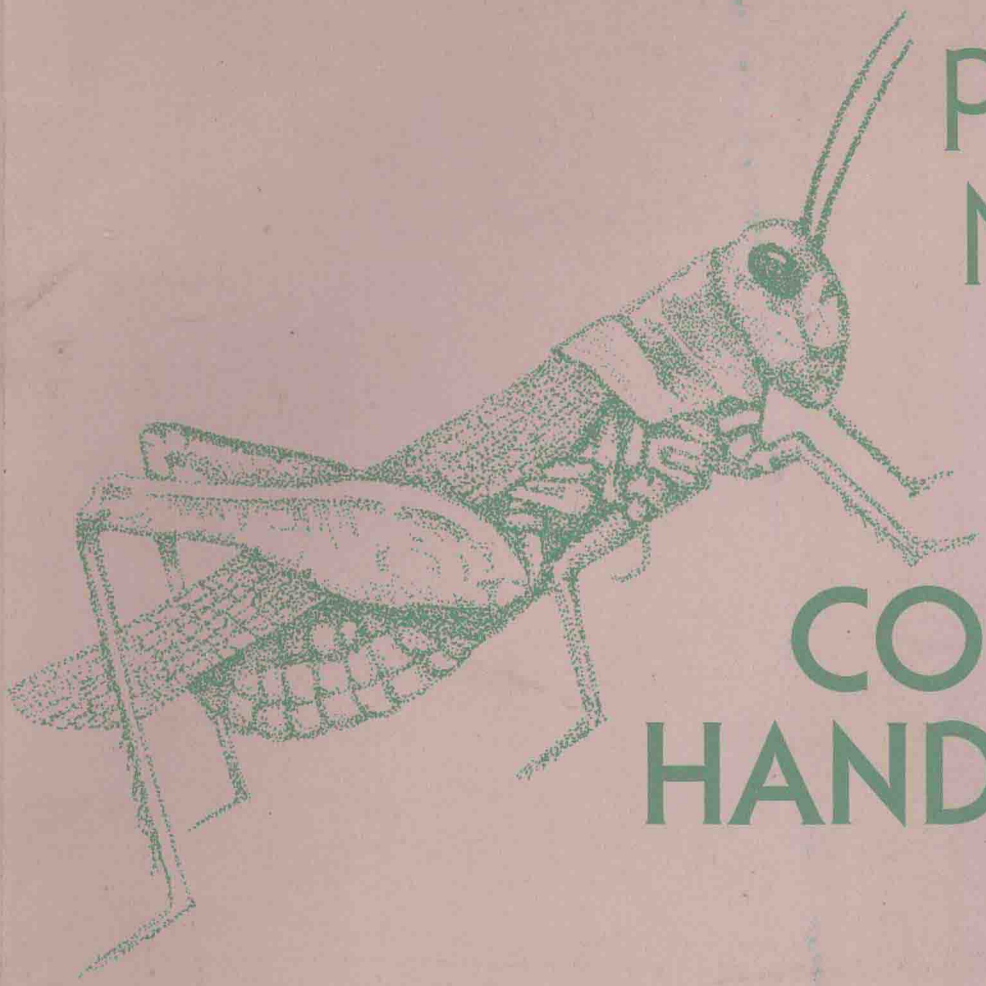

PACIFIC NORTH WEST INSECT CONTROL HANDBOOK

Consultation or Poison Control Centers are listed on the inside back cover

March 1985

(This book is revised annually)

Extension Services of Oregon State University, Washington State University, and the University of Idaho

PACIFIC NORTHWEST INSECT CONTROL HANDBOOK

MARCH 1985

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The information herein is supplied with the understanding that no discrimination is intended and that listing of commercial products, necessary to this handbook, implies no endorsement by the authors or the Extension Services of Oregon, Washington, or Idaho. Criticism of products or equipment not listed is neither implied nor intended.

Due to constantly changing laws and regulations, the Extension Services can assume no liability for the suggested use of chemicals contained herein. (Pesticides should be applied according to the label directions on the pesticide container.)

IMPORTANT PESTICIDE INFORMATION

An amendment to the Federal Insecticide, Fungicide, and Rodenticide Act in 1978 permitted the use of a pesticide to control a pest not on the label if the application was to a crop, animal, or site specified on the label unless mentioned otherwise. This amendment applied only to users of pesticides and experts who recommended the use of pesticides provided they derived no financial gain from the sale or distribution of the products.

However, an Environmental Protection Agency opinion in 1981 now permits chemical company representatives to recommend uses inconsistent with the label in the same manner and with the same restraints afforded to those with noncommercial interests.

In the 1985 PNW Insect Control Handbook, the few insecticide uses that are listed for the control of certain pests not specifically found on any label are identified with the symbol †. These are situations where available insecticide labels may not list the pest for which past use history or available data indicate the insecticide suggested is efficacious.

It should be further noted that a University of Idaho Pesticide Committee has ruled that no pesticide registered in Idaho shall be recommended by university personnel for control of pests not on the label.

Pesticides are registered federally under Section 3 of the Federal Insecticide, Fungicide, and Rodenticide Act as amended in 1972, 1975, and 1978. This law also permits registration (Section 24C) within states under certain conditions to satisfy "special local needs."

The 24C registrations are very useful and often can be obtained quickly with a minimum of data. Because 24C uses are state-initiated, the uses are usually not on the container label but are on supplemental labels (literature) required to be in the possession of users. These uses are identified in the Handbook as 24C with the state or states holding the registration identified. For example OR, WA, 24C.

A third type of registration (Section 18) permits, at the discretion of the administrator of the EPA, special emergency exemption from the provisions of FIFRA-amended. These emergency uses are so limited and unpredictable that they are not included in this Handbook.

INTRODUCTION

The Pacific Northwest Insect Control Handbook is a guide to the control of insect pests. It is written in an abbreviated style for ready reference and assumes that the user has basic information regarding pesticide usage. Supplements are included at the end of the handbook giving detailed information on control of some of the more important pests.

There may be additional insecticide formulations available locally that are labeled for pests, but not included in the Handbook. Conversely not all labels for a given product may include every pest mentioned. It is illegal to misuse a pesticide and therefore it is the responsibility of the user to comply with the label directions on the product which is used.

Developing rules for the use of trade names and common names in this Handbook that are most useful to the reader has resulted in some compromises. In most instances, the common name is used alone when it is believed that the common name is commonly understood. When the common name is unfamiliar, the common name is followed by the trade name(s) unless there are more than two trade names. The Pesticide Names section of the Handbook attempts to deal with this problem further by listing common names, trade names, and chemical definitions of insecticides. Due to the rapidly changing nature of labels and trade names, it is possible that there are omissions.

What are considered to be safe intervals from the last application of pesticides to harvest or feeding are included. These time intervals have been taken from "EPA Compendium of Registered Agricultural Pesticide Chemical Uses," prepared by the Environmental Protection Agency, Pesticides Regulation Division, Washington, D. C. 20250, and in many instances are confirmed by residue data obtained in the Northwest.

ACKNOWLEDGEMENTS

The compilers of this Handbook wish to acknowledge the considerable assistance given them by experts within the agricultural community without whose help the completeness and quality of the result would have been diminished. Advisors include county extension agents and specialists, chemical company representatives, food processing fieldpeople, agricultural experiment station staff in the three states, and private consultants.

State and federal agencies dealing with pesticide laws, health, and the storage and disposal of agricultural chemicals gave of their expertise and time. Medical authorities supplied information on first aid and treatment for poisoning. The agricultural chemical industry supplied toxicity data. Agricultural engineers have given of their knowledge of calibration and formulae. USDA laboratories in the three states have served as an invaluable source of information on pest control.

