

**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, tribal, state and local regulations.

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.

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

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.

**Criteria for 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, 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 of 200 feet is recommended or a 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 feet above the seasonal high water table.

Locate 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.

For unroofed facilities provide storage on the pad as stated above or the volume of the 25-year, 24-hour storm, whichever is greater. Provide a means of storing or field applying, according to chemical label directions, the full storage volume within the 72-hour period following the storm.

Prevent outside runoff water from entering the facility.

**Rinsate Tanks.** Rinsate storage tanks shall be provided to temporarily hold rinsates resulting from cleaning of the chemical mixing pad or sprayer if the operator intends to store or accumulate rinsewater prior to use as a pesticide or as a diluent. 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. The minimum pad width shall be 5 feet wider than the widest piece of equipment including retracted booms.

The chemical mixing pad shall be sloped to allow for drainage of water and pesticide spills to a collection sump. The chemical mixing pad shall be sloped a minimum of 2% (1/4 inch per foot) toward the sump.

**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.

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

**Concrete Surfaces.** To protect the surfaces of concrete, that are exposed to agrichemicals, from penetration and contamination all concrete must have an admixture for concrete meeting the requirements of ASTM C1240 (micro silica), ASTM C618 (fly ash) or ASTM C989 (ground blast furnace slag), be sealed with a chemically resistant non-vapor barrier forming coating, or take measures to prevent vapor formation under the concrete sealed with a chemically resistant coating. Coatings must be compatible with the agrichemicals used at the facility and installed in

accordance with the manufacturer's recommendations.

**Agrichemical Collection.** Provide a collection area or sump with adequate dimensions for sediment removal and pump operation. 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.

**Structural Design.** The structural design shall consider all items that will influence performance, such as design analyses, methods, and assumptions; construction methods and quality control; and operational exposure, use, maintenance, and repair. Minimum structural requirements for agrichemical handling facilities are specified as follows:

1. Steel construction shall conform to AISC Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings.
2. Structural timber components shall conform to National Forest Products association (NFPA) National Design Specifications for Wood Construction.
3. Reinforcing steel shall conform to ASTM A 615, Grade 60.
4. Buildings shall be designed for applicable wind and dead loads in conformance with local building codes. Where no local building code governs, the loading shall be as specified in ASAE EP288.5.
5. Concrete. A watertight concrete design shall be used to avoid leakage from the sump and chemical mixing pad. The granular subbase shall be placed and compacted prior to concrete placement. The minimum concrete thickness of slabs and sump shall be 5 inches and 8 inches respectively and shall contain distributed reinforcing steel. The required area of such reinforcing steel shall be based on subgrade drag theory as discussed in industry guidelines such as American Concrete Institute, ACI 360, "Design of Slabs-on-Grade". When heavy equipment loads are to be resisted and/or where a non-uniform foundation cannot be avoided, an appropriate design procedure

incorporating a subgrade resistance parameter(s) such as ACI 360 shall be used. 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.

Concrete design shall meet the following minimum 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. The maximum size aggregate shall be 1 inch.

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.

**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, backflow prevention and other hardware as needed.

**Safety.** 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 (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. Provide adequate ventilation at all times for enclosed buildings using natural or mechanical means. The **emergency wash area** shall include an emergency overhead shower/eyewash and wash basin for washing

when the applicator's skin is exposed to chemicals. The emergency washing area 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.

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.

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

#### **Criteria for 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 roof over permanent facilities.

Consider installing an apron at the facility entrance to minimize sediment transport onto the 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.

#### **PLANS AND SPECIFICATIONS**

Prepare plans and specifications for constructing agrichemical mixing facilities in accordance with the criteria contained in this standard, to achieve its intended use.

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.

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.

#### **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:

- 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.
- 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.

## REFERENCES

- 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 Society of Agricultural Engineers, ASAE EP514, *Design of Concrete Structures for Secondary Containment of Liquid Pesticides and Fertilizers*, St. Joseph, MI.
- American Society of Civil Engineers, ASCE 7, *Minimum Design Loads for Buildings and Other Structures*, Reston, VA.
- 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.
- Midwest Plan Service, 1995. *Designing Facilities for Pesticide and Fertilizer Containment MWPS-37*, Ames, IA.
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- 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.
- USDA, Natural Resources Conservation Service, *Critical Area Planting*, Code 342, Conservation Practice Standards.