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**GUIDANCE FOR WASH DOWN PIGGERIES:**  
**SEPTIC TANKS, DRAINFIELDS AND**  
**SOIL PERCOLATION TESTS**

By: LT Matt Vojik, P.E., ASEPA

**Table 1: Septic Tank Sizing For Wash Down Piggeries**

| <b>Number of 8'x 8' Pens</b> | <b>Liquid Capacity of Septic Tank (gallons)</b> |
|------------------------------|---|
| 1-8                          | 1,000   |
| 9-12                         | 1,250   |
| 13-14                        | 1,500   |
| More than 14                 | For every two additional pens, add 200          |

**Table 2: Percolation Rates vs Soil Application Rates**

| <b>Percolation Rate from Test Results (min/inch)</b> | <b>Application Rate for Soil (gal/day/ft<sup>2</sup>)</b>                                 |
|--|---|
| Faster than 1  | Not Suitable<br>(Must add fill soil during drainfield construction to slow to 1 min/inch) |
| 1-5  | 1.2   |
| 6-15   | 0.8   |
| 16-30  | 0.6   |
| 31-60  | 0.45  |
| Above 60   | Not Suitable  |

**Table 3: Estimated Water Usage for Wash Down Piggeries**

| <b>Number of 8'x 8' Pens</b> | <b>Water Usage Rate (gal/day)</b>      |
|------------------------------|--|
| 1-4                          | 250                                    |
| 5-6                          | 350                                    |
| 7-8                          | 450                                    |
| 9-10                         | 550                                    |
| 11-12                        | 650                                    |
| 13-14                        | 750                                    |
| More than 14                 | For every two additional pens, add 100 |

## PERCOLATION TEST INSTRUCTIONS

1. Consult the ASEPA engineer first. Tests are time consuming and should be done right the first time. Perform a minimum of 3 tests. This requires three different test holes spaced uniformly throughout the area of the proposed drainfield.
2. Prepare Test Holes: Dig 3 test holes, 6 inches in diameter. The holes should be the depth of the proposed drainfield trenches (a minimum of 2 feet deep). Do not smear the surface of the soil in the hole. The surface texture should be rough for proper percolation. Prepare a Percolation Test Data Sheet for each hole (see Example 1). Describe the location of each hole, or prepare a simple sketch of the test hole locations. Place a yard stick in each hole. Place 2 inches of  $\frac{1}{2}$  -  $\frac{3}{4}$  inch gravel at the bottom of each hole to protect the soil from scouring action when water is added.
3. Soaking Period: Fill the hole with 12 inches of clean water and maintain this water level for at least 2 hours. Use a funnel or similar device to prevent the water from washing down the side of the hole. The soaking period is extremely important to allow the soil to saturate prior to the Percolation Test. Otherwise test results will not be accurate.\*

\* Porous Soils: If, after filling the hole three times with 12 inches of water, the water seeps completely away in less than 10 minutes, the Percolation Test can proceed immediately. This is the only time when soaking is not necessary.

4. Percolation Test: Except for porous soils, the Percolation Test occurs after the 2-hour soaking period. Allow the hole to drain completely. Remove any soil that sloughed into the hole. Adjust the water level to 6 inches above the gravel (8 inches above the bottom of the hole). At no time during the test is the water level allowed to rise more than 6 inches above the gravel.

Measure the water level at approximately 30 minute intervals.\* Readjust the water level to 6 inches above the gravel after each measurement. Record the measurement on the Data Sheet and calculate the percolation rate (See Step 5). Continue this process until the percolation rate remains steady for 2 consecutive measurements. At least 3 measurements must be taken.

\* If the water seeps away in less than 30 minutes, reduce the intervals to 10 minutes. If the water seeps away in less than 10 minutes, reduce the intervals to 1 minute.

5. Calculation of the Percolation Rate: Divide the time interval between each measurement by the water level drop for that interval. Example: If the water drops  $\frac{5}{8}$  inches over a 30 minute interval, the rate for that interval is:

$$\frac{30 \text{ min}}{\frac{5}{8} \text{ in}} = 48 \text{ min/in}$$

For each hole, the last percolation rate measured is the official percolation rate for that hole. To determine the percolation rate for the project area, average the percolation rates for all three holes. If the rates for each hole vary by more than 20 min/inch, do not average them. Consult the ASEPA engineer.