Perhaps of most value has been the contribution of entomologists representing entomology at the universities in Oregon, Washington, and Idaho, headed by Dr. Bruce Eldridge (Oregon), Dr. E. Paul Catts (Washington), and Dr. Gary A. Lee (Idaho).

Grateful acknowledgement is made to the following individuals who have given of their time and expertise in the development of this publication. To these named, and others unnamed, sincere appreciation is extended. Through all efforts combined, this Pacific Northwest Insect Control Handbook will stand as a unique cooperative effort in developing pest control information.

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USE PESTICIDES SAFELY

PERSONAL SAFETY

The single most important approach to pesticide safety is to read the pesticide label before each use and follow the directions given. If still in doubt after reading the label, contact a person qualified to help in evaluating the hazard of the chemical and its use. Qualified people include appropriate Extension specialists and chemical company representatives.

All pesticides are toxic and should be handled with care—but even the most toxic, in the most hazardous circumstances, can be used safely provided recommended precautions are followed. The use of protective clothing, respirators, gas masks, etc., may or may not be recommended on the label. To disregard label directions is a violation of the law no matter now individuals may view the necessity of complying with them. Obviously there may be disagreement as to how safe is safe enough. It is reasonable to assume that the more toxic a pesticide is the more protection should be afforded the user, but there are exceptions to general guidelines. A low percentage granular is less hazardous than the same chemical applied as an E.C. However, the multitude of conditions that could exist cannot be covered on any label. An important increment of safety is that rare ingredient—common sense. Safety should always be carefully considered until it becomes habit; it requires a purposeful, positive attitude. Anything less invites injury or more serious consequences.

Health Hazards

Each season there are accidents, and in some years deaths, attributable to the misuse of pesticides. In case of accidents involving toxic pesticides see your doctor at once. Your doctor may call one of the Consultation or Poison Control Centers listed on the inside back cover of this handbook. It will be of great help to your doctor to know exactly what pesticide is involved. The label on the container gives this information. Take along the entire pesticide container, or try at least to have the trade name of the pesticide.

Watch for These Symptoms

The initial symptoms of organic phosphorus and carbamate poisoning are giddiness, headache, nausea, vomiting, excessive sweating, and tightness of the chest. These are followed or accompanied by blurring of vision, diarrhea, excessive salivation, watering of the eyes, twitching of muscles, especially in the eyelids, and mental confusion. One of the most characteristic signs is constriction of the pupils, but this may be preceded by dilation. Late signs are fluid in the chest, convulsions, coma, loss of urinary or bowel control, and respiratory failure. Repeated exposures to these compounds may, even without symptoms, increase susceptibility to poisoning.

The symptoms of poisoning by chlorinated hydrocarbon insecticides, such as dieldrin and endrin, are primarily due to their effect on the nervous system and include hyperexcitability, tremors, and convulsions. General symptoms are malaise, headache, fatigue, and possible lack of appetite and weight loss.

The symptoms for fumigant poisoning, such as methyl bromide, include mental confusion, double vision, tremors, lack of coordination, and slurred speech. These symptoms are similar to alcoholic intoxication. Severe exposure to fumigants may include skin burns, chemical pneumonia, and liver or kidney damage. Fumigants are extremely toxic gases if inhaled. Working with them in enclosed areas adds additional hazards.

Protective Gear

Special protective gear is usually specified on the label when needed for especially hazardous chemicals or application situations. This gear usually includes one or all of the following: goggles, face mask, respirator, hardhat, waterproof boots, pants, hat, etc.

These special precautions are based on the assumption that each person will be appropriately dressed on all occasions when using pesticides. It is obvious that open or porous-weave clothing; bare arms, chests, legs; and bare feet, sandals, or sneakers provide no protection at all from drift, spills, or other exposure to pesticides. No person should be so garbed when using agricultural chemicals. It is equally obvious that rubber boots will provide more protection than fabric clothing, and so on. Each person should carefully consider the nature and duration of his activity and choose protection appropriate to potential exposure—rather than await development and enforcement of legal dress codes.

We believe that the minimum dress acceptable for personal protection and for maintenance of good discipline in handling pesticides includes: long-sleeved, closely-woven shirts, long-legged trousers, workboots, a hat with a brim capable of protecting the back of the neck (or hat with kepi), and waterproof gloves ("waterproof" means chemically resistant; the gloves can be made from various synthetic materials). We cannot overemphasize the importance of gloves. Exposure studies of handlers and sprayers repeatedly show that by far the greatest fraction of exposure occurs on the hands. If a person works daily in the application of pesticides, basic safety discipline (and basic sanitation concepts) also require that the person bathe and launder clothes daily.

Remember, these are minimum safety requirements. "Rubber" (chemically resistant) boots, apron, jacket and trousers, and goggles, face mask, or respirator should be added if one is specifically mixing and loading chemicals.

Take These Precautions

1. If you plan to apply any of the more dangerous pesticides, make sure your physician knows the types of compounds you are using. If you anticipate using the more toxic organic phosphorus materials, your doctor may suggest that you have a preseason blood test to determine your normal cholinesterase activity level and suggest periodic cholinesterase tests during the spray season. He or she will then be in a better position to deal with a sudden illness. If your doctor should provide you with a supply of atropine tablets for organic phosphorus poisoning, do *not* take them before definite symptoms occur. If you ever take atropine tablets, call your physician as soon afterward as possible. Do not resume flying or operating ground equipment after taking atropine. Any person who is ill enough to receive a single dose of atropine tablets should be kept under medical observation for at least 24 hours, because atropine may produce only temporary

relief of symptoms in what may prove to be a serious case of poisoning. Keep atropine tablets away from children. An antidote for treating organic phosphorus poisoning, parlidoxime chloride (2-PAM)* has been definitely proven to be a valuable supplement to atropine in the treatment of severe and moderately severe cases of organic phosphorus poisoning. It is available to physicians and hospitals through regular pharmaceutical channels.

2. Wear protective clothing, preferably water repellent, while spraying hazardous materials, as toxic pesticides can be absorbed into the body through the skin. Change and launder clothing and bathe daily.
3. Wear a respirator when loading or mixing concentrates and whenever pesticides may be inhaled. See a following section for details on respirators and masks.
4. Flammable empty containers may be burned if local regulations permit. Insure that smoke does not drift over nearby homes, people or livestock. Stand upwind of smoke. Do not burn containers which have held weedkillers. Other details on disposal are addressed in a following section.
5. Keep your pesticide storage shed or room locked.
6. Do not smoke, chew tobacco, or eat while spraying. Wash hands before engaging in these activities.
7. Mix insecticides according to directions, and apply at the recommended rate.
8. Experience shows that poisoning occurs most often in hot weather. Spraying with the more toxic materials should be done during cooler periods insofar as possible. Extra care should be taken when it is necessary to spray during periods of high temperature.
9. Apple thinners and others have been poisoned by working in orchards treated with parathion less than 48 hours earlier. Therefore, it is advisable to wait longer than 48 hours before beginning work in treated orchards. If possible, wait a week.
10. Bury spilled insecticide and wash the contaminated area with soap and lots of water. The breakdown of insecticides can be speeded up by using a weak lye solution.
11. Cover crops treated with most pesticides should not be used as pasture or fed to livestock.
12. Agricultural workers should avoid eating unwashed chemically treated fruit and vegetables in the field. The time limitations from application to harvest have been established to protect the consumer from harmful residues. Disregard of these limitations presents a special hazard to the picker, grower, and fieldperson.

