Pesticide storage

The Occupational Health and Safety Regulation provides requirements for the safe storage of chemicals in general, and pesticides specifically.

Some provisions that are specific to pesticides include

- Pesticides must not be stored in areas where food preparation occurs, in lunchrooms, or in food storage facilities.
- For the storage of bulk or reserve quantities of pesticides, the employer must supply a storage facility that meets the design criteria stated in this manual.
- Factors to be considered in the facility design include maintenance of minimal quantities, compatibility of pesticides, strength of shelving materials, and containment of spills.

Safe pesticide storage involves both storage facility design and safe practices in the storage facility. Special consideration must also be given to mobile storage facilities.

Facility design

Factors to consider when designing a storage facility include location, building materials, entrances, ventilation, plumbing, lighting, and insulation. Figure 12 shows the recommended layout of a pesticide storage shed.

Location

- Always store pesticides in a facility separated from work areas and habitation.
- Depending on the quantity of pesticides, the facility may be a cabinet, room or shed. For larger quantities of pesticides, a shed, completely removed from buildings such as barns, houses, and warehouses, is preferred. In case of fire, the loss of a small shed is far less costly than a larger structure such as a barn or warehouse.
- Do not store pesticides in a basement. Dangerous vapours and gases are more difficult to ventilate from a basement than from a ground-level structure.
- Select a storage site as far as possible from human and animal habitation and on the downwind side.

- If possible, choose a shady site.
- Select a site where surface runoff water used to fight a pesticide fire will not contaminate a surface water body or well.
- Ensure the storage area is above the highest recorded flood level.

Building materials

- Whenever possible, use fire-resistant materials. Gypsum board interiors are preferable to wood panelling. Paints or other sealants should be used on absorbent surfaces.
- A concrete floor with curbs to contain spills is preferred to wood. Paints or other sealants should be used on absorbent floor surfaces.
- Explosion-proof wiring, switches, and fixtures are necessary for storage of flammable pesticides.

Entrances

- Provide locks on entrances.
- Securely attach warning signs outside or next to all entrances. Signs should effectively communicate DANGER to anyone who cannot read or understand English.

Ventilation

- If the storage facility is not used as a mixing area, a reasonable level of ventilation is six air changes per hour. For a facility 3 metres (about 10 feet) high, this would mean about 30 litres per minute (1 cubic foot per minute) of ventilation for every one tenth of a square metre (1 square foot) of floor area. If mixing is done indoors, additional ventilation will likely be required.
- For small quantities of pesticide, natural ventilation may be sufficient. Structures with no vapour barriers or weather-stripping may have natural air leakage of one to three air changes per hour.
- The best location for the ventilation control switch is outside the storage area. One technique is to interlock the ventilation control with the light switch.

