

**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 operations for the storage, mixing, loading, and cleanup of agrichemicals; retain incidental spillage or leakage; and reduce pollution to surface water, groundwater, air, and/or soil.

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies where:

1. 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;
2. An adequate water supply is available for filling application equipment tanks and rinsing application equipment and chemical containers as needed for the operation;
3. 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 Applicable to All Purposes**

Design and construct the agrichemical handling facility in accordance with all federal, state, and local laws, including, but not limited to, storm water management and sediment control laws.

Producers are responsible for securing the necessary permits to install the required facilities and for properly managing the facility.

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, follow the requirements found in the National Fire Protection Association (NFPA) 30, Flammable and Combustible Liquids Code, Chapter 4. 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 mixing facility as follows:

1. Adjacent to or as near the chemical storage building as practical when chemical storage is not incorporated into the facility;
2. As far as practical from streams, ponds, lakes, wetlands, known sinkholes, subsurface anomalies, and wells, with a minimum distance of 100 feet;
3. Isolated and located downwind from residences and other buildings used to store feed, seed, petroleum products, and livestock with a minimum distance required by local regulations;
4. Locate the bottom of the facility a minimum of two feet above the seasonal high water table;
5. Located above the 100-year floodplain elevation or, where this is not practical, as a minimum above the 25-year floodplain elevation. Design the facility to prevent runoff from adjacent land and structures from entering the facility during a 25-year, 24-hour rainfall event;
6. At sites that have not been used as stationary mixing/loading sites in the past.

**Chemical Handling Pad.** Size the chemical handling pad, used for the chemical mixing operation, to accommodate the largest spraying equipment used in the operation. Allow for access from more than one direction. Provide adequate space for easily maneuvering around the equipment and to accommodate the worker. A minimum of 5 feet on each side of the sprayer is required. Where possible, size the minimum width of the facility with the booms of the spray equipment retracted.

To prevent the surface from contamination from chemicals, all concrete exposed to chemicals must have a Micro-silica admixture for concrete

meeting the requirements of ASTM 1240 Designation C or be sealed with a chemically resistant non-vapor forming coating. Coatings must be compatible with the agrichemicals used at the facility and installed in accordance with the manufacturer's recommendations.

Slope the chemical-mixing pad to allow for drainage of water and pesticide spills to a collection sump.

Prevent outside runoff water from entering the facility. Provide a minimum storage capacity on the chemical-mixing pad, including the sump, of 250 gallons or equal to 1.25 times the largest storage or spray tank brought onto the pad, whichever is greater.

**Agrichemical Collection.** Provide a concrete collection area or sump with adequate dimensions for sediment removal and pump operation. The minimum dimensions of the sump are 3 feet by 3 feet by 2 feet deep. Cover with a metal grate. Design the sump for all anticipated loads.

The minimum concrete thickness of the sump walls and bottom is 6 inches with minimum reinforcement steel requirements of #4 bars placed on 12-inch centers in each direction. Construct the metal grate of galvanized steel with a cut out for the sump pump piping. To ensure water tightness, use a waterstop at all cold and construction joints.

Other types of sumps may be approved by the State Conservation Engineer on a case by case basis, but must be supported by strength design computations and water tightness details.

**Sump Pump.** Use a chemically resistant submersible pump or an above ground centrifugal or piston pump that creates a minimum of turbulence within the sump. The pump may be operated either electrically or manually. Provide a filter between the sump pump and sprayer or rinsate tanks.

Provide electrical components that are waterproof and explosion proof for the submersible pump and waterproof for the above ground pump. Install all electrical components in accordance with local and national electrical codes.

**Water Supply.** Provide a reliable water supply for filling the sprayers and rinsing the chemical containers, spray tanks, and chemical-mixing pad. Provide a hose or pipeline for conveyance of water from the water supply to the handling facility. Provide back flow preventers, antisiphoning devices, and a method to allow winterizing of the pipelines on all water supply lines. Locate the water supply pump and well outside of the containment facility.

**Plumbing.** Design all plumbing to allow for easy drainage to prevent freezing. Use corrosion resistant components. Outlet drains are not permitted in the chemical storage, mixing, loading, and collection areas.

**Entrance.** Provide a gravel, concrete, or otherwise suitable entrance for the equipment and to prevent erosion and the tracking of sediment onto the chemical-mixing pad. Minimum width of the entrance is 4 feet wider than the widest piece of equipment used at the facility. The minimum length of the entrance pad is 1.5 times the largest wheel circumference of the equipment used at the facility.

**Mixing Platform.** A mixing platform may be used to facilitate the filling of the spray equipment. The recommended minimum platform size is 3 feet high, with a minimum work area of 3 feet by 4 feet and is moveable on the pad.