What to Do for Poisoning

1. In severe cases of organic phosphorus poisoning, breathing may stop. In such a situation *artificial respiration is the most important first aid until breathing has resumed.*
2. Get the patient to a hospital or physician as soon as possible. Give artificial respiration on the way if the patient turns blue or stops breathing. If you know which pesticide may be involved, *take along a label for the doctor's information.* If the label cannot be removed easily, take along the entire pesticide container.
3. Never try to give anything to an unconscious patient by mouth.
4. If the insecticide has been swallowed, induce vomiting unless the label directs other action. In the case of a child, induce vomiting by stimulating the throat with the blunt end of a spoonhandle—keeping the head in an inverted position.
5. Where excessive amounts of the insecticide, especially in concentrate form, have come into contact with the skin, immediately remove all clothing and bathe the patient with generous amounts of soap and water, rinsing thoroughly.
6. If the eyes have been contaminated with spray, especially with insecticide concentrate, flush immediately with copious amounts of water, preferably with running or flowing water.
7. Make the patient lie down, and keep him or her warm.

This warning statement was prepared with the assistance of staff members of the Wenatchee Research Station, EPA, Wenatchee, Washington.

Organic Phosphorus and Carbamate Poisoning and Cholinesterase Evaluation

Organic phosphorus insecticides such as parathion, TEPP, Phosdrin and Systox are among the most toxic agricultural chemicals in use today. They are readily absorbed through the skin, digestive tract, and lungs, and great care should be taken while working with them.

These poisons are very dangerous because they bond themselves to an important body enzyme, cholinesterase. Cholinesterase is normally present in the blood—it is necessary for proper nerve function. Inhibition or "tying up" of this enzyme causes excessive and uncoordinated nerve action.

Initial symptoms of poisoning by organic phosphorus compounds are giddiness, headache, nausea, vomiting, excessive sweating and tightness of the chest. These are followed by or accompanied by blurring of vision, diarrhea, excessive salivation, watering of the eyes, twitching of muscles, especially in the eyelids, and mental confusion. Constriction of the pupils is a characteristic sign, *but this may be preceded by dilation.* Convulsion, coma, and respiratory failure may follow in acute poisoning.

Cholinesterase is normally present in far greater amounts than necessary for proper nerve action. Therefore, it is possible to absorb a quantity of an organic phosphorus insecticide without feeling ill effects; *however, cholinesterase might be reduced to a dangerous level and further exposure may cause severe illness or death.* Persons who are routinely exposed to these poisons should have their blood checked regularly in order to determine if a dangerous depression of cholinesterase has occurred.

The normal range of cholinesterase activity has been determined, but it varies considerably among individuals. Therefore, it is of considerable value to the physician to know an individual's normal level prior to exposure. If the cholinesterase level is found to be lower at some future date, the physician will be in a much better position to evaluate the significance of this level and its potential danger to the individual's health. In addition, routine tests serve to evaluate effectiveness of precautionary measures exercised in the plant or field. These tests may detect unsuspecting exposure or carelessness which would eventually result in acute poisoning. Some hospitals are equipped to perform this test.

* Available as Protopam Chloride, Ayerst Laboratories.

Where Is *Your* Present Cholinesterase Level?

Normal

Caution

Danger!

Death?

Are you here . . .

here . . .

or here?

LABORATORY BLOOD TESTING SERVICES

In order to assist agricultural workers in finding where blood cholinesterase tests can be obtained, the following list of laboratories providing this service has been prepared.

OREGON

Capitol Medical Laboratory Annex
700 Bellevue SE, Suite 400
Salem, OR 97301
Phone: (503) 364-6750

Capitol Medical Laboratory
3878 Beverly Ave NE
Building 8, Suite 11
Salem, OR 97305
Phone: (503) 364-6821

Metropolitan Hospitals Laboratory
235 N. Graham St.
Portland, OR 97227
Phone: (503) 284-7252

Physicians' Medical Laboratory
18 SW Boundary Court
Portland, OR 97201
Phone: (503) 226-7941, Ext. 31

University of Oregon Medical School
Chemical Pathology Laboratory
3181 SW Sam Jackson Park Rd.
Portland, OR 97201
Phone: (503) 225-8605

Each laboratory uses a slightly different analytical method and reports its results in different units. An individual's cholinesterase value should ultimately be expressed as a *percent of normal value,* and on that basis tests by different methods can be directly compared.

Laboratory	*Procedure*	*Reporting Units*	*Normal Value*
Capitol Medical	Sigma Chemical Co. test kit	Rappaport units[a]	40-80 units per ml of serum
Physicians' Medical	Boehringer-Mannheim test kit	International enzyme units[b]	1.9-3.8 units per ml of serum
University of Oregon	Dupont Automated Analyzer	International enzyme units[b]	7-19 IU per ml of serum
Metropolitan Hospitals Laboratory	Michel	pH units per hr.	0.5-1.3

WASHINGTON

Regional Pesticides and Chemical Laboratory
Department of Social and Health Services
1719 Springwater
P.O Box 190
Wenatchee, WA 98801
Phone: (509) 662-0484 (Day)

Blood cholinesterase tests are done by this laboratory, which can also provide information about other laboratories that can provide this service.

Laboratory	*Procedure*	*Reporting Units*	*Normal Value*
Regional Pesticides and Chemical Laboratory	michel	ph units per hr.	plasma .45ph units per hour

[a] 1 R unit equals that amount of cholinesterase that liberates one micromole of substrate in 30 minutes per mi. of serum.
[b] 1 IU equals that amount of cholinesterase that liberates one micromole of substrate in 1 minute.

IDAHO

Mercy Medical Center Laboratory
1512 12th Ave. Rd.
Nampa, ID 83651
Phone: (208) 467-1171, Ext. 381

RESPIRATORS AND GAS MASKS APPROVED FOR PESTICIDES

The lungs offer pesticides the most direct and quickest route to enter the body. Respiratory protection is offered by certain devices listed here under specific conditions of use. Without extreme care these devices offer false security. Respirators and masks do not supply oxygen. They are capable only of a degree of protection dependent upon the extent of exposure and the concentration of pesticide.

Chemical cartridges and canisters provide respiratory protection against certain toxic gases and vapors in concentration not greater than .1 percent and 2.0 percent, respectively. Most respirators and gas masks utilize mechanical filters in addition to chemical cartridges or canisters. These filters offer protection against nonvolatile dusts, mists, smokes, and fumes. Mechanical filtration alone is not recommended for any pesticide.

Different chemical cartridges or canisters must be used for different pesticides or classes of pesticides. Be sure the cartridge or canister used is approved for the pesticide you intend to use. Do not use chemical cartridge respirators for protection against extremely toxic gaseous chemicals such as hydrogen cyanide, methyl bromide, or other fumigants. Consult with suppliers or manufacturers of fumigants for proper protective equipment.

No one can, with absolute accuracy, advise a user that protection is afforded by a given device under all circumstances. Environmental and human health factors are difficult to anticipate and evaluate. No one can inform the user as to when a cartridge or canister has reached such a point of saturation with toxicant that it needs to be replaced. The statements in this publication regarding changes (twice a day, daily, etc.) are relative. Ultimately the user makes the decision based on knowledge and experience rather than intuition or an arbitrary interval.

All respirators intended for use with pesticides must be approved jointly by the Mine Safety and Health Administration (MSHA) and the National Institute of Occupational Safety and Health (NIOSH). Approval numbers beginning with the letters TC must be on the box containing the facepiece. Cartridges and filters approved for pesticides are necessary and must have the TC number affixed to them plus the part number of the replacement part. Chemical cartridge respirators approved for pesticides will have the code number 23C following the letters TC, and gas masks will have the number 14G following TC. Respirators having numbers other than TC numbers (i.e., BM numbers) are no longer approved unless they can be upgraded to meet requirements through the use of appropriate cartridges and filters.

