



Pesticide products should always be kept in a secured storage area that is accessible only to those who are trained to use these products, such as licensed applicators, dealers, and distributors. Homeowners also need to be aware of proper pesticide storage practices. An important issue of safe storage is the potential for human harm through exposure—accidental or otherwise—especially where children are concerned. Proper storage can also help prolong chemical shelf life and prevent accidents that could cause property or environmental damage. Always consult the pesticide product label and MSDS for specific storage information.

Pesticide Storage and Security

The secure storage of pesticides and application equipment is not only a good practice for safety reasons, it can help reduce the potential of vandalism or theft with possible misuse of products and, unfortunately, the potential for use by terrorists and saboteurs. This is particularly important for those pesticides that are highly toxic or corrosive. However, even products not considered acutely toxic could potentially cause panic if used to contaminate water sources or food commodities, sprayed over populated areas, or otherwise misused.

How Much Storage Space Do I Need?

The amount of storage space should be kept to a minimum to discourage storing large quantities of unneeded pesticides. However, the storage space must be large enough to accommodate not only newly purchased chemicals and opened containers but also unused/unwanted pesticides and empty and triple-rinsed containers that need to be stored until properly disposed or recycled.

Where Should the Storage Site Be Located?

The best storage area would be a portable or prefabricated storage building as it can be repositioned easily in case of a flood hazard. Locate a detached storage structure far enough away from other buildings or structures, so that if a fire erupted, the pesticide storage area would not be threatened.

The storage site should be located in an area that will not be flooded. The storage area should be 12 inches above the immediate ground level to prevent moisture from being absorbed into stored products. Water and moisture can cause problems. They can rust metal containers; disintegrate paper or cardboard packaging; make labels unreadable; cause labels to detach; cause dry formulations to clump or cake, break down, or dissolve and release pesticide; and cause pesticide to spread and contaminate other areas of the facility or the surrounding environment.

Select the storage site to minimize the potential for runoff and prevent possible contamination of surface waters in case of a leak or spill.

The storage site should be located at least 100 feet away from surface waters and downslope from wells, animal feeding stations or shelters, food or feed storage, and dwellings. Consideration should be given to the direction of prevailing winds and what is downwind from the storage site in case of spills or fires.

Locate the storage site for easy access for delivery and emergency vehicles. Be sure to comply with all local zoning, building, and fire codes.

How Should the Storage Unit Be Constructed?

Use nonflammable materials to reduce fire hazard. Use nonabsorbant materials, such as metal or nonporous shelving with a lip or leak-proof plastic trays on the shelves. Also, plastic trays can help organize products and act as secondary containment in case of a spill. Be sure the shelving is strong enough to hold the quantity and weight of the containers. Products should not extend beyond the shelving where they could be bumped or knocked on the floor, causing a spill.

Use sealed floors, such as sealed concrete, epoxy-coated metal or concrete, no-wax sheet flooring, or other easily cleaned, nonabsorbant material. Dirt or unsealed wood flooring is unacceptable. In addition, have a continuous internal lip or curb, 2- to 4-inches high, to prevent spills from overflowing and going outside the building.

In certain situations, diking or some other containment structure may need to be constructed around the storage facility. Bulk or mini-bulk tanks should be stored on a reinforced concrete pad or other impermeable surface. Diking around a tank will keep spilled or leaking pesticides inside a restricted area and will also help prevent damage to the tanks from vehicles and equipment. A dike should be large enough to contain 110 percent of the volume of liquid in the tank. Valves and pumps should be within the diked area, and all drains within the dike should be connected to a holding tank.

If possible, provide electrical power to the storage area. This allows for

internal lighting, an exhaust fan, and a heater, in addition to exterior security lighting and alarm. When possible use explosion-proof wiring and switch.

What Should the Storage Environment Be Like?

Keep the storage unit dry and well ventilated. Keep outside doors and windows closed and locked, unless windows are needed for ventilation. Windows should not be large enough for someone to enter through them.

