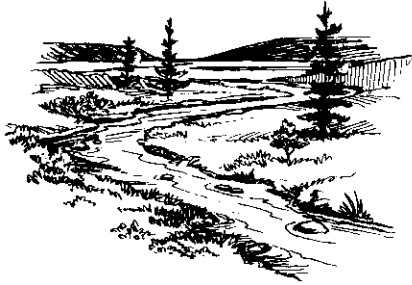


INTRODUCTION



These guidelines are not intended to be regulations and are not enforceable by any state or local agency

Poorly stored pesticides and improper mixing/loading practices can present a potential risk to our health and to the integrity of the environment. The quality of surface water, groundwater and soil can be degraded in areas where pesticides are stored under inappropriate conditions, improperly mixed and loaded into application tanks and where equipment is washed and rinsed after application. Accidents involving spills or leakages may have serious health and environmental consequences. Over the past several years, the Pesticide Bureau of the Department of Agricultural Resources has received numerous phone calls from farmers, golf course superintendents and other pesticide users looking for guidance on building pesticide storage facilities. Questions concerning proper mixing and loading procedures have also been common. The purpose of this document is, very simply, to provide guidance to individuals looking for information on appropriate techniques and approaches for the mixing, loading and storage of pesticides. This document was prepared with input from written resources, individuals and organizations with a broad range of expertise and experience. It is a compilation of the best information available regarding the mixing, loading and storage of pesticides. The result is a solid body of guidance which represents a general consensus on how pesticide mixing, loading and storage issues should be approached. It is important to remember however that mixing, loading and storage needs will vary greatly from situation to situation and site to site. No document could specify exactly what approach should be taken in each situation. As such, it should be kept in mind that this document is intended as general guidance only. These are recommendations, not standards or regulations and as such can be adjusted to meet individual needs. These recommendations are designed to assist pesticide users in managing their storage areas and conduct their mixing/loading operations in ways that will help minimize exposure to pesticides and reduce the risks to public health and the environment. These are not intended to be regulations and are not enforceable by any state or local agency.





Storage

Safety is the key element in pesticide storage. The safest approach to any pesticide problem is to limit the amounts and types of pesticides stored. The amounts and types of pesticides stored should be maintained at the level that is immediately required and should not be stored beyond immediate needs.

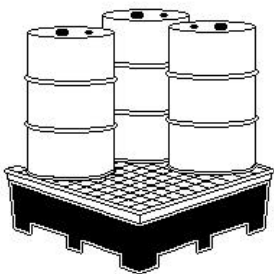


Selecting a Storage Location

An existing or proposed area should be carefully evaluated to determine its suitability for pesticide handling and storage. In particular the potential harm to human health and the environment due to spills, contaminated runoff or fires should be assessed. If possible, the area should be located at least four hundred feet (preferably down hill or down gradient) from any public or private drinking water supplies and two hundred feet (preferably down hill or down gradient) from surface water. Separation from water resources should be greater in areas of sandy soil or fractured bedrock. Whenever feasible, the area should not be located in a 100 year floodplain. Runoff from adjacent areas resulting from a 25 year 24 hour storm should be diverted around the facility. The site location should be accessible in the event of an emergency situation. The pesticide storage area should be located away from direct sunlight, freezing temperatures and extreme heat.

The area should be located at least four hundred feet from any drinking water supply and two hundred feet from surface water

Temperatures in the storage area should be kept between 40F and 100F. Pesticides should not be stored outdoors. Where practical, the mixing/loading area should be located close to the storage facility to minimize the distance that chemicals are carried. Consideration should also be given to the additional area required by a mixing/loading pad when selecting the site for storage.





Storage Practices

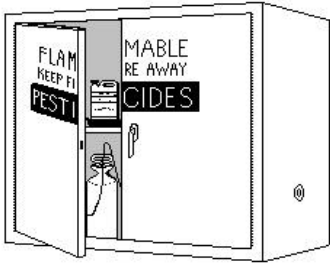
Pesticide storage shall be restricted to a first story room or area which has direct access to the outside (according to the Board of Fire Prevention). Pesticides cannot be stored in basements. Pesticides should be stored in accordance with their label requirements in their original container with the label clearly visible. They should always be kept off the ground to prevent the accumulation of water in or under the containers. Separation of pesticides by hazard and function is essential. Flammable pesticides should be stored separately from non-flammable pesticides, in a fire proof cabinet for example. Dry pesticides should be stored separately from liquid pesticides to avoid wetting from spills. Fungicides, herbicides and insecticides should be stored in separate locations of the storage area to prevent cross contamination and accidental misuse. Pesticides should be stored away from fertilizer, food, feed, potable water supplies, veterinary supplies, seeds and personal protective equipment to avoid cross-contamination. Particular care should be taken if storing phenoxy herbicides due to their volatility. Pesticides shall not be stored in the same place as ammonium nitrate fertilizer (according to the Board of Fire Prevention). Exposure to sunlight can cause chemical breakdown. Pesticides should not be stored in front of windows, unless the windows are covered. Because shelf life is difficult to predict, pesticides should not be stored longer than two years.