As of September 1, 1983, the following chemical-cartridge respirators and gas masks are approved by the Mine Safety and Health Administration and the National Institute for Occupational Safety and Health. Obsolete models, those no longer manufactured but still approved, have been removed from this list.

Chemical-Cartridge Respirators

Approval Number TC-23C	Approval Issued to	Model Number(s)	Respirator Type	Facepiece Type
54	Willson	122115 122115S 122115SR	Rp, Fm	ON
74	Norton	7549M 7549L 7549S	Rp, Fm	ON
78	3M	W-262-12 W-262-24 W-263-L,M W-264 W-279-12 W-279-24 W-291-12 W-291-24 W-296-24 W-296-12 W-351-12 W-351-24	Pw	H/H

Chemical-Cartridge Respirators (Continued)

Approval Number TC-23C	Approval Issued to	Model Number(s)	Respirator Type	Facepiece Type
79	MSA	448848 461009	Rp, Fm, Bm	On
106	AO	R4058, 54058 R5058, 55058 R6059, 56058	Rp, Fm	ON
110	Pulmosan	10264, 10177 10228, 10003	Rp, Fm	ON
110	Fiber Metal	10177, 100288 10003, 100264	Rp, Fm	ON
117	Scott	6412-0313 6422-0313 6411-0313 6413-0313 6421-0313 6423-0313	Rp, Fm	ON
123	3M	8751	Su	ON
133	Willson	162115 172115	Rp, Fm	FF
148	MSA	461858	Rp, Fm	FF
175	Siebe-Norton	75BP31M 75BP31L	Rp, Bm	ON
178	Norton	75BP49M 75BP49L	Rp, Bm	ON
190	Norton	7649 7649S	Rp, Fm	ON
197	Glendale	GR-1625 GR-2025 GR-4025 GR-8025	Rp, Fm	ON
202	Sellstrom	315-G100-F104	Rp, Fm	ON
202	Cover	1482-G100-F104	Rp, Fm	ON
202	Eastern	E455	Rp, Fm	ON
224	Scott	6470-0213	Rp, Fm	FF
224	Scott	6470-0313 6480-0313	Rp, Fm	FF
238	AO	R7058	Rp, Bm	FF
274	U.S. Safety	151T30	Rp, Fm	FF
281	AO	R4563, S4563 R5563, S5563 R6563, S6563	Rp, Fm	ON
282	AO	7563	Rp, Fm	FF
323	Survive Air Div. USD Corp	2231-00 2131-00 2331-00	Rp, Fm	ON
336	U.S. Safety	150T35 150L35	Rp, Fm	ON
337	Cesco	95RC115 95SMRC115	Rp, Fm	ON
338	U.S. Safety	151T35	Rp, Fm	FF
348	Cesco	96RC115	Rp, Fm	FF
354	Siebe-Norton	10041S 10041M	Su	ON
373	Stewart-Warner	7931 +	Rp, Fm	ON

Chemical-Cartridge Respirators (Continued)

Approval Number TC-23C	Approval Issued to	Model Number(s)	Respirator Type	Facepiece Type
374	Willson	302115 302115R 302115S 302115SR	Rp, Bm	ON
375	Willson	312115 322115	Rp, Fm	ON
392	Northcott	70-450 +	Rp, Fm	ON
409	Glendale	GR 7025	Rp, Fm	FF
439	3M	7025	Rp, Fm	ON
456	Survive Air USD Corp.	3231-00	Rp, Fm	FF
464	MSA	472752	Rp, Bm	ON
465	MSA	472755	Rp, Bm	ON
482	Racal	BE 1/A-P3	Pw	HH
483	Racal	BE 3/A-P3 BE 7/A-P3	Pw	FF
484	Racal	BE 5/A-P3	Pw	HH
485	Racal	BE 6/A-P3	Pw	HH

Gas Masks

Approval Number TC-14G	Approval Issued to	Model Number(s)	Respirator Type	Facepiece Type
86	MSA	448983 448984	Fm	FF
94	Willson	2161F 2261F	Fm	FF
99	MSA	448940 448941 448942 448943	Bm	FF
117	Scott	6030-1157 6030-1257 6030-2157 6030-2257 6030-3157 6030-3257 6030-4157 6030-4257 6030-5157 6030-5257	Fm, ES	FF

Abbreviations:

Rp = Replaceable filter
Fm = Facepiece mounted
Bm = Belt, side, or chest mounted
ON = Orinasal (covers mouth and nose)
H/H = Hood or Helmet
FF = Full Facepiece
Pw = Powered
Su = Single use
ES = Escape use only

Use and Care of Respirators

Most respirators are designed as half-face masks that cover the nose and mouth but do not cover the eyes. They are advised for protection from dusts or mists during the field handling of pesticides. *They are not a substitute for essential precautions.*

They do not provide adequate protection for fumigation, greenhouse applications of highly toxic pesticides, or mixing highly toxic pesticides in inadequately ventilated spaces.

Follow these practices when using respirators:

1. Read and follow the instructions with the cartridge or canister.
2. Make sure valves, filters, and cartridges are properly positioned and sealed.
3. Fit respirator on face with headbands snug enough to insure a tight but comfortable seal. A proper seal may be difficult or impossible due to beards, unusual facial shape, dentures, etc.
4. It should be expected that breathing with a respirator or gas mask will not be as easy as without one. These devices may cause unusual stress in high temperatures. Fogging may occur.
5. Test for leakage by placing the hand over the outside exhaust valve housing. Exhale to cause slight pressure inside facepiece. If no air escapes, the respirator is properly fitted. If air escapes, readjust headbands and test again.
6. Change filters when breathing becomes difficult—usually twice a day or more often under heavy usage.
7. Replace cartridges every 8 hours of actual use or more often if the pesticide can be detected by taste or smell, or if extremely toxic pesticides are used.
8. Remove filters and cartridges, and wash the facepiece with soap and warm water after use. After washing, rinse it thoroughly to remove all traces of soap. Dry the facepiece with a clean cloth that is not contaminated with the pesticide. Place the facepiece in a well ventilated area to dry.
9. Store the respirator, filters, and cartridges in a clean, dry place—preferably in a tightly closed paper or plastic bag. Replace worn or faulty parts as needed.

Remember that many pesticides can be absorbed through the skin. When it is necessary to use a respirator, it is also necessary to wear other protective clothing as recommended on the label.

ACUTE TOXICITY DATA ON INSECTICIDES

In the following table the chemical class, the hazard classification, and the LD_{50} values to rats (oral) and rabbits (dermal) are shown, with a few exceptions using other test animals noted. The chemical classes are designated with abbreviations as follows: C, Carbamate; CH, chlorinated hydrocarbon; OP, organic phosphorus; N, nitro; GR, growth regulator; and M, miscellaneous. It should be noted that the classification into hazard groups is both approximate and relative. The classifications are as follows: 1, most dangerous; 2, dangerous; 3, less dangerous; and 4, least dangerous. The LD_{50} values refer to the amount of the chemical that is required to kill 50 percent of the test animals; thus, the lower figures are associated with the most toxic compounds.

The LD_{50} values listed were established by the chemical manufacturers. It should be kept in mind that there may be differences in susceptibility to these chemicals for the rat, rabbit, humans, or other animals. Thus, estimates of toxic hazard based on these figures may not be exact. LD_{50} numbers are based on technical grade products unless otherwise noted.

