

**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 an environmentally-safe facility to:

- Store, mix, load, and clean-up agrichemicals;
- Retain incidental spillage or leakage; and
- Reduce pollution to surface water, ground water, 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 and/or soil, and a facility is needed to properly manage and handle the chemical;
- 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, rules, 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).



Base the size of the agrichemical storage on the maximum agrichemical use on the farm for a single growing season averaged over the last 5 years.

Ensure the materials in the pad, hoses, pipes, valves, seals, connectors, filters, tanks, and all related plumbing are compatible with the agrichemicals being handled and capable of withstanding the intended use. All plumbing shall be designed to allow for easy drainage to prevent freezing.

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

Do not design posts, pipes, hoses, discharge valves, or other devices to pass through the floor, containment storage walls, or the sump within the designed containment area.

Where the agrichemical handling facility is separate from the mixing/loading area and a hose is used to load the application equipment, provide containment on the mixing/loading area equal to that in the handling facility.

When a combined volume of 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, follow 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 for storage.

### **Criteria for Permanent Facilities**

**Location.** Locate the agrichemical handling facility as follows:

- Adjacent to or as near as practical to the existing agrichemical storage building;
- As far as practical from streams, ponds, lakes, wetlands, sinkholes, 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 pesticide storage and/or mixing/loading sites that may have been contaminated in the past.

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

Artificially lowering the water table would be acceptable under the following conditions:

- The artificial drainage system is at least 20 feet from any portion of the agrichemical handling facility including mix/load and transfer pads.
- The drawdown is analyzed using the ellipse equation or equivalent to illustrate the modified seasonal high water table.
- The artificial drainage system discharges to an observable sump with a shut off valve on the outlet pipe that may be closed in the event of an agrichemical spill in or around the agrichemical handling facility
- The design is approved by the Florida NRCS State Conservation Engineer or registered professional engineer.

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.

**Agrichemical 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% (¼ inch per foot) to allow for drainage to a water-tight collection area or sump.

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

Provide a means of storing the accumulated rainfall or spilled agrichemical or field apply the collected volume according to the agrichemical label within 72-hours following the rain or spill event.

Prevent outside runoff water from entering the facility for storms up to the 25-year, 24-hour event with a curb of sufficient height or other acceptable methods.

**Roof.** 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 within the designed containment 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.

**Agrichemical Collection.** Provide a collection sump with adequate dimensions for sediment removal and pump operation. 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. Use a manually activated pump to remove accumulated liquids.

**Equipment Wash Bay.** An equipment wash bay may be included as part of the agrichemical handling facility. If included, separate the wash bay from any dry agrichemical storage area. A sump common to the mixing/handling area and the wash bay could be utilized.

**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.

**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. Base the tank sizes on agrichemical needs the farm owner or operator.

**Liquid Tight.** Design the agrichemical handling pad and other areas needing to be liquid tight with either a flexible membrane liner or according to the structural design section for liquid tight concrete.

**Flexible Membrane Liners.** All flexible membrane installations will meet the material and installation requirements of the plans and specifications provided for each installation.

Flexible membrane liners will be installed under the supervision of a qualified representative of the manufacturer and all field constructed seams shall be tested and repaired in accordance with the manufacturer's recommendations. The type and thickness of liners are shown in Table 1.

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 Exposed to Agrichemicals.** Concrete exposed to agrichemicals will meet the requirements of NEH Part 642 Construction Specification 31 – Concrete for Major Structures. Use Class 5000 concrete with a water to cementitious materials ratio (w/cm) less than or equal to 0.40.

Use Type II or V Portland cement meeting the requirements of ASTM C150. Use concrete containing a supplementary cementitious material such as fly ash or natural pozzolan meeting the requirements of ASTM C618, silica fume meeting the requirements of ASTM C1240, ground blast furnace slag meeting the requirements of ASTM C989, or blended supplementary cementitious materials meeting the requirements of ASTM C1697. Use concrete that is air entrained and continuously cured for a period of seven days.

Any portion of the concrete that could potentially be subjected to continual exposure to caustic chemicals or the abrasive effects of prolonged spray, such as might occur from a leaking pressurized vessel, shall be sealed with a chemically resistant coating. Use a non-vapor barrier coating unless measures are successfully implemented to prevent vapor formation. Coatings must be resistant to the agrichemicals that will be handled at the facility and be installed in accordance with manufacturer recommendations.

**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.

When using a roof/building to cover the facility, use minimum wind loads as specified in the current edition of ASCE 7, *Minimum Design Loads for Buildings and Other Structures*.

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

Permanent structures will be designed according to the criteria in the following references as appropriate:

- Timber - *National Design Specifications for Wood Construction*, American Forest and Paper Association;
- Steel – *Manual of Steel Construction*, AISC, American Institute of Steel Construction;
- Masonry - *Building Code Requirements for Masonry Structures*, ACI 530, American Concrete Institute;
- Concrete non-liquid tight – *Building Code Requirements for Reinforced Concrete*, ACI 318, American Concrete Institute, for concrete structures; *Guide for the Design and Construction of Concrete Parking Lots*, ACI 330R, American Concrete Institute, for slabs-on-ground subject to distributed

stationary loads, light vehicular traffic, or infrequent use by heavy trucks or agricultural equipment; *Guide to Design of Slabs-on-Ground, ACI 360R*, American Concrete Institute, for slabs-on-ground subject to regular or frequent heavy truck or heavy agricultural equipment traffic.

