

Agrichemical Containment Facility (No.) 702

DEFINITION

An impermeable barrier and containment placed or constructed on the ground where agrichemical storage, loading, mixing, and clean-up occur.

PURPOSE

To prevent degradation of surface water, ground water, and soil from an unintentional release of agrichemicals. Unintentional releases of agrichemicals may occur through spills, leaks, or rinsing operations during storage, loading, mixing, and cleanup.

CONDITION WHERE PRACTICE APPLIES

This standard applies where repeated on-farm storage, mixing, and loading or cleanup of agrichemicals occurs.

Agrichemical containment facilities may include both pesticide and fertilizer storage, mixing, and loading only when the requirements stated in Michigan Department of Agriculture (MDA) Regulation 640, Commercial Pesticide Bulk Storage, and/or MDA Regulation 641, Commercial Fertilizer Bulk Storage, and/or MDA Regulation 642, On Farm Fertilizer Bulk Storage, are followed in addition to the criteria in this standard.

Agrichemical containment facilities utilizing an individual storage container with a capacity of 100,000 gallons (378,500 L) or more shall follow the requirements for secondary containment provisions of commercial fertilizer bulk storage.

CRITERIA

General Criteria Applicable to All Purposes

Agrichemical containment facilities shall be planned designed and installed to meet all federal, state, local, and tribal laws and regulations.

Permanent agrichemical storage shall store agrichemicals in a manner to reduce contamination by minimizing losses to the air, surface water, groundwater, or subsoil.

The walls and floors designed for the agrichemical containment facility shall be constructed of any of the following materials and shall be designed to withstand a full hydrostatic head of any discharged liquid and weight load of material: earth, steel, reinforced concrete, precast concrete blocks, or solid masonry.

Capacity for storage of equipment other than that directly related to the agrichemical containment facility operation shall not be included in an agrichemical containment facility.

The agrichemical containment facility and access areas will be designed for the intended material, equipment and vehicle loads.

Secondary containment areas not protected from rainfall shall provide for a complete separation between bulk fertilizers and pesticides while maintaining their individual capacity.

Restrict access to agrichemical storage by children, pets, livestock, wildlife, and unauthorized persons. Refer to pesticide labels and state regulations for controlled access requirements at agrichemical containment facilities with pesticide storage.

Year round storage facilities shall be heated, if required, to comply with label requirements.

Primary containment piping shall be located above the ground and within the secondary containment. No posts, pipes, hoses, discharge valves, or other devices may pass through the floor, containment storage walls, or the sump.

Location: Stationary agrichemical containment facilities are not to be located on sites where mixing and loading has previously occurred.

Locate the agrichemical containment facility above the 100-year flood elevation.

The lowest component shall be at least 2 feet (0.6 m) above the high water table.

Tile drainage tubing that underlies the facility must be removed or broken in a manner to eliminate the risk of agrichemicals from entering the drainage system.

Agrichemical containment facility locations must meet the following minimum separation distances:

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| Wells (private)^{1/} | 150 ft (46 m) |
| Wells (public Type I and IIa)^{2/} | 2000 ft (610m) |
| Wells (public Type IIb and III)^{2/} | 150 ft (244m) |
| Surface waters | 200 ft (61m) |
| Fuel storage tank < 1100 gal | 40 ft (12 m) |
| Fuel storage tank > 1100 gal | 5 ft (1.5 m) |

^{1/} As defined by Part 127, 1978 PA 368, Michigan Public Health Code.

^{2/} As defined by 1976 PA 399, Michigan Safe Drinking Water Act.

Liners: Liners shall be designed to withstand hydrostatic head and anticipated traffic loads. The coating or liner shall be flexible enough to bridge joints and provide watertightness.

An impervious coating or liner material which will prevent deterioration of the concrete and absorption of pesticide will be applied, on all concrete surfaces including mixing/loading areas and storage areas, exposed to pesticides. Coating materials must be designed to remain flexible after curing, aging, cold weather, sunlight, and exposure to anticipated agrichemicals, loads and traffic. Types of coatings to consider include, but are not limited to epoxy phenolic, epoxy novolac, vinyl ester, or a synthetic liner. The coatings or liner shall be installed in accordance with the manufacturer’s specifications.

Exposed surfaces of fertilizer containment will be designed to resist penetration and absorption or fertilizer and fertilizer contaminated waters. An impervious coating or liner is required for secondary containment facilities constructed out of earth, concrete blocks or similar materials. For cast in place concrete walls and floors, an impervious coating or liner is not required for either liquid or dry fertilizers.

Synthetic liners shall be a minimum thickness of 30 mils (0.8 mm) and shall be compatible with the

materials being stored within the secondary containment area.

Synthetic liners shall 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.