Pesticide storage shall be restricted to a first story room or area which has direct access to the outside. Pesticides cannot be stored in basements



Storage of Medium Quantities of Pesticides

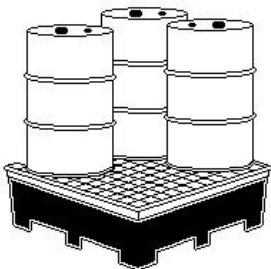
(less than or equal to 500 lbs or 220 gallons)



Flammable pesticides should be stored separately from non-flammable pesticides in a fire proof cabinet

Storage Inside an Existing Building

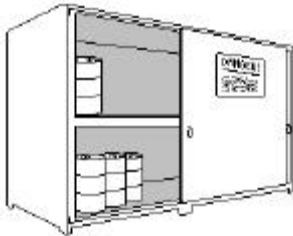
For storage of medium quantities of pesticides inside an existing building, metal cabinets work well. Metal cabinets should be double walled and constructed with 18-gauge sheet metal. Steel cabinets for storing hazardous materials such as pesticides are available commercially in different dimensions of various capacities. Capacities range from one gallon cans to five gallon cans and fifty five gallon drums. Frequently, cabinets feature built in secondary containment systems such as deep, leak-proof sumps. Wooden cabinets can also be used but should be constructed from 1" thick exterior grade plywood and finished with a chemically resistant product that permits easy cleanup. Shelves can be wooden (if finished with a chemically resistant product) or metal. The door sill to the cabinets should be high enough -at least 5"- to contain up to 5 gallons of spilled liquid. The cabinets should be locked at all times and identified as a place of pesticide storage. The cabinets should be located along an outside wall in an area away from extreme heat or freezing. In the absence of cabinets, storage containers should be placed on impermeable shelves (steel or painted wood) with a lip to catch minor spills or leaks. Storing the containers in plastic leak proof trays to contain any leaks is recommended. Other options include spill containment pallets or floor pallets. Access should be unimpeded. Leaks should be detectable. If containers are in danger of leaking, they should be placed in an oversized plastic container or plastic lined (leak proof) cardboard box with vermiculite or other non flammable absorbent material for spill protection.



Storage of Large Quantities of Pesticides



(more than 500 lbs or 220 gallons)



Areas used for the storage or mixing of pesticides shall be constructed in accordance with the Board of Fire Prevention Regulations (527 CMR 37.00), the State Building Code (780 CMR) and the BOCA Mechanical Codes (527 CMR 12.00 Appendix A)



For storage of large quantities of pesticides (more than 500 lbs or 220 gallons), use of a separate facility is a good idea. Two options for storing large quantities of pesticides should be considered where possible:

- 1) The acquisition of a Hazardous Materials Storage (HMS) Building**
- 2) The construction of a new Pesticide Storage Facility.**

(1) Hazardous Material Storage (HMS) Building

Free standing hazardous materials storage buildings composed of heavy duty steel frames with twelve gauge steel roof and walls are available commercially. The building should ideally have a two hour fire rating. They generally provide double stacking and vertical storage of fifty five gallon capacity drums. Secondary containment is achieved by means of sumps. Doors are self closing and can be locked. The walls have air vents or ventilation fans for improved circulation and relief of gaseous vapor build up. Generally the capacities of the HMS buildings vary from five to forty 55 gallon capacity drums.