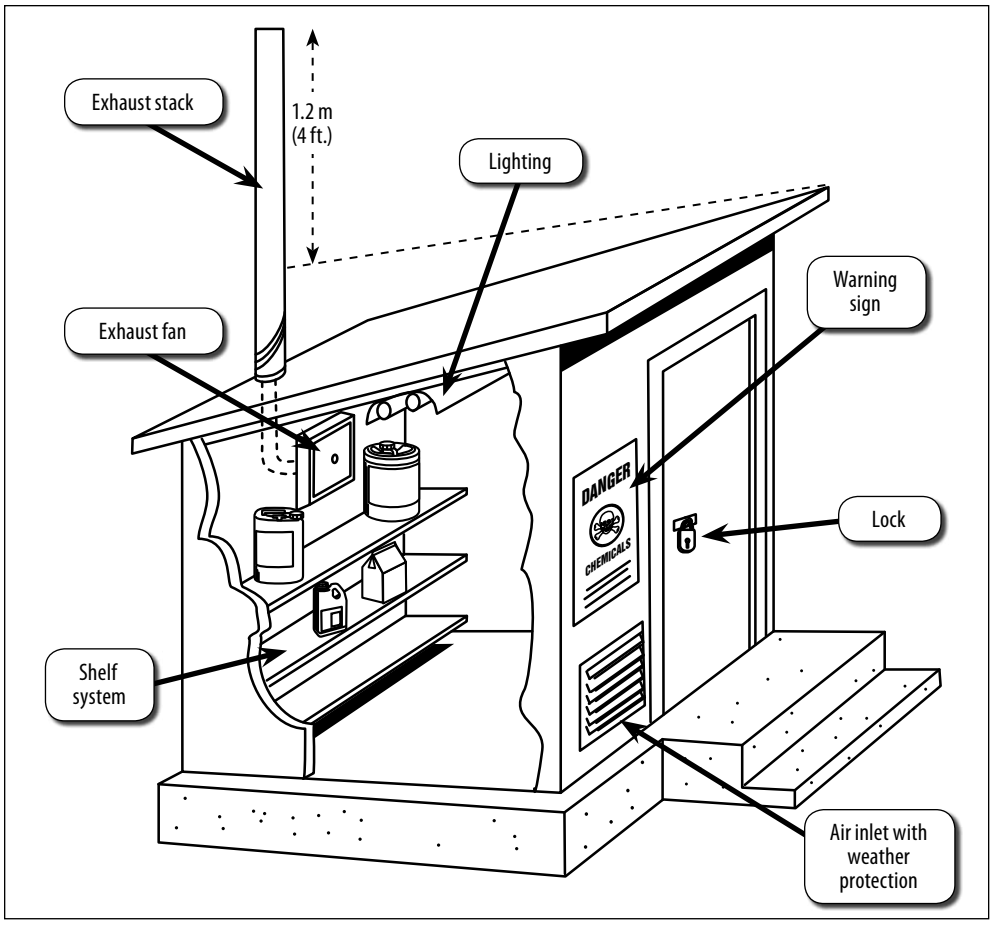

Figure 12: Recommended pesticide storage facility

- For effective ventilation, ensure that exhaust fans are located so as to pull airborne pesticides away from the work areas, and provide an inlet air vent for make-up air. One technique is to mount exhaust fans near the pesticide shelving and mixing areas and to provide inlet grates in locations such as a far wall or in the door.

Plumbing

Safety plumbing features include

- A floor drain that leads to a sump or other appropriate spill and washings collection facility.
- Backflow prevention devices in the piping systems that supply water for mixing pesticides.
- Appropriate washing and shower facilities for routine cleanup and emergency situations. Emergency wash facilities should be located close to mixing areas.

Lighting

- Lighting must be sufficient to ensure safety and to permit easy reading of labels on pesticide containers.
- 100 lux (10 foot-candles) is required in actively used storage areas and 200 lux (20 foot-candles) in areas where pesticides are mixed.

Insulation from heat and cold

- Locate pesticide shelving away from steam pipes, windows with southern exposures, or similar heat sources.
- Provide insulation to maintain storage temperatures in the range of 5˚C to 30˚C. A number of pesticides such as those shown in Table 15 decompose, and in some cases explode, at temperatures not far above ordinary room temperatures. Freezing temperatures can inactivate some pesticides.

Table 15: High temperature hazards of some pesticides

Pesticide	Warning
Acephate	Decomposes rapidly above 40˚C.
Azinphos-methyl	Container may explode after heating above 85˚C.
Malathion	Decomposes above 50˚C.
Maneb	Can decompose and undergo spontaneous combustion at elevated temperatures.

Safe storage practices

- **Store the minimum quantities of pesticides needed.** The smaller the amounts, the less the fire hazard, ventilation needs, and loss of pesticide due to evaporation, leakage, or deactivation.
- **Wherever possible, store pesticides on shelves.** Containers on the floor are often a tripping hazard and are more likely to suffer corrosion or other damage. Metal shelving or well-painted wood shelving is preferred. The bottom shelf should be set at least 10 centimetres (4 inches) above floor level to allow a "kick space" under the shelf. Top shelves must be within easy reach. It is not safe to handle chemicals above face levels.
- **Whenever possible, separate different types of containers.** One recommended practice is the three-shelf system, with small paper containers on the top shelf, small metal and plastic containers on the middle shelf, and large metal and plastic containers on the bottom.

