



Hong Kong Pest Management Association
香港殺蟲業協會

User's Manual

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I. What is a pest?

The term pest means any insect, rodent, nematode, fungus or weed that their existence will cause nuisance or affect the well-being of human. It also includes any form of terrestrial or aquatic plant or animal, virus, bacteria or other microorganism, excluding those viruses, bacteria and microorganisms living on or in man and other living animals.

II. What is a pesticide?

A pesticide is any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any pest as well as any substances, intended for use as a plant regulator, defoliant or dessicant.

Type of Pesticide:

Pesticide can be classified into insecticide, herbicide, rodenticide, fungicide, molluscicide, nematicide and avicide.

Modes of Action by Insecticides:

Insecticides act on their targets in several ways. They are:

1. Stomach poisons which must be ingested by the insect to cause death.
2. Contact poisons which penetrate through the body's outer covering, through the "skin" or through the feet or respiratory apparatus.
3. Fumigants are volatile insecticides as gases or vapors which enter the insect either through breathing pores in the case of insects or the lungs in the case of rodent.
4. Dessicants which remove the insect's protective coating, to cause it to dry out and die.

How pesticides get into the human body

In order to understand how to protect against pesticide hazards it is important to know how pesticides might enter the human body.

There are three major routes:

- through the skin (dermal absorption)
- through the mouth (oral ingestion)
- through breathing (inhalation)

Skin contact (dermal absorption) is the most common cause of the pesticide poisoning. This can occur not only through obvious splashes and spillage of concentrates directly onto the skin, but also through the wearing of contaminated clothing, or by continuous exposures to spray. Chemicals pass readily from clothing to the skin, and can penetrate even through healthy unbroken skin into the body. THE EYES, MOUTH AND GENITAL AREA ARE PARTICULARLY VULNERABLE. HANDS AND ARMS ARE OFTEN EXPOSED WHEN HANDLING A PRODUCT. Special care must be taken in hot weather, because sweating increases skin absorption.

Oral ingestion can be particularly dangerous, but the precautions to prevent it are simple through greater measures of personal hygiene:

- Do not eat, drink or smoke with pesticide-contaminated hands. Always wash hands thoroughly after handling or using pesticides.
- Do not store pesticides in drink or food containers. Keep them only in their original containers that are properly labelled.
- Do not transport or store pesticides with food, so as to avoid contamination.
- Keep rodenticide baits and pesticide-treated seeds away from foodstuffs, to avoid any accidental consumption.

Uptake by breathing (inhalation) may be dangerous if volatile chemicals are used in enclosed spaces or under still air conditions. Few sprays and dusts are capable of passing along the airways from the nose into the lungs, but it is a good practice to avoid breathing spray mists. In addition, ensure plenty of ventilation when handling pesticides, and wear appropriate mask, goggles and protective clothing etc. when advised.

III. Types of formulation

1. Liquid formulations

Liquid formulations include Oil Concentrates, Emulsifiable Concentrates, Wettable Powders, and Micro-encapsulated pesticides.

2. Dry formulations

Dry formulations include Dust, Granules, and Baits.

3. Gaseous formulations:
Gaseous formulations include Fumigants and aerosol.

IV. How to handle pesticides

1. Purchase
Buyers should ensure that the pesticide product they buy is registered in Hong Kong. Pesticides must always be clearly labelled and conform with the regulations stipulated by Hong Kong Government.
2. Transport
 - Load and unload pesticide containers with care.
 - Avoid spillage from containers and spraying equipment.
 - Secure pesticide containers and equipments in place during the transport.
3. Storage
 - a) Do not store pesticides with food or animal feeds
 - b) Ensure all reasonable precautions taken to protect the health of human beings, creatures and plants and to safeguard the environment.
 - c) Keep the pesticides securely out of reach of children.
4. Application
Pesticides should only be used when absolutely necessary, otherwise non-chemical control should be considered.
 - a) Instructions for use
 - Always read the label to make sure that the instructions for the safe and correct use of the pesticide are fully understood.
 - Make sure that the pesticide is for the intended use.
 - b) Measuring & mixing
 - i) Special care should be taken as concentrated pesticides are involved in this step. The wearing of gloves and eye protection is advised.
 - ii) Use suitable equipment for measuring and mixing. Use graduated cups or jugs for liquids, scoops for powders to

measure pesticide for mixing.

- iii) Dusts and granules, ULV spray are ready-to-use products, they can be scooped or poured into the sprayer tanks filled with water to the correct level, and mixed well.

REMEMBER: NEVER USE HANDS AS SCOOPS OR DIPHANDS AND ARMS INTO LIQUIDS WHEN STIRRING.

c) Dosage

Always adhere to the label recommended dose rates and dilutions. Higher doses will not produce better results. Lower doses will be less effective.

V. Application Technique

Residual pesticides are applied to obtain pesticidal effect lasting several hours or longer and are applied as general (surface spray), spot or cracks and crevices treatments.

General treatment is usually considered an application of pesticides to thresholds and other entrances, or the foundation and soil adjacent to the foundation.

Spot treatment is an application to limited areas on which insects are likely to occur. These areas may occur on floors, walls and bases or undersides of equipment. A "spot" will not exceed two square feet.

Cracks and crevices treatment is an application of small amounts of pesticides into cracks and crevices in which pests hide or through which they may enter the building. Such openings can occur at expansion joints, between different elements of construction or between equipment and floors. These openings may lead to voids such as hollow walls, equipment legs, conduits, motor housings, junction or switch boxes.

Non-residual pesticides are applied to obtain pesticidal effect only during the time of treatment and are applied either as space or contact treatments.

Space treatment is the dispersed of pesticides into the air by foggers, misters, aerosol devices or vapour dispersers for the control of exposed flying or crawling insects.

