

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

AGRICHEMICAL HANDLING FACILITY

(No.)
Code 309



DEFINITION

A facility with an impervious surface to provide an environmentally safe area for the handling of on-farm agrichemicals.

PURPOSE

To provide a safe environment on farm and ranch operations for the storage, mixing, loading and cleanup of agrichemicals, retain incidental spillage, retain leakage, and to reduce pollution to surface water, groundwater, air, and/or soil.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where:

- The handling of agrichemicals creates significant potential for pollution of surface water, groundwater, air or soil and a facility is needed to properly manage and handle the chemical operation;
- An adequate water supply is available for filling application equipment tanks, rinsing application equipment and chemical containers as needed for the operation;
- Soils and topography are suitable for construction.

This standard does not apply to the handling or storage of fuels. This standard does not apply to commercial or multi-landowner agrichemical handling operations.

CRITERIA

General Criteria Applies to All Purposes

Plan, design and construct agrichemical handling facilities to meet all Federal, state and local laws and regulations.

Impact to cultural resources, wetlands and Federal and state protected species shall be evaluated and avoided or minimized to the extent practicable during planning, design and implementation of this conservation practice in accordance with established National and Florida policy, General Manual (GM) Title 420-Part 401; Title 450-Part 401, Title 190-Parts 410.22 and 410.26, National Planning Procedures Handbook (NPPH) Florida Supplements to Parts 600.1 and 600.6, National Cultural Resources Procedures Handbook (NCRPH), National Food Security Act Manual (NFSAM), and the National Environmental Compliance Handbook (NECH).

The size of the agrichemical storage will be based on the agrichemical use of the farm needed for a single growing season averaged over the last 5 years.

The pad, hoses, pipes, valves, seals, connectors, filters, tanks, and related plumbing material must be compatible with the chemicals being handled and capable of withstanding the intended use for the anticipated life of the structure.

Outlet drains are not permitted in the agrichemical collection, storage or handling areas.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

Posts, pipes, hoses, discharge valves, or other devices may not pass through the floor, containment storage walls, or the sump.

When more than 60 gallons of Class I, II, or III flammable or combustible liquids or a single storage container larger than 5 gallons of Class I, II, or III flammable or combustible liquids are stored in an agrichemical handling facility, National Fire Protection Association (NFPA) 30, Flammable and Combustible Liquids Code, Chapter 4, shall be followed. Storage cabinets or other remedies must be installed.

When the agrichemical handling facility is also used for agrichemical storage, provide sufficient space and designate a separate room or area.

Permanent Facilities

Location. Locate the agrichemical handling facility as follows:

- Adjacent to or as near the chemical storage building as practical when chemical storage is not incorporated into the facility;
- As far as practical from streams, ponds, lakes, wetlands, sinkholes or subsurface anomalies, and water wells, with a minimum setback distance of 100 feet;
- Isolated and located downwind from residences and other buildings used to store feed, seed, petroleum products, or livestock with a minimum distance as required by local regulations;
- At sites that have not been used as stationary mixing/loading sites in the past.

Locate the bottom of the facility a minimum of two (2.0) feet above the seasonal high water table.

Locate the facility above the 100-year floodplain elevation. However, if site restrictions require location within a floodplain, protect from inundation and damage from the 25-year flood event, or larger if required by laws, rules, and regulations.

Storage Capacity. Provide a minimum storage volume on the chemical-handling pad of 250 gallons or 1.25 times the volume of the largest storage or spray tank on the pad, whichever is greater.

Prevent outside runoff water from entering the facility.

Rinsate Tanks. Provide rinsate tanks of adequate number and size as needed for the type of operation, allowing for separation of non-compatible chemicals. The tanks shall be clearly labeled to identify its contents and target crops. Tanks shall be fiberglass, polyethylene, or other material resistant to the chemicals being used and have the capacity to meet the requirements of the operation plan. The rinsate tanks shall be located on the chemical mixing pad and near the sump.

