

**TITLE 18. ENVIRONMENTAL QUALITY**  
**CHAPTER 9. WATER POLLUTION CONTROL**  
**PART E. TYPE 4 GENERAL PERMITS**

**R18-9-E306. 4.06 General Permit: Natural Seal Evapotranspiration Bed, Less Than 3000 Gallons Per Day Design Flow**

- A.** A 4.06 General Permit allows for the use of a natural seal evapotranspiration bed with less than 3000 gallons per day design flow receiving wastewater treated to a level equal to or better than that specified in R18-9-E302(B).
1. Definition. For purposes of this Section, a “natural seal evapotranspiration bed” means a disposal technology characterized by a bed of sand or other media with an internal wastewater distribution system, contained on the bottom and sidewalls by an engineered liner consisting of natural soil and clay materials.
  2. An applicant may use a natural seal evapotranspiration bed if site conditions restrict soil infiltration or require reduction of the volume of wastewater discharged to the native soil underlying the natural seal liner.
- B.** Restrictions. Unless a person provides design documentation to show that a natural seal evapotranspiration bed will properly function, the person shall not install this technology if:
1. Average minimum temperature in any month is 20° F or less,
  2. Over 1/3 of the average annual precipitation falls in a 30-day period, or
  3. Design flow exceeds net evaporation.
- C.** Performance. An applicant shall ensure that a natural seal evapotranspiration bed:
1. Minimizes discharge to the native soil through the natural seal liner,
  2. Maximizes wastewater disposed to the atmosphere by evapotranspiration, and
  3. Prevents ponding of wastewater on the bed surface and maintains an interval of unsaturated media directly beneath the bed surface.
- D.** Notice of Intent to Discharge. In addition to the Notice of Intent to Discharge requirements in R18-9-A301(B) and R18-9-A309(B), an applicant shall submit:
1. Capillary rise potential test results for the media used to fill the evapotranspiration bed, unless sand meeting a D<sub>50</sub> of 0.1 millimeter (50 percent by weight of grains equal to or smaller than 0.1 millimeter) is used; and
  2. Water mass balance calculations used to size the evapotranspiration bed.
- E.** Design requirements. An applicant shall:
1. Ensure that the evapotranspiration bed is from 18 to 36 inches deep and shall calculate the bed design based on the capillary rise of the bed media, following the “Standard Test Method for Capillary-Moisture Relationships for Coarse- and Medium-Textured Soils by Porous-Plate Apparatus, D2325-68 (2000),” incorporated by reference in R18-9-E307(E), and the anticipated maximum frost depth;
  2. Ensure the media is sand or other durable material;
  3. Base design area calculations on a water mass balance for the winter months and the design seepage rate;
  4. Ensure that the natural seal liner is a durable, low-hydraulic conductivity liner and is accompanied by the liner performance specification and calculations for bottom and sidewall seepage rate;
  5. If a surfacing layer is used, use topsoil, dark cinders, decomposed granite, or similar landscaping material placed to a maximum depth of 2 inches and ensure that:
    - a. If topsoil is used as a surfacing layer for growth of landscape plants:
      - i. The topsoil is a fertile, friable soil obtained from well-drained arable land;
      - ii. The topsoil is free of nut grass, refuse, roots, heavy clay, clods, noxious weeds, or any other material toxic to plant growth;
      - iii. The pH of the topsoil is between 5.5 and 8.0;
      - iv. The plasticity index of the topsoil is between 3 and 15; and
      - v. The topsoil contains approximately 1-1/2 percent organic matter, by dry weight, either natural or added;
    - b. If landscaping material other than topsoil 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

6. Use shallow-rooted, non-invasive, salt- and drought-tolerant evergreens if vegetation is planted on the evapotranspiration bed;
7. Install at least two observation ports to determine the level of the liquid surface of wastewater within the evapotranspiration bed;
8. Design the bed to pump out the saturated zone if accumulated salts or a similar condition impairs bed performance; and

9. Instead of the minimum vertical separation required under R18-9-A312(E), ensure that the minimum vertical separation from the bottom of the natural seal evapotranspiration bed liner to the seasonal high water table is at least 12 inches.
- F.** Installation requirements. In addition to the applicable requirements in R18-9-A313(A), an applicant shall ensure that:
1. The liner covers the bottom and all sidewalls of the bed and is installed on a stable base according to the manufacturer's installation specifications;
  2. If the inlet pipe passes through the liner, the joint is tightly sealed to minimize leakage during the operational life of the facility;
  3. The liner is leak tested under the supervision of an Arizona-registered professional engineer to confirm the design leakage rate; and
  4. A 2- to 4-inch layer of 1/2- to 1-inch gravel or crushed stone is placed around the distribution pipes within the bed. The applicant shall ensure that the filter cloth is placed on top of the gravel or crushed stone to prevent sand from settling into the gravel or crushed stone.
- G.** Additional Discharge Authorization requirements. An applicant shall submit the satisfactory results of the leakage test required under subsection (F)(3) to the Department before the Department issues the Discharge Authorization.
- H.** Operation and maintenance requirements. In addition to the applicable requirements in R18-9-A313(B), the permittee shall:
1. Not allow irrigation of an evapotranspiration bed, and
  2. Protect the bed from vehicle loads and other damaging activities.