(2) Construction of a New Pesticide Storage Facility

(general recommendations)

It is important to consult with an engineer or licensed contractor familiar with the state building code requirements before implementing any plan. Before construction begins, consult with local agencies that deal with planning, zoning, wetlands, health and fire. Areas used for the storage of pesticides shall be constructed in accordance with the Board of Fire Prevention Regulations (527 CMR 37.00), the State Building Code (780 CMR) and the BOCA Mechanical Codes (527 CMR 12.00 Appendix A). A properly designed storage area should be built with regard for worker safety and protection of the environment and public health. It should, at a minimum, facilitate the secure, dry storage of pesticides; safe working conditions for workers with easy access to worker Personal Protective Equipment; secondary containment of incidental spills due to normal mixing/ loading practices and secondary containment of large accidental spills.



**HOLLOW MASONRY
DEFINITION**

*<75% solid cross section
or
>25% void*

*Hollow Masonry Block
Cored Brick
Block Tile*

The storage facility shall be constructed in such a way that run-off from fire streams will not contaminate streams, ponds, groundwater, croplands or buildings

**SOLID MASONRY
DEFINITION**

*>75% solid cross-section
or
<25% void*

*Solid Masonry Brick
Solid Masonry Block
Clay Tile*

Containment

The building should provide adequate within-building spill containment. In the event of an accident or major spillage, the building should be capable of containing 125% of the volume of the largest container. This can be achieved by surrounding the floor with a curb or by a grated trench which drains to a sump. If possible the floor should slope slightly to the center. A change in slope of, at most, 0.06 inches of drop per foot of run (0.5%) is advisable.

These measures will also prevent water or other liquids from seeping or flowing onto the storage area.

The storage facility shall be constructed in such a way that run-off from fire streams will not contaminate streams, ponds, groundwater, croplands or buildings.

Walls

The storage building should be separated as much as is reasonably possible from other use areas. The building should be designed to prevent against potential fires due to storage of flammable pesticides within the building and from fire in adjacent buildings. A fire wall slows the spread of fire from one area to another. It is recommended that a storage building with a 1-hour fire wall should be located at least fifty feet from other buildings. For a 2-hour fire wall, the set back distance should be twenty five feet. For a 4-hour fire wall, there is no minimum setback distance. The building should be accessible from all sides for emergency and fire fighting equipment.

Fire Rating	Wall Type	Wall Type	Wall Type
1 Hour Wall	3" Hollow Masonry	4" Solid Masonry	3" Solid Concrete
2 Hour Wall	4" Hollow Masonry	6" Solid Masonry	4" Solid Concrete
4 Hour Wall	6" Hollow Masonry	10" Solid Masonry	6" Solid Concrete

Gypsum wallboards of 5/8" thickness on both sides of the wall constitute a one hour rated firewall. Two gypsum wallboards on both sides are considered to be 2 hour fire rated fire walls.



The interior wall surfaces should be impervious to pesticides and easily cleaned. Suitable wall liners are painted steel, aluminum, fiberglass, or high density plastic reinforced plywood panels.

Doors

The doors should be windowless, steel (solid core), 36" wide, set in a steel frame and open to the outside.

Floors & Concrete Specifications

The storage building floors should be water tight, chemically impervious and skid resistant. Concrete floors with an impervious sealant or some other material of comparable strength and impermeability should be used.

The following specifications should be used for concrete:

- Type I or Type II high quality cement with 5 - 7.5% air entrainment (this improves water tightness) and compressive strength of 4,000 - 4,500 psi;
- Water - cement ratio of 0.40-0.45 for a stiff (1.5" - 3") slump; a relatively dry mix for maximum strength, pesticide and fertilizer resistance, freeze/thaw resistance and water tightness;

Protective coatings for concrete seal the surface and help prevent the corrosive actions of pesticides and fertilizers on concrete

While concrete is durable, it will deteriorate over time. Liquid fertilizers are the main cause of concrete deterioration. However, pesticides can contaminate concrete and leak through cracks into groundwater. Protective coatings for concrete seal the surface and help prevent the corrosive actions of pesticides and fertilizers on concrete. Among the coatings commercially available are epoxies, urethanes, polyesters, vinyls, chlorosulfonated polyethylene, and polyureas. The appropriate type of coating will depend on the types of pesticides and fertilizers being stored and should be determined in consultation with a distributor.

Lighting

Lighting should be bright enough so that labels may be easily read. The lighting and fan should be turned on by the same switch.

Electrical Design

Electrical equipment and wiring should be designed to prevent sparks. The wires should be shielded. An exterior electrical service disconnect in a locked National Electric Manufacturers Association (NEMA) rated, weather proof box should be provided.