Manufactured Components. Manufactured tanks and components shall be structurally sound, capable of withstanding all anticipated loads, and constructed of suitable materials for their intended use. Tanks will be sized based on a single farm owner or operator agrichemical need.

Chemical Handling Pad. Size the pad to accommodate the largest spraying equipment. Equipment access is allowed from more than one direction. Provide adequate space for maneuvering around equipment, a minimum of two (2.0) feet for open facilities and four (4.0) feet for enclosed facilities. When practical base the minimum width of the mixing pad on the width of the spray equipment with the booms retracted.

Slope the pad a minimum of 2% (1/4 inch per foot) toward the sump to allow for collection of drainage water and pesticide spills.

The chemical handling pad shall have a curb of sufficient height to prevent outside runoff water from entering and for providing storage of chemical spills.

Flexible Membrane Liners. All flexible membranes shall be certified by the manufacturer to be suitable for the intended use.

Design of the flexible membrane shall be in accordance with manufacturer recommendations. All flexible membrane installations shall meet the material and installation requirements of the plans and specifications provided for each installation and shall be certified by the installer. The type and thickness of liners are shown in Table 1.

The liner shall be installed with a minimum of 3 inches of granular material between the liner and the concrete to provide adequate drainage during construction.

Table 1. – Type of Liner and Minimum Thickness

Type	Minimum Thickness
HDPE	40 mil
LLDPE	40 mil
PVC	30 mil
RPR	45 mil
EPDM	45 mil

Concrete Surfaces. A watertight concrete design shall be used to avoid leakage from the sump and chemical handling pad. A granular subbase shall be a minimum of 6 inches in thickness and compacted to at least 95 percent Standard Proctor (ASTM D 698) before placement of the concrete.

The concrete slab shall be protected by a surface applied impervious epoxy coating that is resistant to deterioration from the chemicals used at the facility. The coating material selected shall remain flexible after curing, aging, cold weather, and exposure to the pesticides, loads and traffic. The dry coating thickness of the epoxy coating and method of application shall be as recommended by the manufacturer.

Agrichemical Collection. The sump may be constructed of concrete or stainless steel and shall be water tight. The sump size shall be as small as practical but of sufficient size that it will easily accommodate the pump and provide easy access for the removal of accumulated sediment. The maximum size of the sump should be limited to a capacity of 50 gallons and covered with a corrosion resistant grate for safety. The grate shall be designed to support the anticipated loads.

The sump should be designed with a conical or sloped bottom to facilitate emptying.

Sump Pump. The pump may be permanent or where appropriate a portable pump may be used to empty the sump. The pump shall be resistant to the chemicals used and while operating should create a minimum of

turbulence within the sump. A filter shall be installed between the pump and sprayer or rinsate tanks. The pump shall be operated by a manual switch.

Roofed building. The agrichemical handling facility shall be roofed to prevent rainfall from entering the system. Roof supports shall not penetrate into or through the concrete pad area. Ceiling clearance height (the distance from the containment pad to the ceiling joist) should not be greater than what is absolutely necessary for equipment clearance plus the fill pipe's air gap distances.

On open buildings, to prevent rain from blowing in on the chemical mixing pad, the roof shall extend a minimum of 30 degrees (45 degrees recommended) from vertical from the edge of the concrete pad in all directions or two (2.0) feet, whichever is greater. Side walls may be constructed on one or more sides to reduce the distance the roof must extend.

Fully enclosed buildings shall be adequately ventilated by natural or mechanical means at all times. Occupied areas shall be vented in accordance with recommendations contained in National Fire Protection Association (NFPA) 30.

Entrance. The entrance to the chemical mixing pad shall be graveled, paved, or otherwise treated to provide a suitable entrance for the equipment and to prevent erosion and the tracking of sediment onto the chemical mixing pad. Minimum width of entrance shall be 4 feet wider than the widest piece of equipment used at the facility. The length of the entrance shall be a minimum of 1.5 times the largest wheel circumference of the equipment used at the facility.

Structural Design. For the structural design, address all items that will influence the performance of the structure, including loading assumptions, storage tanks, material properties, and construction quality. Indicate design assumptions and construction requirements on the plans.

