



Pesticide Storage Building

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Proper storage of pesticides can save you time and money. Think of a properly designed, constructed, and managed building as an insurance policy to safeguard these expensive products and the health of you, your family, and your employees. Consider also that a pesticide storage and mixing facility is part of the environment and can affect surrounding areas, buildings, activities, people, and animals. Damp storage areas cause metal and paper containers and paper labels to deteriorate. Wetable powder pesticides can cake into useless blocks if stored in damp conditions. Pesticides can contaminate feed, food, fertilizer, and other items if stored in the same area. The following guidelines will help you store your pesticides properly and keep them ready for use.

Planning Your Storage

An all-weather accessible site is needed to facilitate unloading and possible fire fighting. Locate the building a minimum of 50 feet from other buildings for easy fire truck access and for preventing cross contamination with feed or other items. The buildings should be located a minimum of 100 feet from wells or

other water supplies and downslope from them.

A good storage facility consists of four main parts: 1) the pesticide storage room, 2) the mixing room, 3) the locker room, and 4) an outside concrete filling and washdown pad (which may be roofed). A plan view of a building with these parts is shown below. The pesticides need to be stored in a heated, dry, and ventilated room. This plan does not provide separate storage areas for the herbicides from the other pesticides with a wall. This is optional since it may require two heaters. Store clean personal clothing (disposable coveralls work well) and respirators in the locker room. Store measuring equipment, cleaning agents, pesticide recommendations, and pesticide application records in the mixing room. The pesticide storage room should be locked and accessible only to authorized personnel.

Electrical power is needed for inside and outside lights, for ventilation fan(s) and heating units, if electrical.

A water source needs to be available for filling the sprayer tank; washing hands and measuring devices; and showering. The sink, toilet (optional) and shower should be located in the locker room. Install a check

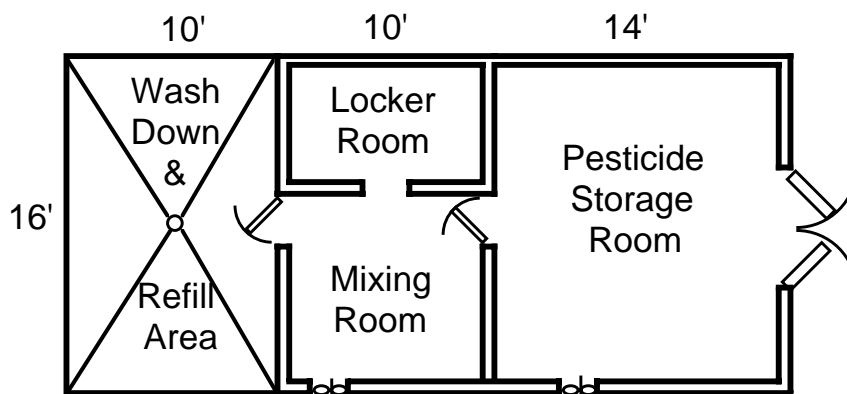


Figure 1. Plan view of a 16' x 24' pesticide storage building.

valve on the sprayer water line to prevent chemicals from entering the water supply system.

A sign should be posted on a prominent wall of the building to indicate the presence of pesticides. A similar sign should be posted on the entrance door of the building. Inform the local fire company of the pesticide storage building location, the type of chemicals stored, and the closest water supply for fire fighting.

Secondary Containment

A safety or "back-up" means is needed to contain pesticide container leaks and spills in the storage and mixing areas. The secondary containment must prevent pesticides from entering the environment and possibly contaminating the soil, groundwater, or runoff water. The secondary containment should be designed to temporarily hold the volume of the largest container (usually the sprayer tank) plus a safety factor of 10 to 25 percent for freeboard. The material is then recovered and used or properly disposed. Secondary containment is economical because it prevents loss of product and saves on cleanup costs.

Typically, secondary containment is achieved by placing the storage building on a waterproof concrete slab with curbs high enough to contain the necessary volume. If you want to drive in and out of the building, ramps or driveover curbs can be used at the door. Or the pesticide storage building can be placed on a mixing pad that serves as the secondary containment for both the storage building and mixing areas. Liquid is collected, drained to a sump, and pumped to sprayer for application or to tanks for storage.

Construction Details

Heat is needed to prevent liquids from freezing (powders are not a problem). The inside temperature should not go below 40°F or above 95°F. The size of the heater needed varies with the building size, insulation value, and fan size. The building shell should be insulated with a minimum insulation R value of 11 in the outside walls and 19 in the ceiling (i.e., 4" fiberglass and 6" fiberglass respectively). It should be covered on the inside with 4 mm plastic film and a rigid material such as 3/8" plywood. A gas or oil heater (15,000 btu/hr) or an electric heater (4 kW) is needed to keep the temperature in a 16' x 24' storage facility above 40°F in Pennsylvania during the cold season. A gas or oil heater must be vented to the outside to prevent the combustion products of water vapor and carbon dioxide from accumulating inside.

Ventilation fans are required in the mixing room

and the pesticide storage room to prevent the build-up of chemical vapors. For the plan above, minimum recommendations are a 200 cubic feet per minute (CFM) fan for the mixing room and a 400-cfm fan for the pesticide storage room. These airflow volumes are based on using a 1/8" static pressure rating. These fans should be set to operate when the lights are turned on. Locate the fans to blow away from the residence and on the leeward side of the building. The pesticide storage room fan inlet should be ducted to the floor to pull the heavier-than-air vapors from the room. This fan should have two speeds to allow higher air flows when working in the building. The 200-cfm fan should be located near the actual mixing area. Both fans require air inlets to operate at their rated airflows. This can be accomplished with either manually adjustable louvers or with self-adjusting gravity louvers in the outside walls or doors. Allow 20 square inches of inlet area for each 100 cfm of fan capacity. The door between the mixing room and the storage room should be weather stripped to keep the storage vapors out of the mixing room.

