**Pima County Department of Environmental Quality**
**Alternative Wastewater On-Site Residential Treatment System Checklist**
**for Engineers, Designers, and Site Evaluators**

**per Arizona Administrative Code Title 18, Chapter 9**

## R18-9-E307. 4.07 General Permit: *Lined Evapotranspiration Bed, Less Than 3000 Gallons Per Day* Design Flow

### General Permit

____ Wastewater treated to a level equal to or better than that specified in R18-9-E302 (B)
____ A lined evapotranspiration bed may be used if site conditions
- Restrict soil infiltration or
- Require reduction or elimination of the volume of wastewater or nitrogen load discharged to the native soil.

____ Provision of a reserve area is not required for a lined evapotranspiration bed.

### Restrictions

____ Provide design documentation to show that a lined evapotranspiration bed will properly function.
____ This technology shall not be installed if:
- Average minimum temperature in any month is 20° F or less,
- Over 1/3 of average annual precipitation falls in a 30-day period, or
- Design flow exceeds net evaporation.

### Performance

____ Prevents discharge to the native soil by a synthetic liner,
____ Attains full disposal of wastewater to the atmosphere by evapotranspiration,
____ Prevents ponding of wastewater on the bed surface, and
____ Maintains an interval of unsaturated media directly beneath the bed surface.

### Notice of Intent to Discharge

____ Meet the Notice of Intent to Discharge requirements specified in R18-9-A301(B) and R18-9-A309(B)
____ Capillary rise potential test results for the media used to fill the evapotranspiration bed,
- Unless sand meeting a $D_{50}$ of 0.1 millimeter (50 percent by weight of grains equal to or smaller than 0.1 millimeter in size) is used; and

____ Water mass balance calculations used to size the evapotranspiration bed.

### Design requirements

____ Meet the applicable requirements in R18-9-A312
____ Ensure that the evapotranspiration bed is:
- from 18 to 36 inches deep, and
- calculate the bed design on the basis of the capillary rise of the bed media, according to the "Standard Test Method for Capillary-Moisture Relationships for Coarse- and Medium-Textured Soils by Porous-Plate Apparatus, D2325-68 (2003)";

____ Ensure the media is sand or other durable material;
____ Base design area calculations on a water mass balance for the winter months;
____ Ensure that the evapotranspiration bed liner is a durable, low hydraulic conductivity synthetic liner
- Has a calculated bottom area and sidewall seepage rate of less than 550 gallons per acre per day;

____ If a surfacing layer is used, use topsoil, dark cinders, decomposed granite, or similar landscaping material placed to a maximum depth of 2 inches.
- If topsoil is used as a surfacing layer for growth of landscape plants:

- The topsoil is a fertile, friable soil obtained from well-drained arable land;
- The topsoil is free of nut grass, refuse, roots, heavy clay, clods, noxious weeds, or any other material toxic to plant growth;
- The pH of the topsoil is between 5.5 and 8.0;
- The plasticity index of the topsoil is between 3 and 15; and
- The topsoil contains approximately 1 1/2 percent organic matter, by dry weight, either natural or added;

- If another landscaping material is used as a surfacing layer, the material meets the following gradation:

| Sieve Size | Percent Passing |
|---|---|
| 1” | 100 |
| 1/2” | 95-100 |
| No. 4 | 90-100 |
| No. 10 | 70-100 |
| No. 200 | 15-70 |

____ Use shallow-rooted, non-invasive, salt and drought tolerant evergreens if vegetation is planted on the evapotranspiration bed;

____ Install at least two observation ports to allow determination of the depth to the liquid surface of wastewater within the evapotranspiration bed;

____ Design the bed to pump out the saturated zone if accumulated salts or a similar condition impairs bed performance; and

____ Instead of the minimum vertical separation required under R18-9-A312 (E), ensure that the minimum vertical separation from the bottom of the evapotranspiration bed liner to the surface of the seasonal high water table or impervious layer or formation is at least 12 inches.

**Installation requirements**

____ Meet the applicable requirements in R18-9-A313 (A), and

____ Ensure that:

- All liner seams are factory fabricated or field welded according to manufacturer’s specifications. The applicant shall ensure that:
- The liner covers the bottom and all sidewalls of the bed and is cushioned on the top and bottom with layers of sand at least 2 inches thick or other puncture-protective material;
- If the inlet pipe passes through the liner, the joint is tightly sealed to minimize leakage during the operational life of the facility;
- The liner is leak tested under the supervision of an Arizona-registered professional engineer; and
- A 2- to 4-inch layer of one-half to 1-inch gravel or crushed stone is placed around the distribution pipes within the bed. The applicant shall place filter cloth on top of the gravel or crushed stone to prevent sand from settling into the crushed stone or gravel.

**Additional Discharge Authorization requirements**

____ Submit the liner test results sealed by an Arizona-registered professional engineer to the Department for issuance of the Discharge Authorization.

**Operation and maintenance requirements**

____ Meet the applicable requirements in R18-9-A313 (B), and

- Not allow irrigation of an evapotranspiration bed; and
- Protect the bed from vehicle loads and other damaging activities.

| Prepared by: | Date: |
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