

## TYPES OF CONVENTIONAL ON-SITE WASTEWATER DISPOSAL SYSTEMS

**General Information:** Sewage disposal of individual homes that lie outside a public sewer district can be accomplished by on-site wastewater treatment facilities commonly called septic systems. A conventional septic system will consist of two parts: a tank to capture the solids and grease and a drain field or disposal area to dispose of the liquid. The type of drain field will depend on the soil characteristics and site conditions. The most common type of drain field for disposal of wastewater from septic tanks are trenches, seepage pits, leach beds and chamber technology.

1. **SEEPAGE PITS: R18-9-E302(A)(2) and (C)(5):** A seepage pit is a drilled pit, no less than 48" and no greater than 72" in diameter that is filled with aggregate. The depth of the pit(s) is based on the design flow and soil absorption rate (SAR) for that particular site. (Design flow means the daily flow rate a facility is designed to accommodate. See R18-9-101 for further definition). The seepage pit may only be installed in valley-fill sediments in a basin and range alluvial (moved by water) basin. You can determine if your location is acceptable for seepage pits here: <http://gisweb.azdeq.gov/arcgis/alluvium/>. It must also be established that the site satisfies the minimum vertical separation test. Once these criteria have been proven acceptable, the pit must then pass a seepage pit performance test. For a seepage pit to be considered for disposal, the following documentation must be submitted with the NOID application:
  - a) A detailed report, prepared by an Arizona-registered Engineer or Geologist, certifying the site has sufficient valley-fill sediments in a basin & range alluvial (moved by water) basin for the seepage pit to perform properly.
  - b) Written test procedures and results from a seepage pit performance test conducted in accordance with R18-9-A310. See R18-9-A312E for more information.
  - c) Site Investigation Report identifying any limiting conditions
  - d) Drill logs, well logs or records from Arizona Department of Water Resources identifying the depth of seasonal high water table.
2. **TRENCHES: R18-9-E302(A)(2) and (C)(2):** One or more trenches filled with aggregate. Trenches may be 12" to 36" wide, have a maximum overall depth 5' less than the depth of the test holes and a maximum length of 100'. Trenches over 100' in length shall be split into two or more trenches of equal length to provide a more even distribution of wastewater and better absorption by the soils. Minimum separation between trench edges (undisturbed soil) is twice the effective depth (the distance between the bottom of the distribution pipe and the bottom of the trench) or 5', whichever is greater. See R18-9-A312(D) for more information.
3. **LEACH BED: R18-9-E302(A)(2) and (C)(3):** A shallow disposal field, which is filled with aggregate. The bed width is between 10' and 12' with 2 distribution lines. The maximum overall depth is 60" and the maximum length is 100'. MCESD highly recommends splitting up the system into multiple, shorter beds to provide more suitable distribution of wastewater. In calculating the size of the leach bed use the soil absorption rate specified in R18-9-A312(D) for "SAR, Bed."
4. **CHAMBER TECHNOLOGY: R18-9-E302(A)(2) and (C)(4):** This method of disposal uses an Arizona Department of Environmental Quality-approved chamber as the filter media rather than aggregate. The chambers are placed in shallow trenches. All chambers must be installed per ADEQ-approved directions.

## SOIL EVALUATION AND TESTING BY TYPE OF DISPOSAL SYSTEM

**SITE INVESTIGATION R18-9-A310(C) and (D):** A site investigation consists of a visual examination identifying any surface or subsurface limiting site conditions, as stated in R18-9-A310(B), that may interfere with the operation of an on-site wastewater disposal system. The information obtained from a site investigation is used in conjunction with the soil analysis to locate, select and design an on-site wastewater disposal system.

MCESD staff can conduct the site and soils evaluation for trench, chamber or leach bed disposal. Arizona-registered engineers, geologists or sanitarians (with prior MCESD approval) may also conduct the evaluations. If the proposed disposal method is a seepage pit, the site evaluation and seepage pit performance test must be conducted by an Arizona-registered engineer or geologist. Site evaluations, percolation tests and/or seepage pit performance tests conducted by persons other than MCESD staff must be submitted on the [ADEQ Site Investigation Report Form](#).

**TEST HOLE EVALUATION R18-9-A310(C), (D) and (E):** The evaluation of three (3) test holes will determine the characterization of the soils and will establish a soil absorption rate (SAR) to be used in calculating the size of the septic system disposal area. The Aquifer Protection Permit Rule describes the approved methods for determining soil characteristics.

