

**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;
- Whenever possible, locate the facility away from hydrologically sensitive areas, for example, Zone II aquifers;
- As far as practical from streams, ponds, lakes, wetlands, and sinkholes, with a minimum setback distance of 100 feet;
- At least 400 feet from private or public drinking water supplies.
- Isolated from residences and other buildings used to store feed, seed, petroleum products, or livestock with a minimum distance as required by local regulations, and located downwind of these buildings when feasible;
- 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 chemical storage is not incorporated into the facility and 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.

Runoff Control. Measures shall be designed to divert runoff from adjacent areas resulting from a 25 year, 24 hour duration storm event.

Storage Capacity for Spillage. For roofed facilities, provide a minimum spillage 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.

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 material type shall be suitable for the type of chemical to be contained in the tank.

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.

Access Ramps. Access to the pad shall be a graveled or paved ramp with a minimum length of 12 feet and maximum slope of 15%. The ramp shall grade away from the pad.

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

The collection area and sump shall not be used for storage of spillage or rinsate. Any spillage or rinsate water shall be pumped to a dedicated storage tank, or pumped to a sprayer tank and spread on the crop land as soon as practical.

Pump. The pump shall be selected to provide the discharge rate at the head requirements of the site, and resistance to the potential corrosive characteristics of the agrichemicals.

If the pump is permanently installed, provisions shall be included for protection against freezing.

Chemical Handling Pad. The handling pad and sump shall be watertight using a concrete or flexible membrane liner, designed to withstand the anticipated loads and prevent flotation.

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 2 feet for open facilities and 4 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 to allow for drainage to a collection area or sump.

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.

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 the 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

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 snow and wind loads as specified in ASCE 7, Minimum Design Loads for

Buildings and Other Structures. The roof shall also meet or exceed all local and state codes. The roof shall cover the entire facility and shall extend sufficiently to limit the amount of precipitation reaching the pad.

The roof supports shall be located outside of the facility. Locate footings below the anticipated frost depth unless measures are designed to accommodate frost/freeze conditions.

The minimum clearance between the lowest chord of the roof and the highest area of the pad shall provide clear access for the spray equipment. The sprayer equipment shall be measured to ensure that the equipment will not interfere with the roof and roof braces.

Fabricated structures shall 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;
- Concrete - Building Code Requirements for Reinforced Concrete, ACI 318, American Concrete Institute;
- Masonry - Building Code Requirements for Masonry Structures, ACI 530, American Concrete Institute;

The concrete slab shall be designed according to the following criteria:

- The subgrade shall provide uniform support to the paving.
- If the subgrade is a soil other than free draining SW, SP, GW or GP (Unified Soil Classification System), then a compacted base course with a minimum thickness of 6 inches shall be placed on the compacted subgrade and beneath the slab. The base course shall consist of granular material (sand, gravel, crushed stone, or sand/gravel mix) meeting the quality and gradation requirements of Massachusetts DPW 1988 Standard Specification for Highways and Bridges, Sections M1 or M2, except with a

maximum stone size of 2 inches and a maximum of 10 percent passing the #200 sieve size.

- The required thickness and reinforcement of the slab shall be determined on the basis of the wheel loads of the existing or anticipated equipment and on loading from any storage tanks that may be installed on the pad, with a minimum slab thickness of 5 inches. The pad shall also be designed to prevent cracking. Construction joints, if used, shall be designed to transfer loading. Joints will be sealed at the surface and have water stops installed. Slabs shall be reinforced and thickened at equipment entry points.
- 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.

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

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

Consider using sprayer equipment that uses injection technology to eliminate the need for mixing of chemicals.

The following shall be considered when locating and designing an agrichemical handling facility (AHF):

- 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 the availability of water and the distance to water sources
- Previous use of the site. Select a site that has not been used previously for chemical storage, mixing, loading, or equipment rinsing.
- Proximity and gradient to water resources and geographic features such as springs, wells, lakes, and wetlands.

- The need for a roof structure over the pad to reduce rainwater storage requirements and runoff problems. The installation of sidewalls should also be considered. Building orientation or roof construction such that the accumulation of wind blown precipitation will be minimized.
- On-farm traffic pattern and accessibility to chemical application areas and chemical storage. A single opening where the equipment is backed in, or a drive through AHF with drive over curbs shall be considered.
- Using crushed stone for the entrance ramp to help remove dirt from the tires of tractors and sprayers and keep the pad cleaner.
- Adjacent land uses, visibility, and the effects of chemical drift on surrounding areas due to prevailing winds.
- The need for an emergency washing area with a faucet and a shower with a pull chain for washing eyes, face, and bodies in the event of an accidental exposure to chemicals.
- Filling the sprayer tanks from water tanks rather than directly from the water supply to reduce the chance and amount of overflow during filling.
- Accessibility to a telephone and prominent posting of emergency telephone numbers.
- The need for supplemental ventilation devices for the more enclosed facilities to dissipate chemical dusts and vapors or to minimize the presence of condensation on liquid storage tanks.
- The need for an adjacent loading platform to facilitate the filling and rinsing of spray equipment.
- Building architecture and materials that are compatible with the surrounding structures.
- 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

The construction drawings for the AHF shall comply with this standard. Plans and specifications shall describe the site specific requirements for implementing this practice to achieve its intended use.

The following statement shall appear on all construction drawings for AHF's:

“Management of chemicals shall be the responsibility of the owner/operator and shall be in accordance with applicable Federal, State, and Local regulations.”

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, as applicable:

- 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.
- 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.
- Clearly post a list of contact names and phone numbers in the event an accidental spill, exposure, fire, or injury.

The owner or applicator shall have appropriate applicators license or permits for chemicals used at the facility. The applicator shall have and use all required personal protection equipment as listed on chemical labels.

REFERENCES

Pesticides and Groundwater, A Guide for the Pesticide User. Northeast Regional Agricultural Engineering Service NRAES-34, 1992.

Recommended Practices for Mixing, Loading and Storage of Pesticides. The Pesticide Bureau, Massachusetts Department of Agriculture, 1998.
(<http://www.mass.gov/agr/pesticides/publications/index.htm>)

Design of Concrete Structures for Secondary Containment of Liquid Pesticides and Fertilizers. American Society of Agricultural Engineers, ASAE EP514, , St. Joseph, MI.

On-Farm Agrichemical Handling Facilities. Northeast Regional Agricultural Engineering Service NRAES-78, 1995.

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

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

Designing Facilities for Pesticide and Fertilizer Containment. MidWest Plan Service MWPS-37, Ames, IA, 1991.

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

A Modular Containment, Mixing/Loading Pad. Noyes, R. T., and D. W. Kammel, 1989.

ASAE Paper No 891613, American Society of Agricultural Engineers, Winter Meeting, New Orleans, LA.

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

Building Code Requirements for Reinforced Concrete. ACI318, American Concrete Institute, 2008

Design of Slabs on Grade. ACI360R-97, American Concrete Institute, 1997.

Subgrades and Subbases for Concrete Pavements. American Concrete Pavement Association, 1995.

Slabs on Grade. Concrete Craftsman Series CCS-1, American Concrete Institute, 1994.

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

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

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