Use minimum wind loads as specified in ASCE 7, Minimum Design Loads for Buildings and Other Structures when designing the roof.

Locate footings below the anticipated frost depth unless measures are designed to accommodate frost/freeze conditions.

Fabricated structures shall be designed according to the criteria in the following references as appropriate:

1. Timber - National Design Specifications for Wood Construction, American Forest and Paper Association;
2. Steel - Manual of Steel Construction, AISC, American Institute of Steel Construction;
3. Concrete - Building Code Requirements for Reinforced Concrete, ACI 318, American Concrete Institute;
4. Masonry - Building Code Requirements for Masonry Structures, ACI 530, American Concrete Institute;
5. Slabs - Base the required area of reinforcing steel on the subgrade drag theory in accordance with American Concrete Institute, ACI 360, Design of Slabs-on-Grade. When heavy loads are to be resisted and/or where a non-uniform foundation cannot be avoided, use an appropriate design such as ASAE EP514 "Design of Concrete Structures for Secondary Containment of Liquid Pesticides and Fertilizers", and procedure incorporating a subgrade resistance parameter(s) such as ACI 360.

The minimum concrete thickness of slabs and sump shall be 6 inches and 8 inches respectively. The minimum reinforcement for slabs shall be equal to that of # 4 bars, 12 inches on centers. Final pad and sump thickness and reinforcement shall be designed based on the wheel loads of existing or anticipated equipment when loaded, the loads anticipated by storage tanks and other equipment, or temperature and shrinkage reinforcement whichever is greater. As a minimum, the concrete design shall meet the following requirements:

- a. A minimum design 28-day compressive strength of 4000 psi and a maximum water/cement ratio of 0.40 to 0.45.
- b. Portland cement Type I or II.
- c. Admixture for concrete meeting the requirements of ASTM C 1240 (micro silica), ASTM C 618 (fly ash) or ASTM C 989 (ground blast furnace slag).
- d. Slump of the concrete shall be 3 ± 1 inches. Super plasticizer admixture may

be used during placement to increase slump to facilitate placement.

- e. Minimum cement content of 564 pounds (6 bags) per cubic yard.
- f. A maximum size aggregate of 1 inch.
- g. Air entrainment of 5% to 7.5% by volume.
- h. Wet curing shall be for a minimum of 7 days (14 days when pozzolan is used) or the application of a liquid membrane forming curing compound (ASTM C 309).
- i. The concrete slab and sump shall be placed in one continuous placement without construction joints or openings. Where construction joints are unavoidable a PVC waterstop shall be installed.
- j. Control joints shall be used to control cracking and shall not exceed a maximum spacing of 30 feet on center in both directions. All control joints shall be filled with a flexible sealant (elastomeric sealers) to prevent leakage.
- k. Polypropylene fiber reinforcing shall be used in the concrete to reduce shrinkage cracking.

Water Supply. Provide an adequate water supply for mixing agrichemicals, rinsing tanks and containers, and for emergency health and safety needs as appropriate for the facility. Provide all pipelines, hoses and other hardware as needed. The water supply system shall be equipped with an air gap or other type of backflow prevention device as specified in Rule 62-555.360(4), Florida Administrative Code (F.A.C.) or an antisiphon device assembly as specified in Rule 5E-2.360(4), F.A.C. If a pump and well are installed, it shall be located outside of the chemical mixing pad and meet the distance requirements listed under "**Location**".

Plumbing. All parts of the plumbing system shall be corrosion resistant. No appurtenances, discharge outlets, drains or other piping shall be installed through the concrete pad, curb, or sump. All plumbing shall be designed to allow for easy drainage to prevent freezing.

Electrical components. Electrical systems (lights, switches, receptacles, circuit breakers, fans, pumps, etc.) shall meet the requirements of the National Electrical Code (NEC) for the hazard classification of the area in which they are installed.

Safety. Design shall include appropriate safety features to minimize the hazards of the facility. Provide warning signs, emergency eyewash station and other devices as appropriate, to ensure the safety of humans.