Acute Toxicity Data on Insecticides

Compound	Chemical class	Hazard classification	rat LD_{50} (mg/kg) Oral	rabbit LD_{50} (mg/kg) Dermal
Abate (temephos)	OP	4	2,030	970–1,930
aldrin	CH	2	39	98
Amaze, oftanol (isofenphos)	OP	1	32	162
Ambush, Pounce (permethrin)	M	4	>4,000	>4,000 (rat)
Amdro	M	4	1131	>5,000
Ammo (cypermethrin)	M	4	1741-4123	Not available
Azodrin (monocrotophos)	OP	1	8–23	450
Baam, Mitac (amitraz)	M	3	800	>1600
Baygon (propoxur)	C	2	94–104	>1,000
Baytex (fenthion)	OP	3	255–298	330 (rat)
BHC	CH	3	600	.....
Bidrin (dicrotophos)	OP	1	21	225
Carzol (formentanate)	C	2	20	10,200
chlordane	CH	3	367–515	>200 but <2,000
Ciodrin	OP	3	110	375
Comite (propargite)	M	4	2,200	10,000
Co-Ral (coumaphos)	OP	3	56–230	860
Counter (terbufos)	OP	1	4.5	1.1 24 hr.
Cygon (dimethoate)	OP	3	215	>1,000 (guinea pig)
cypermethrin, Ambush	M	4	1741-4123	Not available
Dasanit (fensulfothion)	OP	1	2–10	3–30 (rat)
DDD (TDE, Rhothane)	CH	4	>4,000	.....
Delnav (dioxathion)	OP	2	45	235 (rat)
Dessin (dinobuton)	N	3	140	3,200
Diazinon	OP	3	300–400	3,600 (tech)
Dibrom (naled)	OP	3	430	1,100
dicapthon	OP	3	400	790
dieldrin	CH	2	46	10–102 (rat)
dimethoate (cygon)	OP	3	215	>1,000 (guinea pig)
Dimilin (diflubenzuron)	GR	4	4,640	2,000
dinitrocresol (DNOC)	N	2	20–50	.....
dinoseb (DNBP, Elgetol)	N	2	40–60	.....
Di-Syston (disulfoton)	OP	1	2–12	6–25 (rat)
Dursban, Lorsban (chlorpyrifos)	OP	3	97–276	2,000
Dyfonate (fonofos)	OP	1	8–17.5	25 (tech)
Dyfonate 10% granular (fonofos)	OP	2	102	>600
Dylox (trichlorfon)	OP	3	144–184	>2,000 (rat)
endrin	CH	2	7–15	15 (♀ rat)
EPN	OP	2	26	420
ethion	OP	2	96	x245
Ficam, Turcam, Dycarb (bendiocarb)	C	2	40-120	>1,000
Furadan (carbofuran)	C	1	11	10,200
Gardona (tetrachlorvinphos)	OP	4	4,000–5,000	>4,000
Guthion (azinphos-methyl)	OP	3	5–6	220
heptachlor	CH	3	147–220	>2,000
Imidan (phosmet)	OP	3 or 4	147–316	>4,640
Kelthane (dicofol)	CH	4	809	1,230 (tech)
Knox Out (encapsulated diazinon)	OP	4	>21,000	>10,000
Korlan (ronnel)	OP	4	1,740	1,000–2,000
Lannate, Nudrin (methomyl)	C	1	17	5,880 (24%)
lead arsenate	M	3	1,050 (man)	>2,400
lindane	CH	3	125	1,000
Lorsban, Dursban (chlorpyrifos)	OP	3	97-276	2,000
malathion	OP	4	1,375	4,100
Mesurol (methiocarb)	OP	3	15–35	>2,000
metaldehyde	M	2-3	630 (rat)	Not available
Metasystox-R (oxydemeton-methyl)	OP	3	66–75	250 (tech)
methomyl, Lannate, Nudrin	C	1	17	5,880 (24%)
methoxychlor	CH	4	(6,000)	>6,000
methyl parathion	OP	1	9–25	300–400
mirex	CH	4	306	800
Monitor (methamidophos)	OP	1	18–21	118
Morestan (oxythioquinox)	M	4	2,500–3,000	>2,000
Nemacur (fenamiphos)	OP	1	8.1–9.6	72–84
nicotine	M	2	50–60	285
Nudrin, Lannate (methomyl)	C	1	17	5,880 (24%)
Omite (propargite)	M	4	2,200	10,000
Orthene (acephate)	OP	4	945	>2,000
parathion	OP	1	13	6.8 (rat)
Pay-off	M	2	67 (rat)	>1,000 (rabbit)
Penncap-M	OP	4	60	>1,200

Acute Toxicity Data on Insecticides (Continued)

Compound	Chemical class	Hazard classification	rat LD_{50} (mg/kg) Oral	rabbit LD_{50} (mg/kg) Dermal
Pentac (dienochlor)	CH	4	3,160	>3,160
Phosdrin (mevinphos)	OP	1	3.7–12	16–33.8
phosphamidon (Dimecron)	OP	2	17–30	374–530
Piperonyl butoxide	M	4	7,500	>7,950
Plictran (cyhexatin)	M	4	(235)	>2,000
Pydrin (fenvalerate)	M	4	>3,200	2,500 >5,000 (rat)
pyrethrins	M	4	1,500	>1,800 (rat)
Rabon (tetrachlor-vinphos)	OP	4	4,000	2,500
rotenone	M	4	132–1,500	.....
Ruelene (crufomate)	OP	3	770	.....
Safrotin (propetam-phos)	OP	2	119	2,300 (rat)
Sevin (carbaryl)	C	4	850	>4,000
Spur	M	4	5,150 (rat)	2,100 (rabbit)
Supracide (methidathion)	OP	2	44	200 (tech)
Synthrin, SBP-1382 (resmethrin)	M	4	4,240	2,500 (tech)
Systox (demeton)	OP	1	6.2	14
Temik (aldicarb)	C	1	0.9	>5 (tech)
TEPP	OP	1	1.2–2	2.4
Thimet (phorate)	OP	1	2–4	20–30 (tech) wet guinea pig
Thiodan (endosulfan)	CH	3	53	130 (tech)
Torak (dialifor)	OP	1	(39)	145
toxaphene	CH	3	69	1,075
Trithion (carbophenothion)	OP	2	32.2	54
Vapona (DDVP, dichlorvos)	OP	2	56–80	107
Vendex	M	4	2,631	>2,000
Vydate (oxamyl)	C	1	37	2,960
Zectran (mexacarbate)	C	2	19	1,500–2,500
Zolone (phosalone)	OP	2	120	2,000

PESTICIDE NAMES

Name	Chemical Definition	Other Designations
Abate	*0,0,0'0'*-tetramethyl *0,0'*-thiodi-*p*-phenylene phosphorothioate	Biothion, temephos
acephate	O,S-dimethyl acetylphos = phoramidothioate	Orthene
aldicarb	2-methyl-2-(methylthio)propionaldehyde 0-(methyl carbamoyl)oxime	Temik
aldrin	not less than 95% of 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-1,4-*endo*-*exo*-5,-8-dimethanonaphthalene	
allethrin	2-allyl-4-hydroxy-3-methyl-2-cyclopenten-1-one ester of 2,2-dimethyl-3-(2-methylpropenyl)-cyclopropanecarboxylic acid	allyl homolog of cinerin I; "synthetic pyrethrins"
allyl homology of cinerin I		See allethrin
aluminum phosphide	aluminum phosphide	Phostoxin
Amaze	1-methylethyl 2-[[ethoxy [(1-methylethyl) amino] phosphinothioyl]-osy] benzoate	see Oftanol, isofenphos
Ambush	3-(phenoxyphenyl)methyl(±)-cis trans-3-(2,2-dichloroethenyl)-2,2-dimethyl cyclopropane-carboxylate (approximately 60% Trans, 40% cis isomers)	Pounce, permethrin
Amdro	Tetrahydro-5, 5-dimethyl-2(1H)-pyrimidinone (3-[4-(trifuoromethyl) phenyl]-1-(2-[4-trifluoromethyl) phenylidene)]hyrazone	
aminocarb	4-(dimethylamino)-m-tolyl methylcarbamate	Matacil
Animert V-101		See tetrasul
azinphosethyl	*0,0*-Diethyl S-[4-oxo-1,2,3 benzotriazin-3(4H)-ylmethyl] phosphoro = = dithioate	Ethyl Guthion
azinphosmethyl	*0,0*-Diethyl S-[4-oxo-1,2,3-benzotriazin-3(4H)-ylmethyl] phosphoro = = dithioate	Guthion
Azodrin		See monocrotophos
Bacillus thuringiensis var israelensis	spores and endotoxin produced in the fermentation of Bti, serotyoe H-14	Bactimos, Teknar, Dipel, certan Soc-Bt.
Bacillus thuringiensis	spores and endotoxin produced in the fermentation process of HD-1 strain (var. kurstaki, serotypes 3a3b)	Bactur, Bactospeine, Thuricide, Certan SOK-Bt, Dipel
Bay 29493		See fenthion
Baygon		See propoxur
Baytex		See fenthion
bendiocarb		See Ficam