**Rinsate Tanks.** Provide a rinsate storage tank to temporarily hold rinsates resulting from cleaning the chemical-mixing pad or sprayer. Tank(s) shall be of adequate size and number to allow for separation of non-compatible chemicals. Locate the rinsate tank(s) on the chemical-mixing pad.

Label the tanks with type of chemicals. Tanks shall be fiberglass, polyethylene, or other durable material and have the capacity to meet the requirements of the operation plan. Provide a separate tank for each target crop. Herbicides should be kept in separate tanks from any other compounds.

**Safety.** A permanent water supply line is required at the facility for an emergency washing area. Locate the emergency washing area where it is easily accessible to the facility user. Include with the emergency washing area a faucet and

emergency eye wash station. A drop shower is strongly recommended.

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

Post highly visible, waterproof warning signs, such as "CAUTION, CHEMICAL STORAGE AREA," or similar signs at all entrances to the facility. Place "NO SMOKING" signs both outside and inside the facility. Bilingual signs are recommended. All 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.

Where chemicals are stored on-site, provide a lockable secure area for protection against vandalism or unauthorized access. Provide appropriate safety devices including ventilation and appropriate lighting. A fire extinguisher (ABC use rating, dry chemical, minimum 20 pound capacity) is required.

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

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

The use of a building to cover the pad is required. Use minimum snow and wind loads as specified in ASCE 7, Minimum Design Loads for Buildings and Other Structures. Meet all local and state codes. Provide doorways and clearances necessary for the equipment being used.

Provide adequate ventilation on enclosed buildings by natural or mechanical means at all times.

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

Minimum design requirements are as follows:

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** - *ACI 318*, American Concrete Institute. Use Type II cement, 28 day compressive strength of 4000 psi, 5% to 7% air entrainment, with a slump of 3 inches to 5 inches. A plasticizing admixture is recommended to be used during placement;
4. **Masonry** - *Building Code Requirements for Masonry Structures*, *ACI 530*, American Concrete Institute;
5. **Slabs** - Use a five (5) inch minimum concrete slab thickness. 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.

**Table 1. Minimum Required Steel in Concrete Slabs Based on Subgrade Drag Theory, in accordance with ACI 360, *Design of Slabs-on-Grade*.**

Maximum Slab Dimension	Required Steel for 5" Thick Slab with Gravel Subgrade	
	A <sub>s</sub>	Example
≤ 60'	0.058	6 x 6-#6 gage, or 6 x 6-W2.9 x W2.9
>60' ≤ 100'	0.126	#4 @ 18"
>100' ≤ 160'	0.20	#4 @ 12"
>160' ≤ 200'	0.31	#5 bar @ 12"

### Materials.

**Rock** - Gravel (aggregates) must meet the requirements of Delaware Department of Transportation Standard Specifications, Section 813, Type B, Crusher-Run.

**Geotextile** - Geotextile may be woven or non-woven and must meet the specifications in the table below:

**Table 2. Geotextile Specifications.**

Specifications	Type of Geotextile	
	Non-Woven	Woven
Grab Strength lb D 4632	200	250
Puncture Strength lb D 6241	80	90
Permittivity sec <sup>-1</sup> D 4491	0.20	0.20
Apparent Opening Size, max mm D 4751	0.30	0.30
Trapezoid Tear Strength lb D 4533	80	90

**Concrete** - Use Type II cement, 28 day compressive strength of 4000 psi, 5% to 7% air entrainment, with a slump of 3 inches to 5 inches. A plasticizing admixture is recommended to be used during placement

**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.

*Note: Specific programs may dictate criteria in addition to, or more restrictive than, those specified in this standard.*

## 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 chemical 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.

*This practice has the potential to affect National Register listed cultural resources or eligible (significant) cultural resources. These may include archeological, historic, or traditional cultural properties. Care should be taken to avoid adverse impacts to these resources. Follow NRCS state policy for considering cultural resources during planning.*

## PLANS AND SPECIFICATIONS

Plans and specifications for this practice shall be prepared in accordance with the previously listed criteria. Plans and specifications shall contain sufficient detail to ensure successful implementation of this practice. Documentation shall be in accordance with the section

"Supporting Data and Documentation" in this standard

## OPERATION AND MAINTENANCE

An Operation and Maintenance (O&M) plan must be prepared, reviewed, and the responsibility of the client to implement. The O&M Plan shall provide specific instructions for proper operation and maintenance of each component of this practice and shall detail the level of repairs needed to maintain the effectiveness and useful life of the practice.