Keep pesticides from freezing and from extremely high temperatures—most pesticides should be stored between 40 and 90°F. Read the label and the

Figure 1. All storage areas should be locked.



Figure 2. Secure and disable tanks to prevent unauthorized access.



Material Safety Data Sheet (MSDS) to be sure. Keep containers out of direct sunlight. Do not put containers, especially glass or aerosol containers, in windows even temporarily.

What about Security?

Safety and security of pesticides are the responsibility of the applicator from the moment the applicator takes possession of the chemicals until they are used or disposed. Leaving pesticides unsecured in a vehicle where a child, unauthorized person, vandal, or an animal can get into them and suffer or cause an exposure is negligent.

Keep the storage area locked!

Store pesticides in a separate location, preferably in a building specifically

designed to safely store these products. Always lock pesticide storage cabinets, closets, rooms, and buildings.

If the storage area must be inside a larger structure, provide access through a separate outside door. Limit access to the pesticide storage area to only essential persons, and keep a list of all individuals with keys. Consider installing security lighting, an alarm system, or using a guard dog.

Secure pesticides and disable application equipment when kept off site or left in the field. Small equipment should be locked in a shed or other appropriate area. Never leave ignition keys in application equipment.

Aircraft and/or pesticide application equipment should be stored in locked hangars with electronic security

systems when not in use. If hangar space is not available and aircraft must be left outdoors, disable the aircraft and then use propeller chains, locking high-strength tie-down chains, or blocking equipment as practical alternatives.

Be aware of the potential for siphoning or otherwise stealing pesticides from filled tanks such as mini-bulk equipment. Tanks should be secured or disabled so that unauthorized persons cannot access the material inside the containers.

Encourage employees to maintain enhanced security awareness to unusual or suspicious actions, such as unauthorized persons during transport or pesticide applications. For example, all personnel entering large storage facilities must produce a valid identification, or will be denied entry. When quantities dictate, commercial

Figure 3. Use appropriate signage for pesticide storage areas.



driver's licenses should be checked and, if appropriate, copied and filed before loading any vehicle.

Post signs on the door, building, or fence that indicate pesticide storage, such as "Danger Pesticides—Unauthorized Persons Keep Out!" If appropriate, this information should also be in a second language, such as Spanish. Also, post the name, address, and telephone number for two contact people, in addition to at least two emergency response phone numbers—local fire and police, Poison Center (1-800-222-1222), and so forth. Be sure to indicate the location of the nearest accessible telephone. Contact information should also be posted separately from the storage area—in case of a fire or other accident at the storage area.

Post NO SMOKING signs, and do not allow smoking in or near the storage area or facility.

Promptly report any thefts of pesticides or equipment and any suspicious activity to designated authorities: the local police, the Federal Bureau of Investigation (FBI) field office, and the Pennsylvania State Police (check your telephone book).

Safe Storage Practices to Follow

Read the label and MSDS and comply with all product storage requirements. Keep all pesticide labels intact (and firmly attached), and keep the MSDS in an accessible location. When necessary, obtain replacement labels from your dealer or chemical sales representative. A substitute label,

if needed, should have at least the product name, the active ingredient, formulation, the EPA registration number, the manufacturer's name, and any emergency phone numbers listed on the original label.

Treated seed presents a potential hazard if not stored properly. Treated seed is usually colored with a bright dye to serve as a warning that the seed has been treated with a pesticide. Unfortunately, the bright color may be attractive to children. Treated seeds should never be used for feed or mixed with untreated seed. This seed should be handled with the same care as a pesticide and stored in a locked facility away from feed, veterinary supplies, fertilizer, equipment, pets, and children.

Be sure to store pesticides separately from food, feed, and seed. Follow the specific storage separation requirements on the label. Keep food, drinks, veterinary supplies or medications, first aid supplies, and clothing or protective equipment—especially respiratory protection—out of the storage area, as these items can be easily contaminated by dusts, vapors, or spills.

As much as possible—and you must if the label requires it:

- Store all pesticides separately from other chemicals, such as fertilizers
- Store pesticides separately from gasoline and other fuels
- Separate insecticides, fungicides, and so on from herbicides

Figure 4. Metal shelving is used to store dry pesticides above liquid pesticides.