Pesticide Names (Continued)

Name	Chemical Definition	Other Designations
benzene hexachloride	1,2,3,4,5,6-hexachlorocyclohexane, consisting of several isomers and containing a specified percentage of *gamma*	BHC
BHC		See benzene hexachloride
Bidrin		See dicrotophos
binapacryl	2-*sec*-butyl-4,6-dinitrophenyl 3-methyl-2-butenoate	Morocide
biothion		See Abate
bromophos	0-(4-bromo-2,5-dichlorophenyl) 0,0-dimethyl phosphorothioate	Nexion
bufencarb	3-(1-methylbutyl)phenyl + 3-(1-ethylpropyl) phenyl methylcarbamate (3:1)	Bux methylcarbamate
Bulan	1,1-bis (*p*-chloro-phenyl)-2-nitrobutane	
Butacide		See piperonyl butoxide
butoxy polypropylene glycol	polypropylene glycol monobutyl ether	Crag Fly Repellent
butoxy thiocyanodiethyl ether		See Lethane 384
Bux		See bufencarb
carbaryl	1-naphthyl *N*-methylcarbamate	Sevin
carbofuran	2,3-dihydro-2,2-dimethyl-7-benzofuranyl methylcarbamate	Furadan NIA-10242
carbophenothion	*S*-[(*p*-chlorophenylthio)methyl] *0,0*-diethyl phosphorodithioate	Trithion
Carzol	N'-(4-chloro-0-tolyl)-N,N-dimethylformamidine (Also the hydrochloride	formetanote hydrochloride
chlordane	1,2,4,5,6,7,8,8-octachloro-tetrahydro-3a,4,7,7a-4,7-methanoindane	
chloropicrin	trichloronitromethane	
chlorpyrifos		See Dursban
Ciodrin, Ciovap		See crotoxyphos
Co-Ral		See coumaphos
coumasphos	*0,0*-Diethyl *O*-[3-chloro-4-methyl-2-oxo-(2*H*)-1-benzapyran-7-yl] phosphorothioate	Co-Ral
Counter		See terbufos
Crag Fly Repellent		See butoxy polypropylene glycol
crotoxyphos	alpha-methylbenzyl(E)-3-hydroxycrotomate dimethyl phosphate	Ciodrin, Ciovap
crufomate	4-tert-butyl-2-chlorophenyl methyl methylphosphoramidate	Ruelene, Dowco-132
Cygon		See dimethoate
cyhexatin		See Plictran
Cythion		See malathion
Dasanit		See fensulfothion
DDD		See TDE
D-D mixture	1,3-dichloropropene and 1,2-dichloropropane mixture	Vidden D, Dowfume N
DDT	1,1,1-trichloro-2,2-bis(*p*-chlorophenyl)ethane	dichlorodiphenyltrichloroethane
DDVP		See dichlorvos
deet	*N,N*-diethyl-*m*-tolumide	diethyltoluamide; Delphene
Defend		See dimethoate
Delphene		See deet
Delnav		See dioxathion
demeton	mixture of *0,0*-diethyl *S*(and *0*)-[2-ethylthio)ethyl]phosproro-thioates	Systox
Dessin		See dinobuton
dialifor	0,0-diethyl-s(2-chloro-1-phthalimido = ethyl) phosphorodithioate	Torak
diazinon	0,0-diethyl S[6-chloro-2-oxobenzoxazolin-3-yl)methyl] phosphorothioate	numerous
Dibrom		See naled
dibromochloropropane	1,2-dibromo-3-chloropropane plus other hologenated C_3 compounds	Fumazone, Nemagon
Dycarb		See Ficam
dichloropropene		See Telone II
dichlorvos	2.2-dichlorovinyl dimethyl phosphate	DDVP; Vapona
dicofol	4,4'-dichloro-*alpha*-(trichloromethyl) benzhydrol	Kelthane
dicrotophos	dimethyl phosphate of 3-hydroxy N,N-dimethyl cis-crotonamide	Bidrin
dieldrin	not less than 85% of 1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-*endo-exo*-5,8-dimethanonaphthalene	
dienochlor		See Pentac
diethyltoluamide		See deet
diflubenzuron		See Dimilin
Dimecron		See phosphamidon
Dimelone		See dimethyl carbate
dimethoate	*0,0*-dimethyl *S*-(*N*-methylcarbamoylmethyl) phosphorodithioate	Rogor; Cygon; Defend
dimethyl carbate	dimethyl *cis*-5-norborene-2,3-dicarboxylate	Dimelone
Dimilin	1-(4-chloraphenyl)-3-(2,6-difluorobenzoyl)urea	diflubenzuron
Dimite		See chlorfenethol
dinitrobutylphenol	2-*sec*-butyl-4,6-dinitrophenol	DNOSBP; dinoseb; DNBP
dinitrocresol	4,6-dinitro-*o*-cresol	DNOC; DNC; Sinox
dinobuton	2-sec-butyl-4,6-dinitrophenyl isopropyl carbonate	Dessin
dinocap	2-(1-methylheptyl)-4,6-dinitrophenyl crotonate	Karathane

Pesticide Names (Continued)