Highly visible waterproof warning signs, such as "CAUTION, CHEMICAL STORAGE AREA", or similar signs shall be posted at all entrances to the facility. "NO SMOKING" signs shall be placed both outside and inside the facility. Signs should be bilingual. Signs (size, location, color, etc.) shall meet the requirements of Occupational Safety and Health Administration (OSHA) 29 CFR 1910.144 and 29 CFR 1910.144; American National Standards Institute (ANSI) Z35.1-1979, Z35.4-1973, Z525.1-1991, and Z535.2-1991; and any applicable Federal, state, or local laws and regulations.

The emergency wash station shall include an emergency overhead shower/eyewash and wash basin for washing when the applicator's skin is exposed to chemicals. The emergency washing station shall be conveniently located on the pad and easily accessible to the applicator. The plumbing connections for these devices should enter the clean water line between the main line reduced pressure zone (RPZ) valve and any other one-way check valves installed for backflow prevention.

Provide adequate ventilation at all times for enclosed buildings using natural or mechanical means.

Where chemicals are stored on-site, the storage facility shall be secured to provide reasonable protection against vandalism or unauthorized access. The chemical storage area shall include appropriate safety devices including ventilation, lighting, fire extinguisher (ABC use rating, dry chemical, minimum 20 pound capacity), and smoke detector with audible alarm.

Normal winterization procedures to prevent damage to the facility and to chemical containers shall be performed when weather conditions dictate.

On-site chemical storage. Storage of chemicals on the agrichemical handling facility pad can provide additional protection of surface and ground water. The pesticide storage area shall only be used for storage of chemicals used in the landowner's spraying operation. The storage facility shall be located so that it will be accessible to the emergency washing area.

Vegetation. Stabilize disturbed areas, as necessary, to prevent erosion, in accordance with the Florida NRCS conservation practice standard Critical Area Planting, Code 342.

Portable Facilities

The portable agrichemical handling facility is a manufactured portable device that can be easily moved from field to field and will meet the needs of the user.

Pad. The pad shall be constructed of durable material that is chemically resistant for the intended agrichemicals. The minimum containment capacity of the pad is 1.25 times the volume of the largest individual agrichemical container or tank that will be located on the pad. Include a sump or other provisions for easy recovery of spilled liquid.

Rinsing Devices. Design rinse devices so that residual contents of agrichemical containers can be adequately rinsed directly from the container to the spray tank. Design the rinse system to operate from the nurse tank discharge pump or a separate pump that provides adequate pressure. Verify with the manufacturer of the facility that any pump to be used in pressure rinsing is compatible with the rinse device.

CONSIDERATIONS

For permanent facilities, the agrichemical handling facility may cause an increase in water use at the site from the mixing of agrichemicals and rinsing of agrichemical sprayers, containers and agrichemical-handling pad.

Consider providing a mixing platform for filling agrichemical sprayers.

For portable handling facilities consider using a top/bottom-loading valve with built-in check valve in the hose from the nurse tank to the spray tank. This will enable the operator to remain on the ground while filling the sprayer.

Consider locating the agrichemical handling facility a minimum of 200 feet from residences or other occupied buildings.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for constructing agrichemical handling facilities in accordance with the criteria contained in this standard, to achieve its intended use. They shall be site specific and shall describe the requirements for applying this practice to achieve its intended purpose.

As a minimum, plans and specifications shall include:

For Permanent Facilities:

- Planned location and plan view of the facility.
- Location of nearby wetlands, surface waters, wells, sinkholes, and/or surface anomalies and the necessary 100 foot separation buffer.
- Cross sections of the facility including roof and wall details.
- Truss connection and cross bracing details.
- Knee, girder and purlin brace detail.
- Post embedment detail, when pole building is used.
- Electrical components (e.g. switches, lights, outlets, etc.).
- Pump type, size and location.
- Safety signs.
- Sump, liner, and concrete floor sealant details.
- Concrete floor, footer, and curb details with steel reinforcement.
- Emergency eyewash/shower details and location.
- Water supply schematic with antisiphon device type and location.
- Location and size of backflow prevention device.