At a minimum, the following components shall be addressed in the O&M plan, as applicable:

1. Brief description of the facility. Define parameters used to size and design the facility such as storage tank and equipment sizes;
2. 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;
3. An inventory of agrichemicals to be stored or handled at the facility. Include Material Safety Data Sheets in the plan;
4. The proposed method of handling and disposing of rinsate, washwater, and spills. All material removed from the chemical-mixing pad and sump must be properly utilized or disposed of. Appropriate uses and disposal methods include:
  - a. Application to the target crop;
  - b. Use as dilution water in mixing to be applied to the target crop; or,
  - c. Disposal as waste in conformance with all local, state, and federal regulations.
5. A process for handling accumulated rainfall, when applicable;
6. A process for handling accumulated sediment. All material removed from the chemical-mixing pad and sump must be properly utilized or disposed of;

7. A strategy for cleaning surfaces between different agrichemical mixing operations;
8. 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;
9. 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;
10. A schedule of any required written inspection and maintenance reports;
11. Proper winterization of the facility;
12. Required safety signage;
13. 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.

#### **SUPPORTING DATA FOR DOCUMENTATION**

The following is a list of the minimum data and documentation to be recorded in the case file:

1. Location of the practice on the conservation plan map;
2. Assistance notes. The notes shall include dates of site visits, name or initials of the person who made the visit, specifics as to alternatives discussed, decisions made, and by whom.

#### **Field Data and Survey Notes**

The following is a list of the minimum data needed:

1. Plan view sketch;
2. Site access;

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3. A topographic survey of the site location;
4. Location of all buildings, wells, and other permanent features adjacent to the site;
5. Profile from the site to possible drain outlet;
6. Size and capacity of all sprayers;
7. Soil investigation notes and potential high water.

#### **Design Data**

Record on appropriate engineering paper. For guidance on the preparation of engineering plans see Chapter 5 of the Engineering Field Handbook, Part 650. The following is a list of the minimum required design data:

1. A plan view of the facility with contours, buildings, well, streams, etc.;
2. Detail designs of the components: pad, curb, sump, pump configuration, etc.;
3. Calculations showing design and required storage capabilities;
4. List of quantities with supporting computations;
5. Erosion and sediment control measures, and surface water control devices;
6. Show construction specifications on drawings.

#### **Utilities Notification**

1. Forms ENG-5 and ENG-6 can be used to assist in tracking utility notifications;
2. Document on CPA-6 initial discussion about the landowner's responsibility to notify Miss Utility;
3. Document on CPA-6 any information from the landowner about the existence and location of known utilities;
4. Document on CPA-6 assurances from the landowner that Miss Utility has been notified, including staking by the utilities.

### **Construction Check Data/As-Built Plans**

Record on survey notepaper, NRCS-ENG-28, or other appropriate engineering paper. Survey data will be plotted in red on the as-built plans. Document approval by the designer of any changes from the drawings or specifications before implementation of the change.

The following is a list of minimum data needed for as-built documentation:

1. Documentation of site visits on CPA-6. Include the date, who performed the inspection, specifics as to what was inspected, all alternatives discussed, and decisions made and by whom;
2. Final elevations, depths and dimensions of the curb, sump, etc.;
3. Size and location of all rinsate tanks;
4. Location of buried pipelines and power cables where installed as part of facility;
5. Final quantities and documentation for quantity changes and materials certification;
6. Sign and date check notes and plans by someone with appropriate approval authority. Include statement that practice meets or exceeds plans and NRCS practice standards.

In addition, the as-built drawings shall include name of the installer, manufacturer, and date of completion of each transfer system and/or component. The as-built records shall also include any applicable "Statement of Conformance" presented or certified by suppliers of structures or equipment. The design folder, as-built drawings, certifications, and specifications shall be filed in the case file.

### **REFERENCES**

1. American Concrete Institute. *ACI Codes*. Detroit, MI.
2. American Forest and Paper Association. *National Design Specifications for Wood Construction*. Washington, DC.
3. American Institute of Steel Construction. *AISC, Manual of Steel Construction*. Chicago, IL.
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5. American Society of Civil Engineers. ASCE 7, *Minimum Design Loads for Buildings and Other Structures*. Reston, VA.
6. American Society for Testing and Materials. *ASTM Standards*. Philadelphia, Pennsylvania.
7. Daum, D. R., and D. J. Meyer. *Pesticide Storage Building*. Pennsylvania State University, Agricultural Engineering Department.
8. Doane's Agricultural Report. *Chemical Containment Facilities*. Vol. 53, No 36-5.
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10. MidWest Plan Service. 1995. *Designing Facilities for Pesticide and Fertilizer Containment MWPS-37*, Ames, IA.
11. Noyes, R. I. 1989. *Modular Farm Sized Concrete Agricultural Chemical Handling Pads*. Oklahoma State University, Agricultural Engineering Department.
12. 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.
13. USDA, Natural Resources Conservation Service. *Conservation Practice Standards*. Delaware Field Office Technical Guide, Section IV.
14. USDA, Natural Resources Conservation Service. *Preparation of Engineering Plans*. Engineering Field Handbook, Chapter 5.