Temperature

Area temperatures should be kept below 100 deg F and above pesticide



For personal safety and protection, good air ventilation should be present at the facility

freezing points. An electrical heater can be used to keep the temperature above 40 deg F during the winter. Open flames should never be used. Air conditioning may be needed during the summer to prevent the volatilization of pesticides, if this is likely to be a problem. If the storage area is outside, the area must be enclosed in order to protect against the elements, particularly precipitation, freezing temperatures. Outside storage is not recommended in Massachusetts.

Ventilation design

For personal safety and protection, good air ventilation should be present at the facility. The area should have a continuously operating ventilation system sufficient to prevent the accumulation of vapors and to control temperature. Ventilation should be provided by means of fans. The fans should operate off the same switch as the lighting system. An air inlet should be located within 12" of the floor to facilitate the escape of heavier than air vapors. During occupancy, the ventilation system should provide 6 air changes/hour.

Bulk Containers

Storage containers and appurtenances such as valves, fittings, pipes and hoses, should be installed and maintained so as to prevent the discharge of liquid pesticides. As such they should be structurally sound, resistant to changes in temperature extremes and be constructed of materials that are resistant to corrosion, puncture or cracking. Stainless steel, fiberglass, polyethylene, and lined ferrous metal are acceptable. Valves on storage containers should be locked or otherwise secured except during times of authorized access.

Mixing and Loading Facilities



The mixing and loading of pesticides should not occur within four hundred feet of any private or public drinking water supply or two hundred feet of surface water

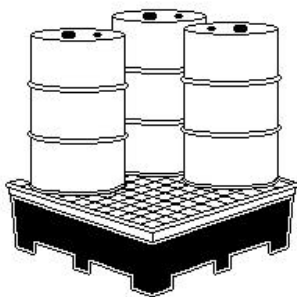
Contamination of soil, groundwater and surface water can result from small quantities of pesticides spilled regularly in areas where pesticides are mixed and loaded into applicator tanks and where equipment is washed and rinsed after application. Spills or overflows can lead to the accumulation of pesticides in the soil and drinking water supplies.

Mixing / Loading Location

Mixing and loading should be avoided in areas where a spill, a leak or overflow could allow pesticides to get into water systems. The mixing and loading of pesticides should not occur within four hundred feet of any private or public drinking water supply or two hundred feet of surface water. No pesticide application equipment or mix tank should be filled directly from any source waters unless a back siphon prevention device is present. Mixing and loading should not occur on gravel driveways or on other surfaces that allow spills to move quickly through the soil.

Mixing / Loading Practices

Mixing or loading of pesticides should be avoided in areas where a spill, leak or overflow could allow pesticides to get into water systems. All transfers of pesticides between containers, including mixing, loading and equipment cleaning, should be conducted over a spill containment surface designed to intercept, retain and recover spillage, leakage and wash water.



MIXING SAFELY

1. Wear the protective equipment.
2. Mix in a well ventilated area.
3. Pour pesticide down the side of the tank this avoids splashing.
4. Make sure you have a solid footing while pouring.
5. Do your calculations prior to mixing.
6. Mix during daylight hours if possible.
7. Water supply should have a back flow prevention device - to prevent back flow into the water supply.
8. Water should be carefully added to the pesticide mix by pouring down the side of the tank.
9. Do not submerge the end of the water supply hose into the pesticide mix as it could back siphon.
10. Work in pairs.
11. Wash gloves before removing them.

Courtesy of Ward Management Company



Appropriate personal protective equipment (PPE) should be worn before opening a pesticide container

Appropriate personal protective equipment (PPE) should be worn before opening a pesticide container. The label should be checked for Agricultural Use Restrictions. PPE should include front protection such as a bib top apron made of butyl, nitrile, or foil laminate material. A face shield, shielded safety glasses or goggles should be worn. When pouring any pesticide from its container, container and pesticide should be kept below face level. A respirator will ensure protection against dusts or vapors. The container should be closed after each use. A tank should never be left unattended while it is being filled. If the pesticide user should splash or spill pesticides on his person, he should stop the operation, wash thoroughly with a mild liquid detergent and water, put on clean PPE and clean up the spill.

Containment needs depend on the quantities of pesticides that are being mixed and loaded. If mixing small quantities, a tarpaulin can be sufficient to contain any spills. Spills can be then cleaned up with an absorbent material. If mixing large quantities regularly, the construction of a mixing/loading pad is an option to consider. The important point to keep in mind, whichever approach is used, is that incidental spills or accidental spills can be contained and cleaned up. If no spill containment is available, pesticides should be mixed in the field away from sensitive resources and in a different area each year.

