Natural Resources Conservation Service

Conservation Practice Standard

POND SEALING OR LINING – CONCRETE

Code 522

(ft^2)

DEFINITION

A liner for an impoundment constructed using reinforced or nonreinforced concrete.

PURPOSE

This practice is installed to reduce seepage losses from impoundments constructed for water conservation and environmental protection.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where—

- In-place natural soils have excessive seepage rates.
- Construction of a compacted soil liner is not feasible with available soils.
- Use of impoundment requires concrete both as a liner and a protective subgrade cover.

CRITERIA

Select the concrete liner design for either 'reduced seepage' or 'liquid tight' criteria, depending on the site conditions and management needs.

Liquid Tight

Where liquid tightness is required to provide an additional level of protection for geologic concerns, groundwater resources and risk factors as described in the Agricultural Waste Management Field Handbook (AWMFH), Chapter 10, building code requirements must be one of the following:

- Structural Engineering, NRCS National Engineering Manual (NEM) Part 536, Structural Engineering.
- Requirements for Environmental Concrete Structures, Slabs-on-Soil, American Concrete Institute (ACI) 350 Appendix H.

Reduced Seepage

Where liquid tightness is not required, building code requirements must be one of the following:

- ACI 318, Building Code Requirements for Reinforced Concrete, ACI.
- ACI 330R, Guide for the Design and Construction of Concrete Parking Lots, ACI.
- ACI 360R, Guide to Design of Slabs-on-Ground, ACI.

NRCS reviews and periodically updates conservation practice standards. To obtain the current version of this standard, contact your Natural Resources Conservation Service State office or visit the Field Office Technical Guide.
USDA is an equal opportunity provider, employer, and lender.

Construction Joints

Design construction and isolation joints to meet the appropriate ACI code specified above. Protrusions through the liner, such as pipes, must be properly sealed.

Side Slopes

Design side slopes of the pond or impoundment to be stable during construction and throughout the service life of the structure. Proportion the concrete mixture for a sufficiently stiff mix that can be installed on the slope without slumping or bulging.

Foundation and Liner Protection

For waste storage impoundments, design foundation conditions for concrete liners, including the location and proximity of groundwater and bedrock, in accordance with Conservation Practice Standard Waste Storage Facility (Code 313).

CONSIDERATIONS

Consider texturing concrete surfaces to provide traction for rubber-tired equipment.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for a concrete liner for a pond or a waste storage impoundment that describe the requirements for applying the practice to achieve its intended purpose. As a minimum, include:

- Soils investigation, including subgrade.
- Concrete and reinforcing requirements.
- Quantities of concrete and reinforcement as specified.
- Subgrade preparation, materials and compaction.
- Construction and material specifications.
- Safety requirements.

The following list of Construction Specifications is intended as a guide to selecting the appropriate specifications for a specific project. The list includes most, but may not contain all, of the specifications needed for a specific project:

IA-1 Site Preparation
IA-3 Structural Removal
IA-5 Pollution Control
IA-11 Removal of Water
IA-21 Excavation
IA-23 Earthfill
IA-24 Drainfill
IA-27 Diversions
IA-31 Concrete
IA-32 Concrete for Nonstructural Slabs
IA-45 Plastic (PVC, PE) Pipe
IA-92 Fences

OPERATION AND MAINTENANCE

Maintenance activities required for this practice consist of those operations necessary to prevent and/or repair damage to the concrete liner. This includes, but is not limited to—

- Visually inspecting liner annually.
- Excluding animals.

- Repairing damage to concrete liner, as necessary. Repairing liner to its original condition.
- Preventing damage from roots of tree and large shrubs by removing such vegetation at first appearance.
- Preventing and/or repairing rodent damage to concrete subgrade.

REFERENCES

American Concrete Institute (ACI), Farmington Hills, MI

- ACI 318, Building Code Requirements for Reinforced Concrete
- ACI 330R, Guide for the Design and Construction of Concrete Parking Lots
- ACI 350, Appendix H, Requirements for Environmental Concrete Structures, Slab-on-Soil
- ACI 360, Design of Slabs on Grade