- Concrete liquid tight – *Structural Engineering*, NRCS National Engineering Manual (NEM) Part 536, for concrete structures; *Requirements for Environmental Concrete Structures, Slabs-on-Soil, ACI 350 Appendix H*, for concrete slabs.

**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 and hoses with backflow prevention 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**".

**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. All electrical components shall be installed by a licensed contractor and/or approved by the local building inspector.

**Safety.** Include appropriate safety features to minimize the hazards of the facility. Provide warning signs, emergency eyewash station, deluge shower, spill response kits, fire extinguishers and other devices as appropriate, to ensure the safety of humans. Provide adequate ventilation at all times for enclosed buildings using natural or mechanical means.

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.

**Vegetation.** Stabilize disturbed areas, as necessary, to prevent erosion. Type of vegetation shall be in accordance with criteria in the Florida NRCS conservation practice standard (CPS) Critical Area Planting, Code 342. Vegetation used to stabilize areas adjacent to the facility must be resistant to herbicide drift and accidental runoff.

### **Criteria for Portable Facilities**

A 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.

### **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 installing rinsing devices so that residual contents of agrichemical containers can be adequately rinsed. The rinse system could 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. Dispose of clean, empty agrichemical containers in accordance with local and State requirements.

Consider providing a mixing platform for filling agrichemical sprayers.

For ventilation of enclosed buildings, consider applying the Florida NRCS CPS Air Filtration and Scrubbing, Code 371, to reduce emitted air pollutants.

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.

### **PLANS AND SPECIFICATIONS**

Plans and specifications shall describe the requirements for applying this practice. The plans and specifications, shall include, but not limited to, the following items:

1. A plan view of facility layout.
2. Pertinent elevations of the facility.
3. Location of water features.
4. Location of electrical lines, gas lines, and requirements for burial and quality of materials.
5. Structural details of all components.
6. Electrical details of all components will be as recommended by the manufacturer and will require shop drawings.
7. Plumbing details of all components.
8. Locations and details of safety features.
9. Where a roof structure is used to protect the facility, include design data and building dimensions.
10. Ingress/egress routes to the facility
11. Vegetative requirements.
12. Quantities.
13. Drainage/grading plan if needed.
14. Soil and foundation findings, interpretations, and reports.
15. Temporary erosion control measures during construction.
16. For portable facilities, review the manufacturer's plans and specifications to ensure that the information submitted by the manufacturer on the proposed facility meets the requirements of this standard.

### **OPERATION AND MAINTENANCE**

Develop an operation and maintenance (O&M) plan 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 will address, but not limited to, the following items:

- Brief description of the facility. Define parameters used to size and design the facility such as storage tank and equipment sizes.

- The facility will 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 must be available on site.
- 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.
- 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.
- Maintaining vegetation on all disturbed areas.

## REFERENCES

40 CFR Part 165, Subpart E – Standards for Pesticide Containment Structures, 165.80 through 165.97

American Concrete Institute, *ACI codes*, Detroit, MI.

American Forest and Paper Association, *National Design Specifications for Wood Construction*, Washington, DC.

American Institute of Steel Construction, *AISC, Manual of Steel Construction*, Chicago, IL.

American National Standards Institute (ANSI) Z35.1-1979, Z35.4-1973, Z525.1-1991, and Z535.2-1991.

American Society of Civil Engineers, *ASCE 7, Minimum Design Loads for Buildings and Other Structures*, Reston, VA.

American Society of Testing and Materials (ASTM) C150, C618, C1240, and C1697

Daum, D. R., and D. J. Meyer. *Pesticide Storage Building*. Pennsylvania State University, Agricultural Engineering Department.

Doane's Agricultural Report. *Chemical Containment Facilities*. Vol. 53, No 36-5.

Florida NRCS CPS

Air Filtration and Scrubbing, Code 371

Critical Area Planting, Code 342

General Manual

Title 420-Part 401

Title 450-Part 401

Title 190-Parts 410.22 and 410.26

Kammel, D. W., 1988. *Protective Treatment for Concrete*. Agricultural Engineering Department, University of Wisconsin.

Midwest Plan Service, 1995. *Designing Facilities for Pesticide and Fertilizer Containment MWPS-37*, Ames, IA.

National Cultural Resources Procedures Handbook (NCRPH),

NEH Part 642 Construction Specification 31 – Concrete for Major Structures

NEM Part 536

National Electrical Code

National Environmental Compliance Handbook (NECH).

National Fire Protection Association (NFPA) 30, Flammable and Combustible Liquids Code, Chapter 4,

National Food Security Act Manual (NFSAM),

National Planning Procedures Handbook (NPPH), Florida Supplements to Parts 600.1 and 600.6,

Noyes, R. I., 1989. *Modular Farm Sized Concrete Agricultural Chemical Handling Pads*. Oklahoma State University, Agricultural Engineering Department.

Noyes, R. T., and D. W. Kammel, 1989. *A Modular Containment, Mixing/Loading Pad*. ASAE Paper No 891613, American Society of Agricultural Engineers, Winter Meeting, New Orleans, LA.

Occupational Safety and Health Administration (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.