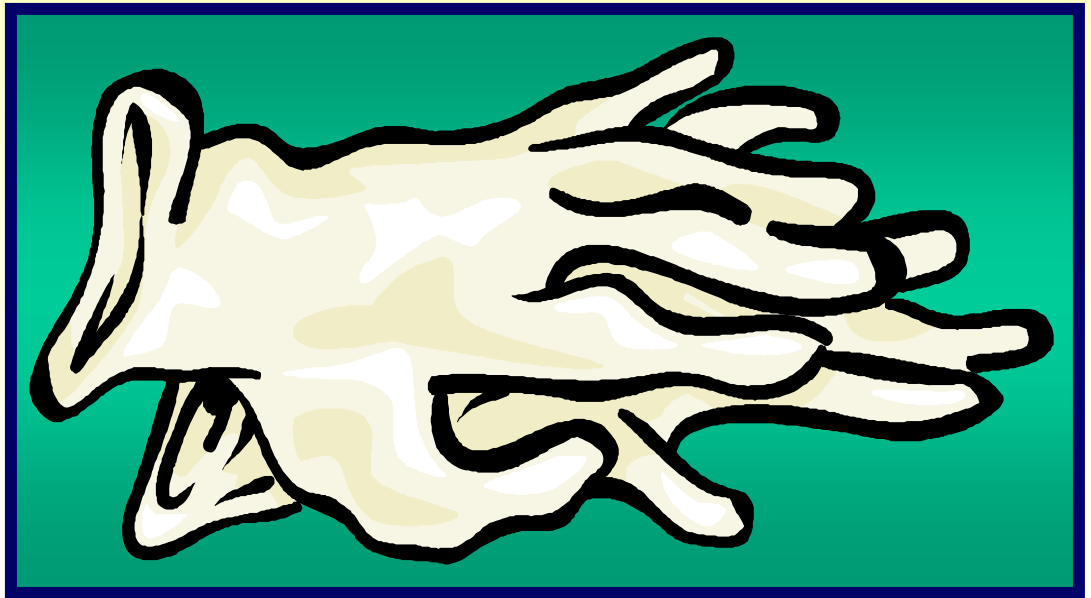
This tough 22-mil thick nitrile rubber glove resists punctures, snags, cuts and abrasions. Curved finger fit with tapered wrist ensures a comfortable natural fit. A textured finish provides a secure grip. Excellent resistance to most pesticides, oils, greases, fats and acids. For use with pesticides which refer to categories A, C, E or F on EPA's Chemical Resistance Category Selection Chart (*see page 9*).
USA made. Specify size: L (10) or XL (11) only. Item No. 4082K

Inside Or Outside?



Chemical-resistant Materials

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



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.**





Coveralls

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





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!**



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**





Chemical-Resistant Aprons

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





**Gloves reduce dermal exposure
by 99%
when mixing,
loading,
and applying**



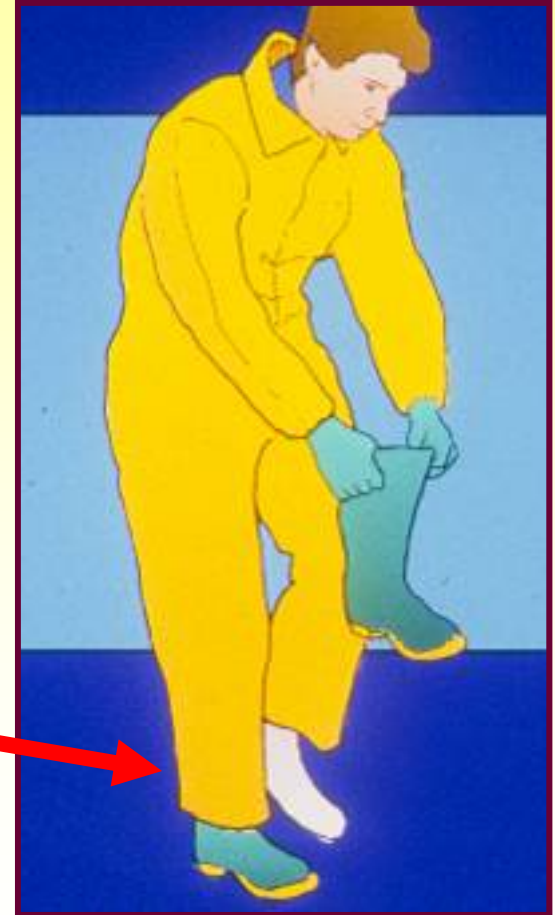
**Exception: Methyl bromide
and other fumigant gases can
become trapped inside gloves
and cause burns**





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!