Contact treatment is an application of a wet spray for immediate pesticidal effect.

VI. General Precautionary Measures

A. Personal hygiene

- Do not eat, drink or smoke when working with pesticides
- Do not touch the face or other bare skin with contaminated hands or gloves.
- Wash hand and face with soap and water after work and before eating and eve smoking
- Wash your work clothes daily and separately from your family laundry.
- Remove spills on your skin and work clothes immediately with soap and water.
- Clean equipment and any auxiliary material thoroughly after work.

B. Protective clothing

- PROTECTIVE clothing can help to prevent skin contamination. However, in hot climates like Hong Kong, the wearing of additional protective clothing may cause severe discomfort due to heat stress. It can be compromised by having lightweight work cloth covering most of the body.
- wash work clothing daily with soap or detergent and separately from your family laundry.
- work clothing must be kept in a good state of repair so that there are no tears or worn area through which the pesticide could penetrate and cause skin contamination.

C. Customer safety

Before treatment

- ask your customer for information about the condition of the pest problems.

- inspect the premises to identify the problem.
- clean all surfaces prior to treatment.
- ensure that customer's personnel are not near the area to be treated.
- remove foodstuffs, kitchen utensils, cups and dishes which may come into contact with the product while spraying or effecting a space treatment.
- turn off the air conditioners.
- extinguish naked flames or pilot if using oil based sprays or solvent.
- use only the pesticide which is registered in the Agriculture & Fisheries Department for application.
- cover aquariums well with plastic sheets.
- remove pets.
- keep children away from any of your activities.
- inform the customer of what you are doing and what he has to observe during and after treatment.

During treatment

- avoid spillage or spraying onto non-target surfaces.
- Take great care in spraying on or near electric cables and other electrical equipment.

After treatment

- check for any spillage and clean up.
- collect products and equipment.
- complete records as appropriate.
- clean your equipment at base.

VII. Equipment – Types and Maintenance

Various types of dispensing equipment have been developed to be best suited to each job in order to obtain the best results.

This equipment is categorized as 1) Sprayers, 2) Mist Machines, 3) Ultra low volume devices, 4) Fog Generators and 5) Dusters.

A. SPRAY EQUIPMENT

1. Sprayers

Compressed Air Sprayer

The basic piece of spray equipment used in the pest control is a small hand-operated and hand carried compressed air sprayer. Air pressure is supplied by a hand-operated pump and is contained on the tank above the surface of the liquid to be dispensed. Open the valve by squeezing the trigger. The compressed air forces the liquid through the siphon tube, hose and out of the nozzle.

It is used to apply oil and water diluted pesticides.

Direct Placement Pumps

This type of sprayer has the same basic principles found in a hand-pumped compressed air sprayer. A power-driven pump is used to provide pressure to the pesticide directly in the line rather than pressuring the tank containing the pesticide. In these sprayers, pumps functioning in this manner can be of the rotary types (gear, roller or impellar pumps) or the reciprocating type (piston, plunger or diaphragm pumps).

2. Mist Machines

All devices producing droplets by means of pressure energy, gaseous (air blast) energy, centrifugal energy or combinations of these energy sources are designated as mist machines.

The simplest device producing a mist is one consisting a tank to be charged with air or gas under relatively high pressure to discharge the formulation through some type of nozzle having a very small orifice. The gaseous or air blast twin fluid atomizer, the flit gun, the Hi-fog machines are all mist machines.

Aerosols

Aerosols, aerosol dispensers or aerosol bombs are simply another type mist. These are oil or water solutions or concentrated pesticide enclosed in disposable or refillable containers together with a non-toxic gas which acts as a propellant to eject the pesticide when a valve is open.

3. ULV Devices

ULV – Ultra low volume is also referred as ULD – Ultra low dosage.

ULV applicators are driven either by gasoline engines or by electric motors with an aim of increasing the concentration and reducing the volume of pesticide.

4. Fog Generators

Fogger, fog generator or thermal aerosol generator are those machines (in which droplets are formed by heat vaporization) dispensing droplets of very small size by introducing an oil-base pesticide formulation into a chamber which is heated to a temperature sufficient to cause immediate vaporization of the oil.

5. Dusters

The application of dusts or powders are another control technique for pest controllers. Cracks and crevices, wall voids and crawlspaces are good examples of application sites where dusts are sometimes best suited.

Hand Dusters – In these devices the dust is placed into a flexible chamber. When you squeeze the bulbs or chambers the air in the chamber is passed over the dust, stirring it up and discharging it through the nozzle.

B. MAINTENANCE

Keep equipment clean and in good repair at all times. Moderates, continuous, preventive care will maintain equipment in good condition if performed in advance of damage.

Equipment in regular use should be cleaned at least once a week. Equipment not in regular use or used with a variety of chemicals should be cleaned every time after use.

You should always follow manufacturer's instructions on maintenance of any kind of equipment.

VIII. Accidental Poisoning

- Administer First Aid if you are competent to do so. (N.B. Check that the air passage is clear and that respiration is adequate. Do **NOT** try to make the patient vomit.)

- In case of accident, contact a doctor immediately, for professional advice. You must refer to the product's safety information sheet and be prepared to give full information on the pesticide used.
- For immediate telephone advice on what to do, please contact Drug & Poisons Information Bureau at the Department of Pharmacology, Prince of Wales Hospital (Tel. No.: 635-111 normal office hours, or 9483-0484 emergency 24 hours service).
- After having first advised your manager, take measure to ensure that the pesticide is not presenting a continuous hazard.

* IN ISSUNG THIS MANUAL, IT IS RECOGNISED THAT ADDITIONS OR AMENDMENTS WILL BE NECESSARY WHEN AND WHERE ANY IMPLEMENTATION IS REQUIRED.