If any glass containers are used, they are least likely to break in the event of a fall if placed on the bottom shelf. Bottom shelves should also be used for large containers such as drums where space permits. An alternative practice is to place drums on pallets next to the wall.

- **Always separate incompatible pesticides and chemicals.** In some pesticide publications, the term "incompatible" is used to describe two (or more) pesticides that reduce each other's effectiveness if applied at the same time.

  However, from a health and safety perspective, the term "incompatible" describes those chemicals which, on contact with each other, can create a hazardous condition such as a fire, explosion, or release of toxic gases. Such chemicals must be separated from each other in storage areas to minimize the chance of mixing in case of spills.

  Examples of incompatible chemicals include

  - **Combustible pesticides and oxidizers**
    Most pesticides are easily ignited or oxidized. This is especially true of organophosphate insecticides.

    Keep such pesticides away from oxidizers such as
    - The pesticides cyhexatin, dodine, and sodium chlorate (Ureabor)
    - Fertilizers that contain ammonium nitrate
    - Cleaning agents such as bleach

WARNING
Ureabor is a very strong oxidizer and should not be stored on wooden shelves.

  - **Some pesticides and water**
    Pesticides such as dazomet and aluminum phosphide will release toxic gases on contact with water. Maneb and mancozeb are combustible on contact with water. Ensure such pesticides are stored away from all sources of water.
  - **Pesticides and corrosives**
    Many pesticides are incompatible with corrosives such as strong acids or caustics. Keep corrosives separated from such pesticides.
  - **Some pesticides and metal**
    Pesticides such as difenzoquat, methyl bromide, and paraquat will produce flammable hydrogen gas on contact with galvanized metal. Make sure to prevent contact between such pesticides and metals.

PESTICIDE STORAGE INVENTORY

TRADE NAME	CHEMICAL NAME OF ACTIVE INGREDIENT	PURCHASE DATE	QUANTITY PURCHASED	ACUTE TOXICITY GROUP (slightly, moderately, or very toxic)	TARGET PEST CLASS (insecticide, herbicide, etc.)	CHEMICAL FAMILY (OP, CB, OC, etc.)	SAFETY NOTES (personal protective equipment, emergency procedures, storage practices, etc.)

- **Never store personal protective equipment, food, or food utensils with pesticides.**
- **Always store pesticides in the properly labelled container with the label clearly visible.** A good practice with paper containers is to place the containers in transparent plastic bags or other similar containers for extra security.
- **Inspect pesticide containers and contents regularly.** As a general rule, pesticides have a shelf life of about two years. Some pesticides such as naled and paraquat corrode metal containers. Some pesticides can become explosive when dry.
- **To prevent problems, record when pesticides are purchased, make periodic checks of containers and contents, and rotate stock.** The Pesticide Storage Inventory form (page 6) will help with the management of stored chemicals.
- **Eliminate all defective containers.** If the original pesticide container breaks, repackage the pesticide as follows:
  - Put it in a container that is similar to the original; for example, replace plastic with plastic. (An alternative with torn paper containers is to patch the tear and place it in a clear plastic bag secured on top. Do not cover up the label.)
  - Label any new container with a replacement supplier's label or a workplace label which shows the trade name, common name, concentration of the chemical, PCP number, safe handling information, and reference to the MSDS (where available).
- **Be prepared for emergencies.** It is a safe practice to provide emergency supplies such as a first aid kit and spill cleanup equipment at the pesticide storage area. Emergency phone numbers should be displayed next to the telephone. See Chapter 9 for details on emergency procedures.