The landowner is responsible for assuring that the facility is constructed in accordance with local building and electrical codes and for

obtaining inspections for compliance with such codes.

For Portable Facilities:

Portable agrichemical handling facilities are manufactured items. Review plans and specifications submitted by the manufacturer to ensure that the proposed facility meets the requirements of this standard.

OPERATION AND MAINTENANCE

An operation and maintenance (O&M) plan shall be developed that is consistent with the purpose of the practice, the intended design life, safety requirements, design criteria, and all local, state, and federal laws and regulations.

The O&M Plan is to address the following:

For Permanent Facilities:

- Brief description of the facility. Define parameters used to size and design the facility such as storage tank and equipment sizes.
- The facility shall not be used for purposes other than the storing, mixing, loading, cleaning, and maintenance of materials and equipment used for agrichemical application.
- An inventory of agrichemicals to be stored or handled at the facility. Material Safety Data Sheets may be included in the plan.
- The proposed method of handling and disposing of rinsate, washwater, and spills.
- A process for handling accumulated rainfall.
- A process for handling accumulated sediment.
- A strategy for cleaning surfaces between different agrichemical mixing operations.
- An inspection plan of structural components such as the condition of concrete, curbing, sump, access roads, building structure, etc. Note the timing of inspections, conditions that would cause concern, and required actions as appropriate. The inspection should include, but not limited to:
 - Cracks in the concrete pad and sump
 - protective coating on the surfaces of the concrete pad, sump, and sidewalls

- operation of back flow prevention devices
- hoses, pipes, valves, connectors, filters, tanks, and related plumbing material
- sump and sump pump
- safety equipment
- electrical systems and controls
- roof and structural integrity of facility
- access roads and ramps
- drainage around building
- labeling of rinsate storage tanks that will ensure proper methods for applying rinsate back to the land
- chemical inventory
- Any weekly, monthly, or annual maintenance that may be necessary for the proper functioning of the system components including, but not limited to, concrete surfaces, sumps, pumps, hoses, pipelines, building materials, electrical equipment, and other materials and equipment.
- A schedule of any required written inspection and maintenance reports.
- Proper winterization of the facility.
- Required safety signage.
- An Emergency Response Plan with safety procedures in the event of an accidental spill, exposure, fire, or other hazardous incident. Provide a list of safety equipment, contact names, and phone numbers.

For Portable Facilities:

- Prior to first use and at beginning of each season, check the unit for proper operation using only clean water. For wintering storage, drain all water from the unit to avoid freeze damage.
- Repair any breaks, leaks, or damaged components immediately.

REFERENCES

- American Concrete Institute (ACI) Codes 318, 360, and 530
American Forest and Paper Association, National Design Specifications for Wood Construction
American Institute of Steel Construction (AISC) Manual of Steel Construction
American National Standards Institute (ANSI) Z35.1-1979, Z35.4-1973, Z525.1-1991, and Z535.2-1991
American Society of Agricultural Engineers, ASAE EP514, Design of Concrete Structures for Secondary Containment of Liquid Pesticides and Fertilizers
American Society of Civil Engineers, ASCE 7, Minimum Design Loads for Buildings and Other Structures
ASTM A 615, Grade 60
ASTM C 309
ASTM C 618
ASTM C 989
ASTM C 1240
ASTM D 698
Florida NRCS conservation practice standard, Critical Area Planting, Code 342
General Manual
Title 420-Part 401
Title 450-Part 401
Title 190-Parts 410.22 and 410.26
National Cultural Resources Handbook
National Environmental Compliance Handbook
National Fire Protection Association (NFPA) 30, Flammable and Combustible Liquids Code, Chapter 4
National Food Security Act Manual
National Planning Procedures Handbook
Florida Supplements to Parts 600.1 and 600.6
OSHA 29 CFR 1910.144 and 29 CFR 1910.144 Rule 5E-2.360(4), F.A.C.
Rule 62-555.360(4), F.A.C.