Foundation Preparation: Concrete agrichemical containment facilities will be provided with a foundation of at least 4 inches (100 mm) of compacted sand on native mineral soil or compacted sub-base. The sand will have no more than 12 percent passing the No. 200 sieve (74 microns) and be free from clay lumps.

Synthetic liners will be placed on relatively smooth ground that is free of stumps, roots, rocks, sticks, or other items that could puncture the liner or interfere with the operation. Surface preparation will be provided as required by the manufacturer.

Structural Requirements: Concrete will be structurally designed for: 1) the wheel loads of the existing or anticipated loaded equipment; 2) the loads imposed by storage tanks and other equipment; and 3) temperature and shrinkage. If the containment is to serve as part of a foundation or support for a building or roof, consider the total load in the structural design of the concrete.

When vertical frost footings are used, there must be a smooth transition from the footing to the floor along the interface with the subgrade to reduce the stress from drying shrinkage and expansion and contraction from temperature changes of the concrete.

Roofs will be designed for snow and wind loads as specified in ASAE S288 (Designing Buildings to Resist Snow and Wind Loads).

Reinforced concrete will comply with the guidance in the current ACI-318 and Construction Specification NRCS-MI-158 Reinforced Concrete Construction.

For slabs 50 feet (15 m) or less in length, the minimum steel reinforcement provided when the liner is dependent upon uncracked concrete is 0.18 percent of the concrete area. For slabs with a length or width over 50 feet (15 m), the steel ratio in the direction of that length or width that is greater than 50 feet (15 m) shall be increased to 0.18 percent times the length divided by 50 feet (15m).

Where reinforced concrete construction is required and also requires contraction or expansion joints or other conditions where steel is not continuous through a joint, a waterstop is required.

When a synthetic liner is used over the concrete walls and/or floor, the slab may be plain (non-reinforced) concrete. An ungated pipe or slot outlet may be provided for drainage of rainfall when the synthetic liner is not in place.

Appurtenances: Sumps will be designed as shallow and small as practical while allowing sufficient size for cleaning. Construct sumps of corrosion and leak resistant material. If the sump will create a hazard to traffic, cover the sump opening with a corrosion resistant grating capable of supporting anticipated loads. A manually activated pump shall remove accumulated liquids. Underground outlets shall not be used.

Sumps or low point shall be located where accessible by operator from the outside of the containment area.

Design appurtenances to prevent damage from freezing and thawing.

Use hoses, pipes, valves, connectors, filters, tanks, and related plumbing material compatible with the agrichemicals being handled. Suction hoses shall be designed for vacuum operation.

Backflow prevention devices shall be provided on pipes supplying non-contaminated water. Design transfer piping to prevent backflow between the pump and the storage tank(s). Air gaps are acceptable backflow prevention measures. Check valves are not acceptable backflow prevention measures.

Additional Criteria for Mix-Load Pads for Pesticides

The pad width shall be at least 2 feet (0.6 m) wider than the widest piece of equipment and the pad length at least 2 feet (0.6 m) longer than the maximum length of the application equipment. Only the additional room necessary to accommodate entrance and exit ramps, worker access, tanks, pumps, power washers, hoses, temporary placement of agrichemical containers, storage of sprayers, and other necessary equipment shall be provided.

Ramps, rounded curbing, or other methods will be designed to provide a smooth transition for entrances and exits.

The floor of the facility shall slope to a watertight catch basin or sump.

Minimally sized sumps, shallow depressions, or cleanup channels must be provided to collect spills, rinsate, sediment, etc. in each containment area.

The mix load area shall provide the capacity to hold at least 750 gallons (2,840 L) or the volume of the largest application equipment tank, whichever is less.

Additional Criteria for Pesticide Storage

If more than 60 gallons (227 L) of Class I, II, or III flammable or combustible liquids or a single storage container larger than 5 gallons (19 L) of Class I, II, or III flammable or combustible liquids are stored in an agrichemical containment 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.

Additional Criteria for Permanent Pesticide Storage

Storage will be provided that will contain 110 percent of the largest container stored in the area.

Ventilate all enclosed areas while occupied. This may be accomplished by the use of door openings, removable walls or a forced air ventilation system.

The floor shall be graded to a low corner to collect concentrated liquids.

Additional Criteria for Secondary Containment of Bulk Liquid Fertilizers

Primary storage containers of bulk fertilizer shall be located within a walled or diked containment area.

Primary storage containers shall be anchored, elevated, or secured by some other means as necessary to prevent flotation or instability.

Primary storage containers and appurtenances shall be constructed of materials that are resistant to corrosion, puncture, or cracking.

Primary storage containers shall be labeled as fertilizer in order to identify the contents within. The storage container labeling shall be in a prominent location with lettering that is a minimum of 4 inches (100 mm) in height.

Primary storage containers and appurtenances shall be secured to provide reasonable protection from wildlife, vandalism, and unauthorized access at all times. The container and appurtenances may be secured using fencing, lighting or locks.