Containment needs can be achieved in one of three ways:

- 1) Mobile Containment Systems
- 2) Closed Mixing Systems
- 3) Construction of a Mixing/Loading pad

1.0 Mobile Containment Systems

If mixing pesticides in granular formulations, loading over a tarpaulin that can contain any spillage of materials is adequate.

A recommended strategy is to use a mobile containment system. Mobile containment systems, such as a basin or pad of a chemically compatible construction material that contains spills are economical, flexible and efficient approaches to mixing and loading.

Several types of portable, temporary, synthetic drive-over mixing/loading pads are available commercially. Generally the pads are vinyl or nylon reinforced elastomer pads or steel pads and vary in size from 4 X 8 feet to 34 X 74 feet. Most have a flexible wall designed to be self-supporting. The material can be decontaminated. The pads are lightweight, easily deployed, durable and reusable.





The pad is rolled over a rock-free level surface. The sprayer is driven over the berm onto the pad. The spray material is loaded and the sprayer is driven off. Spillages are collected with a sump pump, squeegee, or sponge and mop. The spilled material can be collected and returned to the tank.

A sound option would be to haul water to the field or site and do all pesticide mixing onsite on a mobile pad. Sprayers and equipment could also be rinsed in the field to avoid concentrating residues from repeated rinsing near wells. The mixing site should change each year within the field of application.

Absorbent material such as re-usable gelling agents, vermiculite, clay, pet litter or activated charcoal should be on hand along with a garbage can and shovel to quickly contain and clean up any spills. The spilled pesticide should be contained - it should not be hosed down. Absorbing materials should be used to soak up the pesticide which can then be shoveled into a leak proof drum.

Areas used for storage or mixing of pesticides should be constructed in accordance with Board of Fire Prevention Regulations (527 CMR 37.00) , the State Building Code (780 CMR) and the BOCA Mechanical Codes (527 CMR 12.00 Appendix A)

2.0 Closed Mixing Systems

An excellent option is the use of a closed mixing system (CMS). A CMS transfers pesticides from sealed containers to mixing tanks without exposing the worker to the pesticides. The CMS can accurately measure quantities, rinse containers and transfer the mixed pesticide into applicator tanks. Using a CMS greatly reduces the hazards of exposure to concentrated pesticides.

3.0 Construction of a Mixing/ Loading Pad

It is important to consult with an engineer or licensed contractor familiar with the state building code requirements before implementing any plan. Before construction begins, consult with local agencies that deal with planning, zoning, wetlands, health and fire.

If pesticides are often mixed and loaded in the same place, or equipment is cleaned in the one spot, a permanent pesticide mixing/ loading pad is a sound option. Spill clean ups can be made easier, and pesticide waste can be reduced. They can also prevent the harm that spills and runoff can cause to the environment or to people. The area should be located at least four hundred feet (preferably down hill) from any public or private drinking water supplies and two hundred feet (preferably down hill) from surface water. It should not be located within any residential area or other sensitive area (such as feedlots, animal shelters, play areas, schools).



Design

The design of the pad should be a function of the operations performed at the site - the number and volume of different pesticides stored and applied, the rinsing procedures, the size of the spray boom- and also the weather conditions, especially the levels of precipitation and freezing conditions. The pad should be located adjacent to the storage area.

It is recommended that the pad be constructed of an impervious material such as sealed concrete. The pad should remain intact under freezing conditions. The following concrete specifications should be followed to ensure a water tight pad and good surface durability:

- Type I or Type II high quality cement with 5 - 7.5% air entrainment (this improves water tightness) and compressive strength of 4,000 - 4,500 psi;
- Water- cement ratio of 0.40-0.45 for a stiff (1.5" - 3") slump; a relatively dry mix for maximum strength, pesticide and fertilizer resistance, freeze/thaw resistance and water tightness;
- The subgrade (original ground) upon which the pad will be placed must be dense, uniform and relatively free draining to provide a good foundation for the concrete pad. If the subgrade is not adequate a sub-base material should be installed consisting of 4 inches of well compacted clean sand, gravel or sand and gravel mixture;
- The subgrade or sub-base should be moistened immediately prior to concrete placement to minimize shrinkage and cracking potential;
- Large coarse aggregate (1 to 1.5 inches) which permits a lower water content and reduces the potential for cracking should be used;
- Reinforcing steel should be placed two inches from the top of the pad. Reinforcing bars (supported #4 bars at 15 to 18 inch spacing) are superior to wire mesh for proper location of the steel in the slab and to allow workers to step between the bars. Reinforcing steel will keep shrinkage cracks closed if properly located;
- A high level of workmanship should be ensured during concrete placement and curing of the pad.