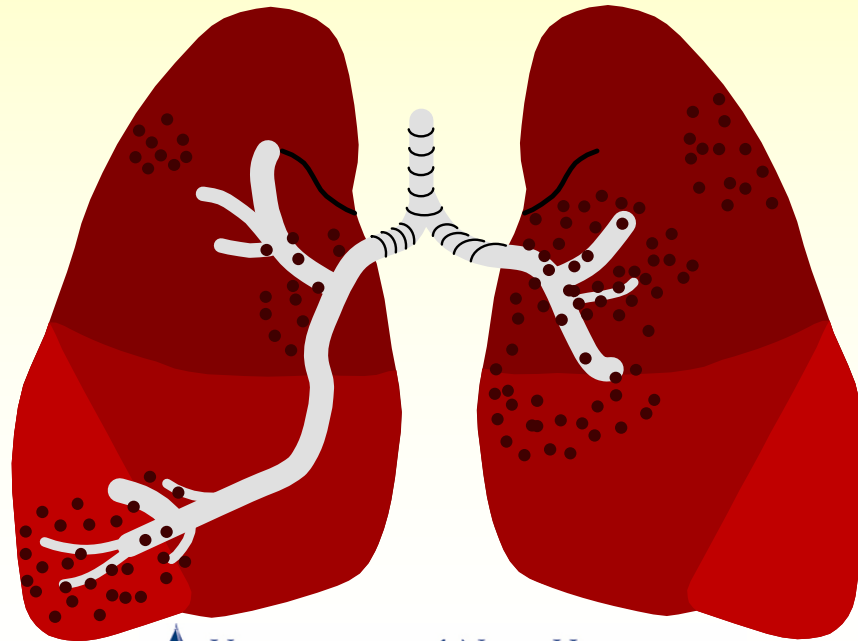
A portable eyewash is recommended for people in the field without access to a stationary eyewash





Respirators

**Prevent pesticide exposure
through the respiratory system**



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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**

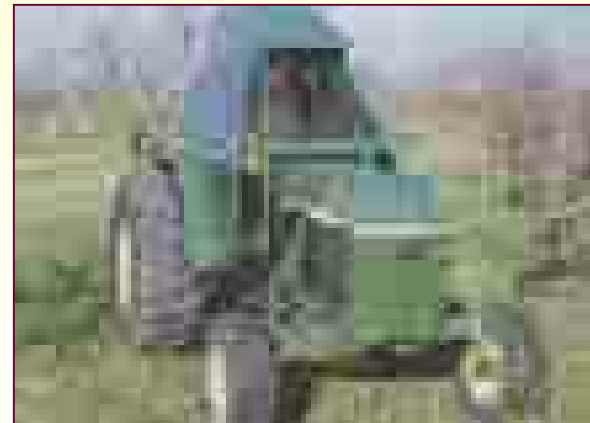


Air-Purifying Respirators



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

**R
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Helmet Style

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



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





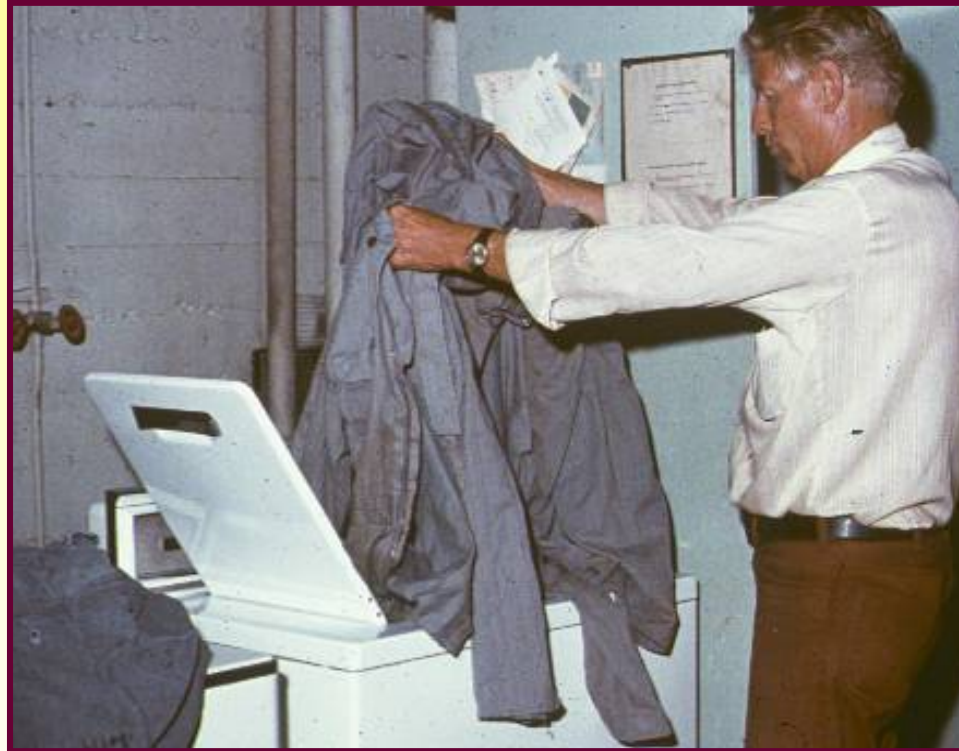
Clean Up!

