

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**POND SEALING OR LINING - FLEXIBLE MEMBRANE**

(NO.)  
CODE: 521A

**DEFINITION**

A manufactured hydraulic barrier consisting of a functionally continuous sheet of synthetic or partially synthetic, flexible material.

**PURPOSE**

To control seepage from water and waste impoundments for water conservation and environmental protection.

**CONDITION WHERE PRACTICE APPLIES**

On ponds and water storage structures that require treatment to control seepage rates within acceptable limits.

On waste storage and waste treatment facilities built in or of excavated earth, and which require treatment to prevent the migration of contaminants from the site.

**CRITERIA**

Impoundment Structures to be lined shall have been constructed to meet all applicable NRCS Conservation Practice Standards, and may include any of the following as appropriate:

- Irrigation Storage Reservoir (Code 436)
- Pond (Code 378)
- Waste Storage Facility (Code 313)
- Waste Treatment Lagoon (Code 359)

All inlets, outlets, ramps, and other appurtenances may be installed before, during, or after the liner placement, but shall be done in a manner that does not damage or impair the proper operation of the liner.

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 Criteria for Membranes**

Type	Limiting Parameter
HDPE	40 mil thickness
LLDPE	40 mil thickness
PVC	30 mil thickness
GCL	0.75 lb./sq. ft (bentonite)
EPDM	45 mil thickness

HDPE = High Density Polyethylene  
LLDPE = Linear Low Density Polyethylene  
PVC = Polyvinyl Chloride  
GCL = Geosynthetic Clay Liner  
EPDM = Synthetic Rubber

Select soil materials shall be used as cover for liners where required for the proper performance, protection, and durability of the installation. Cover soils shall not contain sharp, angular stones or any objects that could damage the liner. Maximum allowable particle size of soil cover material shall be 3/8-in (10 mm), unless the liner is cushioned by a needle punched, non-woven geotextile. Cover materials shall be stable under all operational and exposure conditions.

Subgrade preparation shall conform to manufacturer recommendations. Subgrade materials shall not contain sharp, angular stones or any objects that could damage the liner or adversely impact its function.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

All structures shall be fenced to protect the liner from damage and for the safety of humans, livestock, wildlife, and pets.

Manufacturer recommendations shall be followed with regard to protection from weather and exposure.

If venting is used, manufacturer recommendations shall be followed regarding vent type and spacing.

### **CONSIDERATIONS**

Venting should be considered if gas build up under the liner is anticipated.

If high water tables could adversely affect the proper functioning of the facility, interceptor or relief type drainage systems should be considered to control uplift pressures.

### **PLANS AND SPECIFICATIONS**

Plans and specifications shall be prepared for specific field sites in accordance with this standard and shall describe the requirements for applying the practice to achieve its intended uses.

### **OPERATION AND MAINTENANCE**

A plan for operation and maintenance of the liner shall be prepared that is consistent with the manufacture's recommendations.

Liners shall be protected from livestock and /or equipment traffic and from the operation of agitation equipment and pumps.

Any tears or holes in the liner shall be repaired immediately to prevent leakage or further damage to the liner.

### **REFERENCES**

National Engineering Handbook Series,  
Agricultural Waste Management Field  
Handbook, Chapter 10, Part 651, Appendix D

Kentucky NRCS Conservation Practice  
Standards:

Code 436 - Irrigation Storage Reservoir  
Code 378 - Pond  
Code 359 - Waste Treatment Lagoon  
Code 313 - Waste Storage Facility

## POND SEALING OR LINING - FLEXIBLE MEMBRANE CONSTRUCTION SPECIFICATIONS

### Installation

**Subgrade preparation.** The area to be lined shall be drained and allowed to dry until the surface is firm and can support the personnel and equipment that must travel over it during installation of the lining.

All banks and fills in the area to be lined must be sloped no steeper than 1 horizontal to 1 vertical for exposed linings, and 2 1/2 to 1 for buried linings.

The foundation area for flexible membrane linings shall be smooth and free of projections that can damage the lining. Stumps and roots shall be removed. Rocks, hard clods, and other such material shall be removed, rolled so as to provide a smooth surface or covered with a cushion of fine soil.

If needed, an effective sterilant shall be applied to the subgrade at the rate recommended by the manufacturer.

An anchor trench shall be excavated completely around the area to be lined at the planned elevation of the top of the lining. The trench shall be 8 inches to 10 inches deep and 12 inches wide.

All lining material shall be free of damage or defect. Each package delivered to the job site shall bear the name of the material, the manufacturer's name or symbol, the quantity therein, and the thickness or weight of the material.

**Placement.** Membranes shall be loosely spread over the subgrade. Polyethylene film requires about 5 percent slack for satisfactory results.

All field splices shall be made according to the manufacturer's recommended technique, using materials furnished for this purpose. The joints shall be watertight and capable of maintaining their integrity throughout the expected life of the lining.

Approximately 8 inches of the top of the lining shall be placed in the anchor trench and anchored with compacted backfill.

For covered membranes, the material to be used as a protective cover shall be free of large clods, sharp rocks, sticks, and other objects that can puncture the lining. The cover shall be placed to the specified depth without damage to the membrane.