While concrete is durable, it will deteriorate over time. Pesticides can contaminate concrete and leak through cracks into groundwater. Protective coatings for concrete seal the surface and help prevent the corrosive actions of pesticides and fertilizers on concrete

While concrete is durable, it will deteriorate over time. Pesticides can contaminate concrete and leak through cracks into groundwater. Protective coatings for concrete seal the surface and help prevent the corrosive actions of pesticides and fertilizers on concrete. Among the coatings commercially available are epoxies, urethanes, polyesters, vinyls, chlorosulfonated polyethylene, and polyureas. The appropriate type of coating will depend on the types of pesticides being used and should be determined in consultation with a distributor.



Containment Volume

The total mixing / loading area containment volume should be 1.25 times the volume of the largest tank to be loaded in the area. If the area is not protected from contact with precipitation, the containment volume should be equal to the volume generated by a 2 year 24 hour storm (2.9 - 3.6 inches of rainfall). If the rainwater mixes with a single known pesticide or compatible pesticides (i.e., pesticides with at least one common use site on their labels) the mixture can be applied to the field at or below the label rate.

The pad should be curbed to a sufficient height in order to contain spills, leaks, releases or other discharges that are generated during the mixing and loading of pesticides and to prevent water or other liquids from flowing onto and off of the surface.

To avoid rainwater mixing with pesticides, it is recommended that the area be roofed. Roof overhangs should be at least a thirty degree angle from vertical from the edge of the mixing/loading pad in all directions. As an alternative to roof overhangs, heavy plastic strips or plastic sheeting can be installed to prevent rain from entering the pad.

A well secured heavy tarpaulin can serve as a low cost alternative to a roof. Pads should be constructed with fastening points such as eye hooks to allow quick and secure anchoring of the tarp. It is recommended that a device to elevate the center of the tarp is placed under the tarp to allow rain water to drain off. A greenhouse frame covered with a three year co-polymer film can also be a low cost alternative to a roof. Greenhouse frames are available in widths of up to forty feet. Clean surface and roof water should be diverted away from the pad by a waterway.

Containment needs may be further met by constructing the pad in such a way that it slopes (at least 2%) to a single liquid tight sump.

Sump Designs

The pad should slope to a water tight sump or catch basin. The purpose of a sump is to collect the spilled material and facilitate its reuse. Collected rinsates should be pumped to an above ground holding tank or reservoir and reused for mixing subsequent loads. The sump pump should be capable of transferring the liquid to the holding tank from the sump at a rate equivalent to the fastest sump filling rate. The tanks should not be filled beyond 95% of their capacity to allow for thermal expansion and must be placed on a concrete or other impervious surfaced floor on pallets or on a raised platform to allow the detection of leaks from, or water in or under, the pesticide container.

To avoid rainwater mixing with pesticides, it is recommended that the area be roofed. Roof overhangs should be at least a thirty degree angle from vertical, from the edge of the mixing/loading pad in all directions



The sump should be kept clean to avoid the creation of sludge due to dirt, mud, trash and rocks. Sludge is considered to be hazardous waste if contaminated by unknown or incompatible pesticides

A single sump can be placed monolithically with the mixing/loading pad or a precast concrete or prefabricated steel sump could be installed before the concrete pad is placed. Precast concrete sumps are built in a range of sizes with capacities up to 100 gallons. A double lined stainless steel sump allows the monitoring by inspection of potential leaks from the sump. Most have a capacity of thirty gallons.

The sump should be kept clean to avoid the creation of sludge due to dirt, mud, trash and rocks. Sludge is considered to be a hazardous waste if contaminated by unknown or incompatible pesticides. If the sludge is contaminated by only one pesticide or a compatible mix, the material can be applied to the land at or below the label rate. To reduce sludge problems in sumps where applicator vehicles are washed, some facilities may require two sumps in series. Sumps should be kept clean as contaminated soil and debris in sumps creates a serious hazardous waste disposal problem. In addition, the sump should be covered with a structural grate to ensure safety. The grate should be covered with a dust cover. The sump should be kept covered and cleaned out especially during spraying season.

