

R18-9-E302.4.02 General Permit: Septic Tank With Disposal by Trench, Bed, Chamber Technology, or Seepage Pit, Less Than 3000 Gallons Per Day Design Flow

- A. A 4.02 General Permit allows for a system consisting of a septic tank dispensing wastewater to an approved means of disposal described in this Section. Only gravity flow of wastewater from the septic tank to the disposal field is authorized by this general permit.
1. The standard septic tank and disposal field design specified in this general permit is intended to serve most sites where no site limitations are identified by the site investigation conducted under R18-9-A310.
 2. If site conditions allow, this general permit authorizes the discharge of wastewater from a septic tank meeting the requirements of R18-9-A314 to one of the following disposal fields:
 - a. Shallow trench,
 - b. Deep trench,
 - c. Bed,
 - d. Disposal field using chamber technology, or
 - e. Seepage pit.
- B. Performance. An applicant shall design a system consisting of a septic tank and one of the disposal fields listed in subsection (A)(2) on the basis that treated wastewater released to the native soil meets the following criteria:
1. TSS of 75 milligrams per liter, 30-day arithmetic mean;
 2. BOD5 of 150 milligrams per liter, 30-day arithmetic mean;
 3. Total nitrogen (as nitrogen) of 53 milligrams per liter, five-month arithmetic mean; and
 4. Total coliform level of 100,000,000 (Log10 8) colony forming units per 100 milliliters, 95th percentile.
- C. Design and installation requirements.
1. General provisions. The applicant shall:
 - a. Ensure that the septic tank meets the requirements specified in R18-9-A314;
 - b. Before placing aggregate or drain lines in a prepared excavation, remove all smeared or compacted surfaces from trenches by raking to a depth of one inch and removing loose material. The applicant shall:
 - i. Place aggregate in the trench to the depth and grade specified in subsection (C)(2);
 - ii. Place the drain pipe on aggregate and cover it with aggregate to the minimum depth specified in subsection (C)(2); and
 - iii. Cover the aggregate with landscape filter material, geotextile, or similar porous material to prevent filling of voids with earth backfill.
 - c. Use a grade board stake placed in the trench to the depth of the aggregate if the distribution line is constructed of drain tile or flexible pipe that will not maintain alignment without continuous support;
 - d. If two or more drain lines are installed, install a distribution box approved by the Department of sufficient size to receive all lateral lines and flows at the head of each disposal field. The applicant shall:
 - i. Ensure that the inverts of all outlets are level and the invert of the inlet is at least one inch above the outlets;
 - ii. Design distribution boxes to ensure equal flow and install the boxes on a stable level surface such as a concrete slab or native or compacted soil; and
 - iii. Protect concrete distribution boxes from corrosion by coating them with an appropriate bituminous coating, constructing the boxes with concrete that has a 15 to 18% fly ash content, or by using other allowable means.
 - e. Construct all lateral pipes running from a distribution box to the disposal field with watertight joints and ensure that multiple disposal field laterals, wherever practical, are of uniform length;
 - f. Lay pipe connections between the septic tank and a distribution box on natural ground or compact fill and construct the pipe connections with watertight joints;
 - g. Construct steps within distribution line trenches or beds, if necessary, to maintain a level disposal pipe on sloping ground. The lines between each horizontal section shall be constructed with watertight joints and installed on natural or unfilled ground; and
 - h. Ensure that a disposal field consisting of trenches, beds, chamber technology, or seepage pits is not paved over or covered by concrete or any material that can reduce or inhibit possible evaporation of wastewater through the soil to the land surface.
 2. Shallow and deep trenches.
 - a. The applicant may, in computing the trench bottom absorption, include a trench sidewall area

- between 12 and 36 inches below the distribution line.
- b. The applicant shall ensure that trench bottoms are level. The applicant shall calculate trench sizing for shallow and deep trenches from the soil absorption rate specified under R18-9-A312(D).
- c. The following design criteria for shallow and deep trenches apply:

Shallow and Deep Trenches	Minimum	Maximum
Number of trenches	1 (2 are recommended)	----
Length of trench	----	100 feet
Bottom width of trench	12 inches	36 inches
Depth of cover over distribution pipe	9 inches	24 inches
Aggregate material under pipe	12 inches	----
Aggregate material over pipe	2 inches	2 inches
Slope of distribution pipe	Level	Level
Distribution pipe diameter	3 inches	<u>4 inches</u>
Spacing of distribution pipe	2 times effective depth or five feet, whichever is greater	

Notes:

1. For more than 24 inches, SDR 35 or equivalent strength pipe is required.
2. The distance between the bottom of the distribution pipe and the bottom of the trench bed.