Name	Chemical Definition	Other Designations
dinoseb		See dinitrobutylphenol
dioxathion	(2,3-*p*-dioxanedithiol S,S-bis(*0,0*-diethyl phosphordithioate)	Delnav, Deltic
Dipterex		See trichlorfon
disulfoton	0,0-Diethyl *S*-[2-(ethylthio) ethyl] phosphordithioate	Di-Syston
Di-Syston		See disulfoton
DMC		See chlorfenethol
DNBP		See dinitrobutylphenol
DNC		See dinitrocresol
DNOC		See dinitrocresol
DNOSBP		See dinitrobutylphenol
Dowfume N		See crufomate
Dowco-132		See Plictran
Dowco-213		See D-D mixture
Dri-Die	silicon dioxide plus ammonium silicofluride to extent of 3% fluorine	
Dursban	*0,0*-diethyl *0*-(3,5,6-trichloro-2-pyridyl)phosphorothioate	chlorpyrifos, Lorsban
Dyfonate		See fonofos
Dylox		See trichlorfon, Proxol
endosulfan	6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-6,9-methano-2,4,3-benzodioxathiepin 3-oxide	Thiodan
endrin	1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-*endo-endo*-5,8-dimethanonaphthalene	
Entex		See fenthion
EPN	*0*,ethyl *0*-(*p*-nitrophenyl) phenylphosphonothioate	EPN-300
ethion	*0,0,0'0'*-tetraethyl *S,S'*-methylene bisphosphorodithioate	Nialate
ethoprop	*o*-ethyl *s,s* - dipropyl phosphorodithioate	Mocap
Ethyl Guthion		See azinphosethyl
Famophos		See famphur
famphur	0,0-dimethyl 0-[p-(dimethylsulfamoyl) phenyl] phosphorothioate	Famophos, Warbex
fenamiphos		See Nemacur
fenthion	0,0-dimethyl 0-[4-(methylthio)-m-tolyl] phosphorothioate	Baytex; Tiguvon; Bay 29493; Entex
fensulfothion	0,0-diethyl 0-[p-(methylsulfinyl) phenyl] phosphorothioate	Dasanit
fenvalerate		See Pydrin
Ficam	2,2-dimethyl-1,3-benzodioxyl-4-ol *N*-methylcarbamate	bendiocarb
fluvalinate	(*RS*)-a-cyano-3-phenoxybenzyl (*R*)-2-[2-chloro-4-(trifluoromethyl) anilino]-3-methyl-butanoate	Spur, Mavrick
fonofos	*o*-ethyl *s*-phenyl ethylphosphorodithioate	Dyfonate
formetanate hydrochloride		See Carzol
Fumazone		See dibromochloro-propane
Furadan		See carbofuran
gamma BHC		See lindane
Gardona		See stirofos
Guthion		See azinphosmethyl
heptachlor	1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-4, 7-methanoindene	
Imidan	0,0-dimethyl *S*-phthalimidomethyl phosphorodithioate	Prolate; phosmet
isofenphos		See Amaze, Oftanol
Karathane		See dinocap
Kelthane		See dicofol
Korlan		See ronnel
Lannate		See methomyl
Lethane 384	2-(2-butoxyethoxy) ethylthiocyanate	butoxy thiocyanodiethyl ether
lindane	1,2,3,4,5,6-hexachlorocyclohexane, *gamma* isomer of not less than 99% purity	*gamma* BHC
Lorsban		See Dursban
malathion	*0,0*-dimethyl phosphorodithioate of diethyl mercaptosuccinate	Cythion
Marlate		See methoxychlor
Matacil		See aminocarb
Mesurol		See methiocarb
Metacide		See methyl parathion
metaldehyde	A polymer of acetaldehyde	
Metasystox-R		See oxydemetonmethyl
methamidophos	*o, s* - dimethyl phosphoramidothioate	Monitor
methidathion		See Supracide
methiocarb	4-(methylthio)-3,5-xylyl methylcarbamate	Mesurol
methomyl	S-methyl-N-[(methylcarbamoyl)-oxy]thioacetimidate	Lannate; Nudrin
methoxy DDT		See methoxychlor
methoxychlor	2,2-bis (*p*-methoxyphenyl)-1,1,1-trichloro ethane	Marlate; methoxy DDT
methyl parathion	*0,0*-dimethyl *0*-*p*-nitrophenyl phosphorothioate	methyl homolog of parathion; Metacide
mevinphos	methyl 3-hydroxy-*alpha*-crotonate dimethyl phosphate	Phosdrin

Pesticide Names (Continued)

Name	Chemical Definition	Other Designations
MGK 264	*N*-(2-ethylhexyl)-5-norbornene-2-3-dicarboximide	
MGK Repellent 11	1,5a,6,9,9a,9b-hexahydro-4a(4*H*)-dibenzofurancarboxaldehyde	
MGK Repellent 326	di-*n*-propyl 2,5-pyridinedicarboxylate	
Mocap		See ethoprop
monocrotophos	dimethyl phosphate ester with (E)-3-hydroxy-N-methylcrotonamide	Azodrin
Morestan		See oxythioquinox
Monitor		See methamidophos
naled	1,2-dibromo-2,2-dichloroethyl dimethyl phosphate	Dibrom
Neguvon		See trichlorfon
Nemacur	Ethyl 3-methyl-4-(methylthio)phenyl (1-methylethyl) phosphoramidate	fenamiphos
Nemagon		See dibromochloro-propane
Neo-Pynamin		See tetramethrin
Nialate		See ethion
Niran		See parathion
Nudrin		See methomyl
Oftanol		See Amaze, isofenphos
Omite	2-(*p-tert*-buthylphenoxy) cyclohexyl 2-phopynyl sulfite	propargite
Orthene		See acephate
oxamyl	methyl N',N'-dimethyl-N-[(methylcarbamoyl)oxy]-1-thiooxamimidate	Vydate-L
oxydemetonmethyl	*0,0,* Dimethyl *S*-[2-ethylsulfinyl)-ethyl] phosphorothioate	Metasystox-R
oxythioquinox	cyclic S,S-(6-methyl-2,3-quinoxalinediyl) dithiocarbonate	Morestan
parathion	*0,0*-diethyl *0-p*-nitrophenyl phosphorothioate	Niran
Pay-Off	(±)-cyano(3-phenoxyphenyl)methyl (+)-4-(difluoromethoxy)-α-(1-methylethyl)benzeneacetate	Flucythrinate
Pentac	decachlorobis-2,4-cyclopentadien-1-yl	dienochlor
permethrin		See Ambush
phorate	0,0-diethyl s-[ethylthio)methyl] phosphorodithioate	Thimet
phosalone	0,0-diethyl S[(6-chloro-2-oxobenzoxazol in-3-yl)methyl] phosphorodithioate	Zolone
Phosdrin		See mevinphos
phosmet		See Imidan
phosphamidon	2-chloro-2-diethylcarbamoyl-1-methylvinyl dimethyl phosphate	Dimecron
Phostoxin		See aluminum phosphide
piperonyl butoxide	alpha-[2-(2-butoxyethoxy)ethoxy]-4,5-(methylenedioxy)-2-propyltoluene	Butacide
Plictran	tricyclohexylhydroxide	cyhexatin, Dowco-213
Pounce		See Ambush
Prolate		See Imidan
propargite		See Omite
propoxur	0-isopropoxyphenyl methylcarbamate	Baygon
Pydrin	cyano(3-phenoxyphenyl)methyl 4-chloro-alpha- 1-methylethyl) benzeneacetate	fenvalerate
Rabon		See stirofos
Rhothane		See TDE
Rogor		See dimethoate
resmethrin	(5-benzyl-3-furyl)methyl 2,2-dimethyl-3-(2-methyl = propenyl) cyclopropane = carboxylate (approx. 70% trans. 30% cis-isomers)	Synthrin
ronnel	0,0-dimethyl(*0*-2,4,5-trichlorophenyl) phosphorothioate	Korlan; Trolene
Ruelene		See crufomate
Safrotin	(E)-0-2-isopropoxy-carbonyl-1-methylvinyl 0-methyl ethylophosphoramidothioate	
Sevin		See carbaryl
Sinox		See dinitrocresol
SMDC		See Vapam
soap	potassium salts of fatty acids	Safers Insecticidal Soap
Spur		See fluvalinate
stirofos	2-chloro-1-2,4,5-trichlorophenyl) vinyl dimethyl phosphate	Gardona, Rabon
Strobane	terpene polychlorinates (65% chlorine)	Strobane AC-14
Sulfatep		See sulfotepp
sulfotepp	*0,0,0,0*-tetraethyl dithiopyrophosphate	Sulfatep; thiotepp
Supracide	0,0-dimethyl phosphorodithioate, S-ester with 4-(mercaptomethyl)-2-methoxy-Δ^2-1,3,4-thiadiazolin-5 one	methidathion
"synthetic pyrethrins"		See allethrin
Synthrin		See resmethrin
Systox		See demeton
Tabatrex	dibutyl succinate	Tabutrex
Tabutrex		See Tabatrex
TDE	1,1-dichloro-2,2-bis(*p*-chlorophenyl)ethane	DDD, Rhothane
Telone II	1,3 = Dichloropropene	dichloropropene
temephos		See Abate
Temik		See aldicarb
tepp	tetraethyl pyrophosphate	