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





Separate from family clothing



**Wash contaminated clothing
in hot water with detergent**



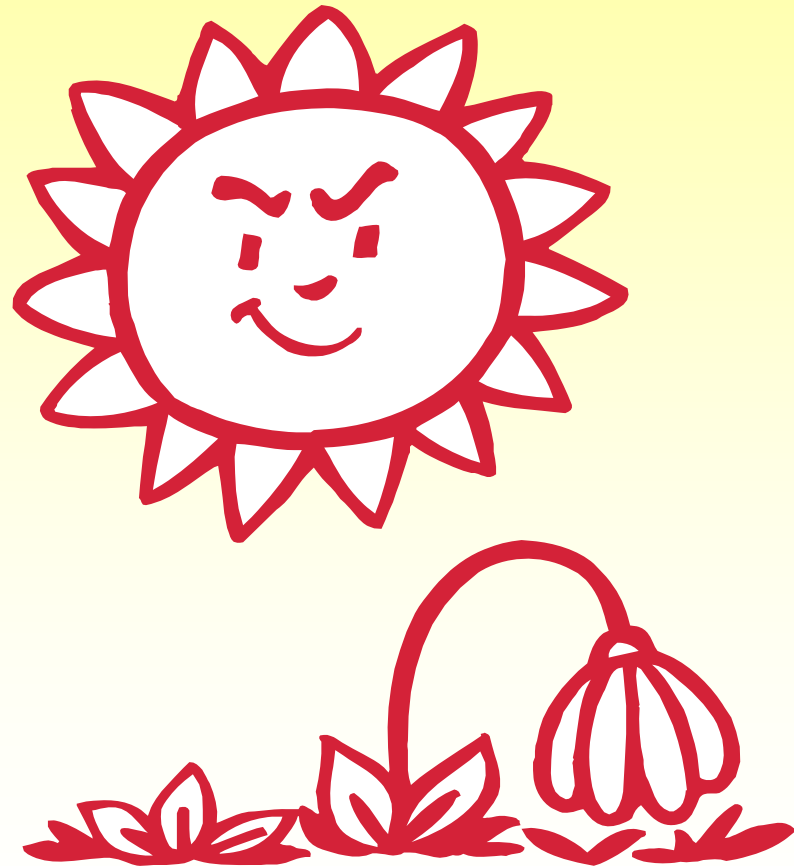


Line dry clothing if possible!



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

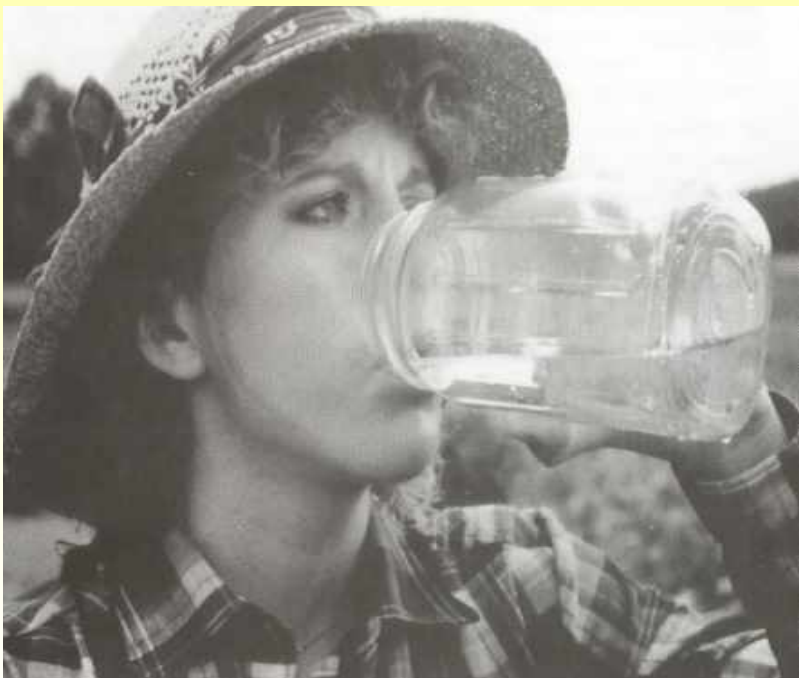


Heat Exhaustion

- **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**



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**

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!!**



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