Figure 5. Take inventory of your storage area on a regular basis.



- Store volatiles separately
- Store liquid formulations below dry formulations
- Store glass containers on the lowest level
- Store containers off the floor
- Store large drums and bulky bags on plastic pallets
- Store empty, clean containers separately from full and used containers

Rotate materials so the oldest chemicals are used first, especially those that have a short shelf life. Mark the purchase and opening date on the container, if not all used, before storing.

Store pesticides in their original containers. Keep labels legible by protecting them with transparent tape. The label is the most important safety factor in the use of pesticides. Do not let the label become damaged or destroyed.

Be sure all opened (used) containers are kept securely closed and sealed when not in use. Dry formulations tend to cake when wet or subjected to high humidity. Opened bags of wettable and soluble powders, dusts, and granules can be placed into sealable plastic bags or other suitable containers. This will reduce moisture absorption by the material and prevent a spill should a tear or break occur.

If pesticide in a damaged container needs to be repackaged, transfer the

contents to an empty container that originally held the same material and has the same label attached or place the container inside another container. Do not use a container that resembles a drink or food container. Firmly attach as much of the label from the original container as possible.

Keep spill-control supplies in the storage area. If a spill occurs, make sure the absorbent material is compatible with the spilled chemical. Spilled pesticides can be collected and disposed of according to the "Directions for Use" statement on the label. Otherwise the material becomes hazardous waste.

Keep an inventory of your pesticides and include the product name, date of purchase, quantity, and location within the storage area. This will help determine future needs and serve as a reference to check against in case of spills, fire, weather-related damage, or theft. Keep a copy of this information, duplicate copies of product labels, and the MSDS at different locations in case of an emergency. Also, inspect the storage area regularly, looking for leaks and missing inventory. Keep a log of these inspections.

Have copies of a map indicating the location of your storage facility, the storage unit floor plan, and current or seasonal inventory in a secure place away from the storage area. Also, have a copy filed with the fire department, other first responders, and/or the Local Emergency Planning Commission, if required.

Develop a contingency plan for your establishment with the local emergency response personnel. Firefighters are

trained to put out fires; however, in case of a fire in a chemical storage facility, the preferred course of action in most instances is to let it burn. If water is used to control the fire, then any runoff would be contaminated and therefore would contaminate the surrounding environment. Work with fire and emergency response agencies to determine the best response before you need their assistance. Have an ABC fire extinguisher and fire/rescue telephone numbers outside the storage building. Keep MSDS in an accessible location.

Know what your insurance policy covers. Keep your policy in a safe place.

Reduce the need to store pesticides by purchasing only what is needed for a particular application or season. When a product is on sale, you should not necessarily buy large quantities and store for future use. Consider other factors such as available storage space, the product's shelf life, possible changes in the product's use recommendations, product cancellations, and the potential hazards (exposures, spills, fires) associated with storing pesticides. Purchasing extra product on sale may actually cost more in the long term.

To minimize the need for container recycling, buy pesticides in mini-bulk containers, other returnable container systems, or bulk containers, and buy pesticides that are formulated or packaged to reduce or eliminate containers.

If you do have unused or unwanted pesticides, an excellent disposal option is available for all Pennsylvanians—the Department of Agriculture's

CHEMSWEEP program. Another program available to commercial and agricultural users of pesticides through the Department of Agriculture is the Plastic Pesticide Container Recycling Program, which accepts and recycles clean, plastic crop protection product (CPP) containers. (See sidebar for more information.)

Do not sell or give pesticides to anyone you do not know. Only licensed pesticide dealers may sell restricted-use pesticides (RUPs). Dealers need to make sure buyers of RUPs have a valid pesticide applicator's license. Commercial and public applicators may only purchase RUPs that can be used for applications in the category for which they are certified.