Pesticide Names (Continued)

Name	Chemical Definition	Other Designations
terbufos	*s*-[[(1,1-dimethylethyl)thio]*0,0*-dimethyl phosphorodithioate	Counter
tetramethrin	2,2-dimethyl-3-(2-methylpropenyl)cyclopropane-carboxylic acid ester with N-(hydroxymethyl)-1-cyclohexene-1,2-dicarboximide	Neo-Pynamin
tetrasul	*p*-chlorophenyl 2,4,5-trichlorophenyl sulfide	Animert V-101
Thimet		See phorate
Thiodan		See endosulfan
thionazin	*0,0*-diethyl *0*-pyrazinyl phosphorothioate	Cynem, Nemaphos
Thiotepp		See sulfotepp
Tiguvon		See fenthion
Torak		See dialifor
toxaphene	chlorinated camphene containing 67-69% of chlorine	
Tranid	5-chloro-6 oxo-2 norbornanecarbonitrile *0*-(methylcarbamoyl)-oxime	UC 2047A
trichlorfon	*0,0*-Dimethyl 2,2,2-trichloro-1-hydroxyethyl phosphate	Dipterex; Dylox; Neguvon
Trithion		See carbophenothion
Trolene		See ronnel
Turcam		See Ficam
Vapam	sodium *N*-methyldithiocarbamate	VPM, SMDC
Vapona		See dichlorvos
Vendex	hexakis (β,β-dimethyl = phenethyl) distannoxane	
VC-13 Nemacide		See dichlorofenthion
Vidden-D		See D-D mixture
Vorlex	methyl isothiocyanate-chlorinated C3 hydrocarbon mixture	
VPM		See Vapam
Vydate		See oxamyl
warfarin	3-(*alpha*-acetonylbenzyl)-4-hydroxycoumarin	
Warbex		See famphur
Zolone		See phosalone

PACIFIC NORTHWEST CONTAINER DISPOSAL

PESTICIDE REGULATIONS

The specific laws and regulations governing storage, disposal, transportation and so forth of pesticides differ slightly in each of the Northwest states. Each pesticide user should obtain a copy of the detailed regulations for the states in which he or she is operating. Sources for this information follow:

Oregon

Department of Environmental Quality
522 SW 5th Avenue
Portland, OR 97204
(503) 229-5316 or, toll free 1-800-452-7813

Idaho

Division of Environment
Hazardous Materials Bureau
Department of Health and Welfare
450 W State St.
Boise, ID 83730
(208) 334-4128

Washington

Washington State Department of Ecology, Hq.
Mail Stop PB-11
Olympia, WA 98504
(206) 753-4276

OREGON

How should empty containers be managed?

- At the time of emptying, *decontaminate* rigid containers (such as cans, buckets, pails, or drums made of plastic, metal, glass, or fiber) *by* (1) jet or multiple rinsing; (2) visually verifying that the residues have been removed; and (3) crushing. If possible, also jet or multiple rinse nonrigid containers such as paper containers lined with plastic or foil.
- Decontaminated metal containers can be recycled. Take them to the nearest scrap metal collection, metal-remelting, pesticide-manufacturing, distributing, or retailing facility that will accept them for recycling. Contact the facility for terms of acceptance.
- Dispose of decontaminated containers at *any* DEQ permitted landfill. Obtain the landfill operator's permission.
- Farmers may bury on their property empty contaminated paper and other decontaminated containers resulting from their own use of pesticides if the burial location is on flat ground and at least 500 feet from the surface waters or any well.
- Farmers may burn on their property empty contaminated paper containers in less than 50 pound lots on the same day they are emptied or as soon thereafter as possible. Follow the local fire district's requirements for open burning. Avoid nuisance conditions (odors and smoke) that may pose a hazard to public health or the environment. Bury ash and foil liners after burning.

Commercial Disposal

In Oregon there is only one commercial site for disposal of quantities of surplus or waste pesticides. It is located at Arlington and is operated by Chem-Security Systems, Inc., Bellevue, Washington.

The Portland office of Chem-Security Systems, may be reached by dialing (503) 223-1912. The Arlington telephone is (503) 454-2777.

Hazardous waste rules

New hazardous waste rules being formulated, and soon to appear in an Extension publication, will further restrict certain identified pesticides as being especially hazardous and will impose stringent procedures.

WASHINGTON

Pesticide Disposal

New federal and state regulations concerning hazardous wastes are being implemented. The State Department of Ecology has set minimum standards for handling solid wastes, but local health departments may be more restrictive. For example, pesticide containers that have been triple rinsed are not considered hazardous waste by the Department of Ecology, yet several county landfill sites refuse to accept them.

During this transition period, the state Department of Ecology suggests that all questions concerning interpretation of the regulations, and locations of disposal sites, be referred to its regional offices:

Northwest Washington (206-885-1900), Redmond
Southwest Washington (206-753-2353), Olympia
Central Washington (509-575-2491), Yakima
Eastern Washington (509-456-2926), Spokane

An Oregon site near Arlington that handles hazardous waste, can be contacted at the following addresses in Washington:

Chem-Security Systems, Inc.
Box 1866
Bellevue, WA 98009
(206) 827-0711

Great Western Chemical Co.
P.O. Box 99211
Spokane, WA 99211
(509) 928-0195

The Spokane address is also a collection site, but do not take waste to it until you have contacted the manager.

In some instances it may be possible to detoxify extremely hazardous wastes so that they may be disposed of in Washington. Consult with the Department of Ecology to determine if this option is feasible.

IDAHO

There is one approved disposal site in Idaho where containers that once contained heavy metals, or surplus pesticides, may be disposed of. To contact the owner or manager of the site, use the following address and phone number:

Envirosafe Services of Idaho
P.O. Box 936
Mountain Home, ID 83647
(208) 587-8434

To find out where triple-rinsed pesticide containers may be discarded, call the county health unit at the local courthouse. Their Environmental Quality Specialist will have a list of approved sanitary landfills. If unable to contact the county specialist, call the Division of Environment in Boise (334-4128).

Containers with "STC" marked on them, excess pesticides, and those wastes considered hazardous must be disposed of at Envirosafe Services of Idaho.

Disposition of Waste on Owner's Land

Idaho Code Title 31, Chapter 44, contains regulations that apply to solid waste disposal on private land. To quote from a summary of this law or these regulations, "every owner of land who disposes of solid waste on his own land shall obtain a written permit from the Board of County Commissioners for such disposal." The state attorney general's office stated that this was interpreted to include pesticide containers, which means that anyone wishing to dispose of pesticide containers on their land must have the approval of the Board of County Commissioners.

Open Burning of Pesticide Containers

1. Persons living in rural areas (defined as an area with less than 100 dwelling units per square mile) may burn readily combustible rubbish if no commercial or public solid waste collection service is available (Rule 1-1153.05 of the *Rules and Regulations for the Control of Air Pollution in Idaho).*
2. The open burning of rubber or plastic products, or other materials that may emit "toxic contaminants or large volumes of smoke" is prohibited (Rule 1-1152.01). A listing of pesticides that may emit toxic contaminants, in 40 CFR 165.7(C), includes ". . . organic mercury, lead, cadmium, or arsenic compounds . . . ."
3. Rule 1-1153 lists the only categories of allowable burning. Nowhere in this rule are any provisions made for the open burning of any material by any commercial concern. Therefore, commercial pesticide operators cannot burn their waste material.
4. Rule 1-1151.03 allows local government units to adopt more restrictive open burning ordinances. Many cities and counties have done so.

Since cities and counties may adopt more restrictive regulations, the county health unit should be called to determine if the state regulations are in force in a particular county.