

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

Structures to be lined shall have been constructed to meet all applicable NRCS standards. 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.

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
EPDM	45 mil thickness
PVC	30 mil thickness
PP	
(Reinforced)	36 mil thickness
(Nonreinforced)	40 mil thickness

GCL	0.75 lb./sq ft (bentonite)
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HDPE = High Density Polyethylene
LLDPE = Linear Low Density Polyethylene
EPDM = Synthetic Rubber
PVC = Polyvinyl Chloride
PP = Polypropylene
GCL = Geosynthetic Clay Liner

PVC and GCL liners shall be covered with soil a minimum of 12 inches thick.

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.

All banks and fills in the area to be lined must be sloped no steeper than 3:1. Slope the bottom of the pond towards the sides, at 0.005 feet/feet, to allow migration of any gas from beneath the liner.

Liners shall be vented if organic soils are present. Manufacturer recommendations shall be followed regarding vent type.

Vents, when required, shall be spaced at no greater than 50 foot intervals. Install gas vents above the high water line and about 1 foot below the top of bank. The vent must be covered to protect the liner and prevent rainfall from getting below the liner.

Provide a cushion or padding under the liner if the subgrade particles are GM materials greater than $\frac{3}{8}$ inch or GCL materials greater than $\frac{1}{2}$ inch. Vented liners also require padding or a cushion. Padding or cushion can be a heavy non-woven geotextile or properly graded soil on non-vented liners. Padding or cushion can be a heavy non-woven geotextile or sand layer on vented liners.

All liners shall be anchored to prevent slippage.

All structures shall be fenced to protect the liner from damage and for the safety of humans, livestock, wildlife, and pets. Warning signs shall be provided and posted in a visible location.

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

CONSIDERATIONS

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. Consider use of sandbags on exposed liners to provide anchorage against uplift by wind.

Cultural Resources Considerations

NRCS's objective is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice will have any effect on any cultural resources.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

GM 420, Part 401, the California Environmental Handbook and the California Environmental Assessment Worksheet provide guidance on how the NRCS must account for cultural resources. The Field Office Technical Guide, Section II contains general information, with Web sites for additional information.

Endangered Species Considerations

Determine if installation of this practice, along with any others proposed, will have an effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS's objective is to benefit these species and others of concern, or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates that the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the U.S. Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed

species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

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. The plan should include specific instructions for operating and maintaining the system to ensure that it functions properly. It should also provide for periodic inspections and prompt repair or replacement of damaged components.