Washing and Rinsing Operations

Washing and rinsing of pesticide residues from application equipment, mixing equipment or other items used in storing, handling or transporting pesticides should occur on the pad.

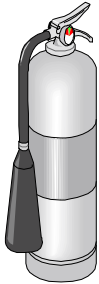
Protection of Water Supplies

No pesticide application equipment or mix tank should be filled directly from any source waters unless a back siphon prevention device is present.

Non-Liquid Pesticides

If non-liquid pesticides are mixed or loaded the spill containment surface may consist of a tarpaulin made of non-absorbent materials which is of adequate thickness to withstand all foreseeable loading conditions.

Recommended Safety Practices



Pesticide Handling Instructions

Materials Safety Data Sheets for each pesticide should be posted in a prominent location. At a minimum the employer should have posted the product label and physical and health hazards associated with the pesticides being used. Agricultural enterprises are required by law to post the labels of the pesticides in use. The measures employees can take to protect themselves from these hazards, including safety precautions and protective work procedures, should be posted.

Emergency Response Plan

An emergency response plan should be developed. Such a plan lists actions to take and personnel to contact in the event of a spill or accident. The plan should begin with a current listing of the pesticides used or stored at the facility and should include the following information:

- Names and quantities of pesticides;
- Location of the property including a map with directions;
- Names, addresses and telephone numbers of the owner and key employees;
- Plan of the facility showing pesticides locations, flammable materials, electrical service, water supply, fuel storage tanks, fire hydrants, storm drains, and nearby wetlands, ponds, or streams;
- Location of emergency equipment supplies including breathing equipment and protective equipment;

Copies of the emergency response plan should be located near the entrance to the pesticide facility and with business records. Copies should also be given to the local police department and fire department.

Contacts should include the following: fire department; police; spill clean up firm; nearest hospital; pesticide bureau; board of health; owner of the facility;

The plan should be available in both English and the language or languages understood by workers if this is not English.

Fire Prevention

An automatic smoke detection system or smoke and heat detection system should be installed. The appropriate fire prevention and emergency procedures should be devised in consultation with the local fire department. Suitable methods for extinguishing fires should be installed, such as the

Copies of the emergency response plan should be located near the entrance to the pesticide facility and with business records





It is essential that protective eyewear be worn when mixing/loading. The protective eyewear should consist of safety glasses that provide front, brow and temple protection, goggles or a face shield

appropriate type and number of fire extinguishers. The number and placement of fire extinguishers should conform with the National Fire Protection Association Standard No. 10. All electrical fixtures and appliances should be non-sparking units approved for use in facilities storing flammable and combustible liquids.

In the event of a fire it is frequently more environmentally sound to allow the fire to burn itself out if it can be contained within the area. This avoids the likelihood of pesticides being released into the ground as a result of water being added.

Personal Safety

Personal protection equipment such as respirators, chemical resistant (CR) gloves, CR footwear, coveralls with long sleeves, protective eyewear, CR headgear, CR aprons and a first-aid kit should be available immediately outside the storage area. The first-aid kit should include the following items: adhesive strips, tape, ammonia inhalant, eye pads, burn cream, gauze bandages and tweezers. Gloves should be made of rubber, neoprene or other chemical resistant material.

It is essential that protective eyewear be worn during mixing/loading. The protective eyewear should consist of safety glasses that provide front, brow and temple protection, goggles or a face shield.

Workers should be instructed in the correct procedure for the removal of contaminated clothing.

Eye wash stations or portable eye wash bottles should be easily accessed by each person engaged in the operation and should be capable of flushing eyes for a minimum of fifteen minutes. At a minimum, a hose and nozzle should be on hand. Routine wash up facilities, equipped with soap, hand cleanser and single use paper towels should be available near the storage area.

Record Keeping

All discharges to the environment or spills should be recorded. The records should include the date and time of the incident and the cleanup.

Accident Response

An absorbent material such as re-usable gelling agents, vermiculite, clay, pet litter or activated charcoal should be on hand along with a garbage can and shovel to quickly contain and clean up any spills.