**PERCOLATION TESTS R18-9-A310 (F):** Arizona-registered engineers, geologists or sanitarians (with prior MCESD approval) may conduct percolation tests. A percolation test is a water absorption test conducted in the primary disposal (two test holes) and reserve disposal (one test hole) areas. Percolation test hole: The percolation test hole shall be 12" x 12" square or 15" round, presoaked with clean water 16 to 24 hours in advance of the actual test as stated in Rule. This test may be used solely or in conjunction with a test hole analysis to determine the soil absorption rate (SAR) to be used in calculating the size of the disposal system. Percolation test results are reported in minutes per inch.

**SEEPAGE PIT PERFORMANCE TEST R18-9-A310 (G):** *MCESD staff does not conduct seepage pit performance tests.* The site evaluation and seepage pit performance test must be conducted by an Arizona-registered engineer or geologist. The primary and reserve disposal areas must be noted on the site plans. In the primary area only, conduct the test in a minimum 18" in diameter hole and at least 30' deep or to the depth of the proposed seepage pit, whichever is greater. Presoak the hole with clean water to a point 36" below the land surface. Observe as per R18-9-A310(G)(2). The actual test is conducted by refilling the hole with clean water to the same point as for the presoak and measuring the drop in the water level in 10-minute increments. The final numbers will represent a soil absorption rate (SAR) to be used in calculating the size and number of seepage pits to be installed at the site. Seepage pit performance test results are reported in minutes per inch. (The full testing and reporting procedure can be found below.)

### SEEPAGE PIT PERFORMANCE TESTING (R-18-9-A310(G))

An investigator shall test seepage pits described in R18-9-E302 as follows:

1. Planning and Preparation. The investigator shall:
  - a. Identify primary and reserve disposal areas at the site. A test hole at least 18 inches in diameter shall be drilled in the primary disposal area to the depth of the bottom of the proposed seepage pit, at least 30 feet deep.
  - b. Scarify soil surfaces within the test hole and remove loosened materials from the bottom of the hole.
2. Presoaking procedure. The investigator shall: **(include details with the NOID submittal)**
  - a. Fill the bottom six inches of the test hole with gravel, if necessary, to prevent scouring;
  - b. Fill the test hole with clean water up to three feet below the land surface.
  - c. Observe the decline of the water level in the hole and determine the time in hours and minutes for the water to completely drain away.
  - d. Repeat the procedure if the water drains away in less than four hours. If the water drains away the second time in less than four hours, then the seepage pit performance test shall be conducted following subsection (G)(3).
  - e. Add water to the hole and maintain the water at a depth that leaves at least the top three feet of hole exposed to air for least four more hours if the water drains away in four or more hours;
  - f. Not remove the water from the hole before the seepage pit performance test if there is standing water in the hole after at least 16 hours of presoaking.
3. Conducting the test. The investigator shall: **(include details with the NOID submittal)**
  - a. Fill the test hole with clean water up to three feet below land surface.
  - b. Observe the decline of the water level in the hole and determine and record the vertical distance to the water level from a fixed reference point every 10 minutes. The investigator shall ensure that the method for measuring water level depth is accurate and does not significantly affect the rate of fall of the water level in the test hole.
  - c. Measure the decline of the water level continually until three consecutive 10-minute measurements indicate that the infiltration rates are within 10%. If measurements indicate that infiltration is not approaching a steady rate or if the rate is close to a numerical limit specified in R18-9-A312(E), an alternate method based on a graphical solution of the test data shall be used to approximate the final stabilized infiltration rate.
  - d. \*Submit the seepage pit performance test results to the Department, including:
    - i. Data, calculations, and findings and all supporting on a form provided by the Department.
    - ii. The log of the test hole indicating lithologic characteristics and points of change; and
    - iii. The location of the test hole on the site investigation map.
  - e. Fill the test hole so that groundwater quality and public safety are not compromised if the seepage pit is drilled elsewhere or if a seepage pit cannot be sited at the location because of unfavorable test results.

\* In addition, MCESD requires that the following items are included with the seepage pit test results:

1. The field worksheets recording all procedures in detail.
2. Identification on the site plan where the seepage pit performance test(s) were conducted, including measurements to at least two adjoining property lines.