Liquid pesticide containers should be placed on pallets to prevent freezing of chemicals especially along the outer walls. If products are to be stored on the concrete floor, then insulate under the floor with 1" thickness of rigid waterproof foam insulation. A 4 mm plastic film moisture barrier under the concrete is also advised to keep the floor and room drier. Large containers can be moved into the building by a forklift or skid loader if a large entrance door is provided. Store lighter materials on shelves if extra space is needed.

Personal Safety Tips

Many pesticides sold for agricultural use can cause severe illness, or even death, if misused. Be prepared to handle pesticides by using water repellent protective clothing that completely covers the body (including the head). Wear shirt sleeves and pant legs over gloves and boots so that runoff will stay away from your skin. The most effective way to keep from breathing harmful pesticide vapors is to wear a respirator that is approved for the pesticide you are handling. Fact sheets on *Handling Pesticides Safely* (Agricultural Engineering Safety Fact Sheet, Safety-23, *Respiratory Protective Devices for Pesticides* and *How to Handle Chemical Spills* (Agrichemical Fact Sheets 1 and 5) are available from your county extension office. These fact sheets should be posted and reread each year by everyone using pesticides.

A shower should be located in the locker room for routine clean-up and for emergencies (the douse type is desirable). A sink should also be available for

Table 1. Winter Storage of Chemicals*

Product	Heated Storage Required	Heated Storage Not Required	Quality Questionable After Freezing	Usable After Freezing	Usable After Freezing if Shaken	Quality Damaged by High Temperatures
AAtrex (atrazine) 4L		X		X		
Amiben 2E	X				X	
Banvel		X		X		
Basagran	X				X	
Benlate		X				
Bicep		X		X		
Bladex 4L		X		X		
Buctril		X		X		
Captan WP		X				
Cygon 400	X		X			
Cythion 5E					X	X
Dacithal WP		X				
Diazinon		X		X		
Di-Syston 6LC		X		X		
Dual 8E		X		X		
Dyfonate 4E	X		X			X
Eptam 7E			X		X	
Eradicane		X		X		
Furadan 4F	X		X			
Fusilade 2000		X		X		
Gramoxone (Paraquat)	X					X
Imidon WP		X				
Lannate L	X				X	
Lasso 4E	X				X	
Lorox 4L	X		X			
Lexone 4L	X		X			
Lorsban 4E		X				
Malathian EC		X			X	
Monitor 4E		X		X		
N-Serve		X			X	
Penncap-M		X			X	
Poast	X				X	
Pounce		X			X	
Pramitol 25E	X				X	
Prefar 4E	X		X			
Princep 4L		X		X		
Prowl	X		X			
Roundup	X		X			
Sencor 4F		X			X	
Sevin 4F		X			X	
Spectracide Liquid		X		X		
Surflan AS		X				X
Supracide 2E	X				X	
Sutan+ 6.7E		X			X	
Tolban		X		X		
Treflan EC	X		X			
Trithion 8E		X		X		
Vernam 7-E		X		X		
2,4-D Amine	X		X			
2,4-D Ester		X		X		
2,4-D LV Ester		X		X		

* Adapted from "1992 Commercial Vegetable Production Recommendations" (Pennsylvania) and "Vegetable Newsletter" by Chris Doll, Illinois County Extension Agent. "X" indicates Yes. Trade names are used for informational purposes only and does not imply endorsement by the authors or the Pennsylvania State University.

washing hands and measuring devices after mixing. A toilet is optional.

Storage of Chemicals

Store the oldest chemicals near the front so they will be used first. Most pesticides should be used within two years (exclusive reliance must be placed on use directions supplied by the manufacturer). In the inventory, write the purchase or delivery date on the container so you will know how long a product has been stored. Do not rely on memory or guess on pesticide recommendations; instead, write them down. Keep duplicate application records in two locations in the event of loss or damage.

No matter what time of year it is when you decide to use pesticides, always test liquid products for bottom precipitates before using them. Precipitates form when the product is exposed to low temperatures. To check for this crystallization, insert a long metal rod into the container to the bottom and stir. Products can stratify at low temperatures. A hollow glass or plastic tube inserted into the mixture can be used to withdraw some of the liquid for the check. Insert tube, place finger over exposed end, and remove tube from container. Be very careful; you are handling a concentrated pesticide!

For winter storage of chemicals, check Table 1 to

see the effect of cold temperatures on various chemicals. It also tells you if a heated storage is needed for the pesticide.

Summary

A special storage building should be constructed for the safe storage of pesticides. It should:

- ◆ protect its contents from extremes in temperature, humidity, and from unauthorized personnel
- ◆ be locked at all times and consist of a storage room, mixing room, locker room, and an outside wash pad
- ◆ be constructed to contain any pesticide spill to prevent ground or surface water contamination
- ◆ have electricity supplied for lights, ventilation, and heating so that the pesticides can be stored in a dry, well ventilated room
- ◆ display a sign to advise fire fighters and other of the building contents.

Remember: Pesticides can cause severe illness and even death if used improperly. Therefore, care must be taken to prevent people from coming in contact with pesticides by breathing, swallowing, or absorption through the skin. Protective clothing that covers the entire body, including the head, must be worn when handling pesticides.

Recommended Reference

Designing Facilities for Pesticide and Fertilizer

Containment, MWPS-37, may be purchased from Publication Distribution Center, 112 Agricultural Administration Building, University Park, PA 16802 (814/865-6713).

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For a copy of our Fact Sheet Listing contact:
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