3. Beds. An applicant shall:

- a. If a bed is installed instead of a trench, ensure that the area of each bed is at least 50% greater than the tabular dimensions required for a trench. The applicant may, in computing the bed bottom absorption area, include a perimeter sidewall area between 12 and 36 inches below the distribution line.
- b. Ensure that the bottom of a bed is level and calculate bed sizing from the soil absorption rate as specified by R18-9-A312(D).
- c. The following design criteria for beds apply:

Gravity Beds	Minimum	Maximum
Number of distribution pipes	2	--
Length of bed	--	100 feet
Distance between pipes	4 feet	6 feet
Width of bed	10 feet	12 feet
Distance from pipe to sidewall	3 feet	3 feet
Depth of cover over pipe	9 inches	14 inches
Aggregate material under pipe	12 inches	--
Aggregate material over pipe	2 inches	2 inches
Slope of distribution pipe	Level	Level
Distribution pipe diameter	3 inches	4 inches

4. Disposal field using chamber technology. An applicant shall:

- a. If leaching chambers are proposed instead of trenches or beds installed with distribution pipes, calculate an equivalent effective chamber absorption area to size the disposal field area and the number of chambers needed. The effective absorption area of each chamber is calculated as follows:

$$A = (1.43 \text{ 48 B 48 L}) + (2 \text{ 48 V 48 L})$$

- i. "A" is the effective absorption area of each chamber,
- ii. "B" is the nominal width of the open bottom absorption surface of the chamber,
- iii. "V" is the vertical height of the chamber sidewall, and
- iv. "L" is the length of the chamber.
- b. Calculate the disposal field size and number of chambers from the effective absorption area of each chamber and the soil absorption rates specified in R18-9-A312(D), taking care to use the appropriate value, depending on whether the proposed chamber installation is shallow or deep. Example calculations for effective chamber absorption area, disposal field size, and number of required chambers are on file with the Department.
- c. Ensure that the sidewall of the chamber provides at least 35% open area for sidewall credit and that

the design and construction minimizes the movement of fines into the chamber area. The use of filter fabric or geotextile against the sidewall openings is prohibited.

5. Seepage pits. The applicant shall:
- a. If allowed by R18-9-A311, design a seepage pit to comply with R18-9-A312(E)(1) for minimum vertical separation distance;
 - b. Ensure that multiple seepage pit installations are served through a distribution box approved by the Department or connected in series with a watertight connection laid on undisturbed or compacted soil. The applicant shall ensure that the outlet from the pit has a sanitary tee with the vertical leg extending at least 12 inches below the inlet;
 - c. Ensure that each seepage pit is circular and has an excavated diameter of four to six feet. The applicant may use the alternative design procedure specified in R18-9-A312(G) for a proposed seepage pit more than six feet in diameter;
 - d. For a gravel filled seepage pit, backfill the entire pit with aggregate. The applicant shall ensure that each pit has a breather conductor pipe that consists of a perforated pipe at least four inches in diameter, placed vertically within the backfill of the pit. The pipe shall extend from the bottom of the pit to within 12 inches below ground level;
 - e. For a lined, hollow seepage pit, lay a concrete liner or a liner of a different approved material in the pit on a firm foundation and fill excavation voids behind the liner with at least nine inches of aggregate;
 - f. For the cover of a lined seepage pit use an approved one or two piece reinforced concrete slab with a minimum compressive strength of 2500 pounds per square inch. The applicant shall ensure that the cover:
 - i. Is at least five inches thick and designed to support an earth load of at least 400 pounds per square foot;
 - ii. Has a 12 inch square or diameter minimum access hole with a plug or cap that is coated on the underside with an approved bituminous seal, constructed of concrete with 15% to 18% fly ash content, or made of other nonpermeable protective material; and
 - iii. Has a four inch or larger inspection pipe placed vertically not more than six inches below ground level;
 - g. Ensure that the top of the seepage pit cover is four to 18 inches below the surface of the ground;
 - h. Install a vented inlet fitting in every seepage pit to prevent flows into the seepage pit from damaging the sidewall.
 - i. An applicant may use a 1/4 bend fitting placed through an opening in the top of the slab cover if a one or two piece concrete slab cover inlet is used; or
 - ii. For multiple seepage pit installations, an applicant shall install the outlet fittings following a reference design drawing on file with the Department.
 - i. Bore seepage pits five feet deeper than the proposed pit depth to verify underlying soil characteristics and backfill the five feet of overdrill with low permeability drill cuttings or other suitable material;
 - j. Backfill seepage pits that terminate in gravelly, coarse sand zones five feet above the beginning of the zone with low permeability drill cuttings or other suitable material;
 - k. Determine the minimum sidewall area for a seepage pit from the design flow and the soil absorption rate derived from the testing procedure described in R18-9-A310(F). The effective absorption surface for a seepage pit is the sidewall area only. The sidewall area is calculated by the following formula:
$$A = 3.14 \ 48 \ D \ 48 \ H$$
 - i. "A" is the minimum sidewall area in square feet needed for the design flow and soil absorption rate for the installation;
 - ii. "D" is the diameter of the proposed seepage pit in feet;
 - iii. "H" is the vertical height in feet in the seepage pit through which wastewater infiltrates native soil. The applicant shall ensure that H is at least 10 feet for any seepage pit.

Historical Note

New Section adopted by final rulemaking at 7 A.A.R. 235, effective January 1, 2001 (Supp. 00-4).