Watch for unusual behavior by a purchaser or other individual who seems unfamiliar with details of using an agricultural chemical; acts nervous, seems uneasy or vague, and avoids eye contact; demands immediate possession of purchased material instead of future delivery; asks for material in smaller, individual containers rather than in bulk; wants large quantities of highly toxic pesticides; insists on paying with cash instead of using credit or a check; and inquires about or wants to purchase equipment, especially ultra-low volume (ULV) application equipment, and has no apparent legitimate use for this equipment.

Worker Safety Practices to Follow

Have a basic first aid kit containing information on pesticide poisonings and emergency medical information,

including the national telephone number for poison centers (1-800-222-1222). Locate a telephone in or near the storage area for reporting emergencies.

Have a nearby source of clean water to decontaminate skin, eyes, and other exposure.

Use personal protective equipment (PPE) to decrease the potential for exposure when handling pesticide containers in and around the storage area. However, remember that PPE should not be stored in the same area as pesticides.

Conduct regularly scheduled safety and maintenance inspections of the storage unit or facility and PPE.

Remember, proper storage, security, and disposal of pesticides is as important as using them safely in the field—no matter what field you may be in.

Where to Find More Information

Penn State Pesticide Education Program: www.pested.psu.edu/issues/security

Purdue Pesticide Programs, Purdue University Cooperative Extension Service. *Pesticides and Their Proper Storage*. www.ppp.purdue.edu/Pubs/PPP-26.pdf.

Your local emergency management services

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Pesticide Safety Fact Sheets are produced by the Pesticide Education Program in Penn State's College of Agricultural Sciences. Topics covered in the series include:

- pesticide laws and regulations
- handling chemical spills
- personal protective gear
- pesticides in the environment
- equipment care and cleaning
- pesticide toxicity and health effects

For a complete list of fact sheets and electronic copies or for more information about the Pesticide Education Program, visit this url:

www.pested.psu.edu

Programs for Applicators

The Pennsylvania Department of Agriculture has implemented two programs to help applicators recycle plastic pesticide containers and dispose of canceled, suspended, and unwanted pesticide products.

CHEMSWEEP Pesticide Disposal Program

The CHEMSWEEP waste pesticide collection program is designed to provide all citizens of the Commonwealth with a means to dispose of canceled, suspended, phased out, unusable, or unwanted pesticide products. The high cost of disposal prohibits many users from hiring professionals to dispose of these materials and also postpones disposal decisions until a more cost-effective means becomes available. The waste pesticides may then become a health and safety hazard and environmental liability through long-term storage in barns, garages, or other areas in and around the home. The liability may also manifest itself as a high hidden cost during the cleanup and removal of these pesticides in the transfer or sale of a property.

Participation in CHEMSWEEP is free for the first 2,000 pounds. Participants with waste pesticides exceeding 2,000 pounds will be responsible for the cost exceeding that limit, but at the cost charged to PDA by the contractor, which is significantly less than normal hazardous waste costs. Any pesticide or related pesticide product will be accepted in this program. However, dioxin precursors such as slivex, 2,4,5-T, and pentachlorophenol will only be accepted if these products are packaged in Labpack quantities and meet the definition of "universal waste." Approximately 18 counties are selected each year to participate in CHEMSWEEP. To see which counties are eligible, see our Web site at www.pested.psu.edu/pdaprog/chemsweep.

Plastic Pesticide Container Recycling Program

The Plastic Pesticide Container Recycling (PPCR) Program accepts and recycles clean, plastic, crop protection product containers. This program is available to commercial and agricultural users. In order to participate in the program, applicators must ensure that all containers are free of all product, inside and outside. Triple rinsing or pressure rinsing is required. All label booklets, plastic sleeves, and caps should be removed and discarded. Only #2 HDPE plastic containers from EPA-registered agricultural, structural, turf, forestry, and specialty pest control products, as well as containers from crop oils, surfactants, and fertilizers will be accepted. Recycling sites are located throughout the state at chemical dealers and commercial application businesses. Please note that containers that do not meet the above criteria will be rejected. Instructions on triple and pressure rinsing, as well as recycling sites, are available on our Web site at www.pested.psu.edu/pdaprog/ppcr.

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