Security

The storage cabinets should be kept locked and the door to the storage area should contain a weather proof sign warning of the existence and danger of pesticides inside. The door should be kept locked. The sign should be visible at a distance of twenty five feet and should read as follows:

**DANGER
PESTICIDE STORAGE
AREA
ALL UNAUTHORIZED
PERSONS KEEP OUT
KEEP DOORS LOCKED
WHEN NOT IN USE**

The storage cabinets should be kept locked and the door to the storage area should contain a weather proof sign warning of the existence and danger of pesticides inside

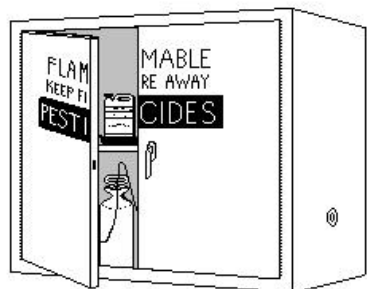
The sign should be posted in both English and the language or languages understood by workers if this is not English.

The following checklist should assist you in quickly assessing your facility

Pesticide Safety Checklist	Yes	No
GENERAL RECOMMENDATIONS		
Clean, neat pesticide storage site		
MSDS posted for each pesticide		
SAFETY		
Smoke detectors / detection system		
Appropriate numbers of fire extinguishers		
Personal Protection Equipment available outside storage area		
First Aid Kit		
Eye wash stations or portable eye wash bottles		
Wash up facilities		
ACCIDENT RESPONSE		
Emergency Response Plan with on-site pesticide inventory		
Posted emergency phone number		
Absorbent materials, shovel and bucket		
RECORD KEEPING		
Accurate storage log maintained		
All discharges to the environment recorded		
Inspection and maintenance records		
PESTICIDE CONTAINERS		
Insecticides, herbicides and fungicides separated		
Pesticides stored in original containers with purchase date and legible labels		
Pesticides stored off floor		
"No smoking" signs posted		
SECURITY		
Storage room posted with sign: Danger - Keep Out		
Storage site well lit and ventilated		
Storage Room locked		
Safety Equipment separated from pesticides		



Equipment Distributors



1) Grainger Industrial Supplies Inc.
54 New Market Square
Boston, MA 02118
www.grainger.com

888-WWG-4MASS

2) Safety Strategy
Manchester
MA, 01944

978-526-7715

3) Albeco Fasterner & Supply Corp
44 Border St.
West Newton, MA 02465

617-965-8840

4) Environmental Equipment Systems
Division of Turf, Products Corp
157 Moody Rd.
Enfield, CT 06083

800-243-4355

5) Haz Mat Containment Corp. Inc
712 Bancroft Rd., No. 216
Walnut Creek, CA 94598

510-943-5250

6) Safety Storage, Inc.
2301 Bert Dr.
Hollister, CA 95023
www.safetystorage.com

408-637-7405

7) Global Occupational Safety
22 Harbor Park Dr.
Port Washington, NY 11050

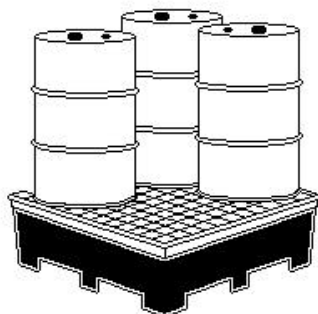
800-433-4848

8) Eagle Manufacturing Company
2400 Charles St.
Wellsburg, WV 26070

304-737-3171

9) Hunter Agri-Sales
Box 2
Coatesville, IN 46121

317-539-4400





Acknowledgements

A great deal of the information in this document is drawn from the following document which is the definitive guide to pesticide storage, mixing and loading and is highly recommended.

Kammel, David W., Noyes, Ronald T., Riskowski, Gerald L., Hofman, Vernon L., 1991
Designing Facilities for Pesticides and Fertilizer Containment, First Edition, MWPS-37
MidWest Plan Service, Iowa State University, Ames, Iowa

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United States Environmental Protection Agency
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The following publications were also used as reference guides

1) Ross, David S., Bartok, John W. 1995. On-Farm Agrichemical Handling Facilities
NRAES, CES, Ithaca

2) Conference Proceedings, National Symposium on Pesticides and Fertilizer Containment
Design and Management. MWPS-C1. 1992.
MidWest Plan Service, Iowa State University, Ames, Iowa

3) Dean, Thomas W., Ray A. Bucklin. 1995.
Permanently - Sited Storage Facilities in Florida
Florida Cooperative Extension Service

4) Storrs, CT. 1990
Pesticide Storage
Connecticut Extension System

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