All storage containers shall have the capability to have the liquid level within the storage container measured readily and safely.

All storage containers shall be equipped with a shutoff valve that is located on the storage container or at a distance from the storage container dictated by standard engineering practice.

For multiple valves that are located on a single line, the valve closest to its storage container shall be securable.

Walls or dikes shall not be more than 4 feet (1.2 m) in height above interior grade unless provision is made for safe access and exiting.

For earth embankment dikes, the minimum sum of the inside and outside slopes of the settled embankment shall not be less than five horizontal to one vertical with neither slope steeper than 2:1. Slopes shall be designed to be stable in all cases.

The minimum top width for an earthen embankment is 4 feet (1.2 m).

Secondary containment areas protected from rainfall shall contain a minimum of 110 percent of the volume of the largest storage container within the containment area, plus the displacement volume that is occupied by all other tanks within and below the height of the wall or dike.

Secondary containment areas not protected from rainfall shall contain a minimum of 110% of the volume of the largest storage container within the diked area, plus the volume that is occupied by all other tanks within and below the height of the dike, plus the volume of a 6-inch rainfall.

The floor shall be graded to a low corner or sump to collect concentrated liquids.

Allow 2 feet (0.6 m) minimum distance for inspection and maintenance between storage containers and, between storage containers and the secondary containment wall.

Additional Criteria for Operational Area for Bulk Liquid Fertilizer Storage

Operational areas shall be utilized for transferring, loading, unloading, and mixing fertilizers at farm storage facilities.

The operational area containment shall provide the capacity to hold at least 750 gallons (2,840 L) or the volume of the largest application equipment tank, whichever is less.

The operational area shall have a minimum width of 10 feet (3.0 m) and a minimum length of 20 feet (6.1 m).

Loading and unloading operations shall be supervised at all times by an attendant who is familiar and/or trained in the procedures that are used for the control and recovery of discharges.

Any fill or unloading point of the mobile container shall be positioned over the containment area during loading or unloading or assure retention of any discharge.

A portable operational area will satisfy the requirements of an operational area.

Additional Criteria for Bulk Dry Fertilizer

A storage facility shall store non-fluid fertilizers in a sound structure that has a cover or roof, sidewalls, and a base sufficient to prevent contact with precipitation and surface waters. If the dry fertilizer is stored outdoors, the storage facility shall place the dry fertilizer on a ground cover that is sufficiently impermeable to prevent seepage or runoff and shall completely cover the dry fertilizer with a tarpaulin or other suitable covering to prevent contact with precipitation and surface water.

A storage facility shall allow that all loading, unloading, mixing, and handling of dry fertilizer is on an impermeable surface of a size and design that will contain the fertilizer and allow for the collection of spilled material to be recycled and applied at agronomic rates.

CONSIDERATIONS

Consider the potential effects of installation and operation of agrichemical containment facilities on the cultural, archeological, historic, and economic resources.

Consider the prevailing winds during the season when the agrichemical containment facility will be used. Locate agrichemical containment facilities downwind and downhill from sensitive areas such as waters of the state, wetlands, sensitive upland areas, houses, play areas, gardens, and livestock feedlots.

Consider including measures to reduce the accumulation of sediment transported by wind, vehicles, or other means.

For roofed agrichemical containment facilities, consider providing measures to prevent blown-in precipitation.

Consider sighting the facility to meet the following guidelines:

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| Farm buildings | 50 ft. (15 m) |
| Residential/business building | 200 ft. (61 m) |
| Public roads | 50 ft. (15 m) |
| Pressurized water lines (Domestic/livestock use) | 25ft. (7.6 m) |
| Property lines | 25 ft. (7.6 m) |

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared in accordance with the criteria of this standard and shall describe the requirements for applying the practice to achieve its intended use.

Support data documentation requirements are as follows:

- Inventory and evaluation records
 - Assistance notes or special report
- Survey notes, where applicable
 - Design survey
 - Construction layout survey
 - Construction check survey
- Design records
 - Physical data, functional requirements and site constraints, where applicable
 - Soils/subsurface investigation report, where

applicable

- Design and quantity calculations
- Construction drawings/specifications with:
 - Location map
 - Designed by” and “Checked by” names or initials
 - Approval signature
 - Job class designation
 - Initials from preconstruction conference
 - As-built notes
- Construction inspection records
 - Assistance notes or separate inspection records
 - Construction approval signature
- Record of any variances approved, where applicable
- Record of approvals of in-field changes affecting function and/or job class, where applicable.

OPERATION AND MAINTENANCE

An Operation and Maintenance (O&M) plan shall be developed for this practice. The O&M plan shall be consistent with the purposes of the practice, its intended life, safety requirements, and the criteria for the design.

REFERENCES

Michigan State University Extension Bulletin E-2335
“On-Farm Pesticide Storage and Handling”