6. Submit a copy of the Percolation Test results to the ASEPA engineer for review.

**Example 1: Percolation Test Data Sheet**

**SOAKING PERIOD**

**Date/Time:** 9/24/07, 8:00 am  
**Location:** East side of ASEPA Office Building  
**Test Hole #:** 1  
**Performed By:** Matt Vojik  
**Depth of Hole:** 24 inches  
**Diameter of Hole:** 6 inches

| <b>Depth (inches)</b> | <b>Soil Texture/Description</b>        |
|-----------------------|--|
| 0-5                   | Red top soil with gravel               |
| 5-16                  | Brown sandy soil                       |
| 16-24                 | Grey & brown sandy soil with sandstone |
|                       |  |
|                       |  |

**Soaking Period End Date/Time:** 9/24/07, 10:00 am

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**PERCOLATION TEST**

**Date/Time:** 9/24/07, 10:30 pm

| <b>Time</b> | <b>Interval (minutes)</b> | <b>Measurement (inches)</b> | <b>Drop in Water Level (inches)</b> | <b>Percolation Rate (minutes/inch)</b> |
|-------------|---------------------------|-----------------------------|-------------------------------------|--|
| 10:30       | -                         | 8                           |                                     |  |
| 11:00       | 30                        | 7                           | 1                                   | 30                                     |
| 11:35       | 35                        | 6 3/4                       | 1 1/4                               | 28                                     |
| 12:00       | 25                        | 7                           | 1                                   | 25                                     |
| 12:30       | 30                        | 7 1/8                       | 7/8                                 | 35                                     |
| 1:00        | 30                        | 6 7/8                       | 1 1/8                               | 27                                     |
| 1:30        | 30                        | 6 7/8                       | 1 1/8                               | 27                                     |
|             |                           |                             |                                     |  |
|             |                           |                             |                                     |  |
|             |                           |                             |                                     |  |

**Percolation Rate for this Test Hole:** 27 min/inch

**Suggested Equipment:**

- Watch
- Yard Sticks (3)
- Buckets (3)
- Gravel
- Calculator
- Narrow shovel, post hole digger, or iron digging bar
- Instructions
- Data Sheets
- Funnel
- Water Source

## **Example 2: Sizing a Drainfield**

Per ASEPA guidelines, every approved Wash Down piggery must include an adequately designed drainfield in accordance with a soil Percolation Test. See the Percolation Test Instructions on the previous page.

As an Example, let's say the Percolation Test reveals a percolation rate of 45 minutes/inch:

1. See Table 2. The percolation rate would be in the 31-60 range, which corresponds to a 0.45 gal/day/ft<sup>2</sup> application rate.
2. How many 8 ft x 8 ft pens will your piggery have? As an example, let's say you plan to build a piggery with 6 pens.
3. See Table 3. For 6 pens, you would estimate a water usage rate of 350 gal/day.
4. Estimate the width of your drainfield trenches. Most backhoes have a 2-foot wide bucket, so let's estimate that the trenches would have a width of 2 feet.
5. Determine the area for a 1 foot length of drainfield: 1 ft long x 2 ft wide = 2ft<sup>2</sup>
6. Multiply this area by the recommended application rate (step 1). In this case it would be: 2ft<sup>2</sup> x 0.45 gal/day/ft<sup>2</sup> = 0.90 gal/day. That's how much water can be absorbed by 1 ft of your drainfield, or 0.90 gal/day/ft.
7. Now the question is, what is the total length of drainfield required? Divide your usage rate (Step 3) by your absorption rate per foot (step 6). In this case it's:

$$\frac{350 \text{ gal/day}}{0.90 \text{ gal/day/ft}} = 389 \text{ ft, which rounds to 390 ft.}$$

8. So your drainfield would need a total length of 390 ft. You could have 4 lengths of 98 ft, or 5 lengths of 78 ft, or 6 lengths of 65 ft, or 8 lengths of 49 ft and so on. The total length of drainfield could be more than 390 ft, but it could not be less. Drainfield trenches need to be 6 ft apart and they can't exceed 100 ft in length.