**Section 570.APPENDIX C Procedure to Estimate Soil Infiltration Rate**

Procedure to Estimate Soil Infiltration Rate

Soil infiltration rate for a runoff field application area can be determined by using:

1. Any of three methods given in EPA Process Design Manual – Land Treatment of Municipal Wastewater dated October, 1981; Chapter 3.4 – Infiltration Rate Measurements.

2. The following modified cylinder infiltrometer method:

Procedure

A. Preparing the test site

Drive a rigid, leak-proof container approximately 6 inches into the ground taking car to avoid disturbing the soil as much as possible. This container should be approximately 2 feet long by at least 10 inches wide, and may be of any suitable material. A metal pipe is recommended (see Figure 1).

B. Saturation and Swelling of the Soil

Before conducting the test, saturate the soil for at least four hours, but preferably 8 hours, by refilling the container with clean water as needed.

C. Testing

At the time of the test, adjust the water level to 12 inches above the soil surface. Allow the water level to drop six inches and then commence measuring the drop in water level at 15 minute intervals until the water has infiltrated. Repeat part C.

D. Recording Results

Record results of all tests as the total minutes required for the last six inches of water to infiltrate (minutes/inch). Average the two tests at each site. For example:

|  |  |  |  |
| --- | --- | --- | --- |
| Site 1 – Data Recorded | |  |  |
| min | inch | min | inch |
| 0 | 6.0 | 45 | 2.5 |
| 15 | 4.5 | 60 | 2.0 |
| 30 | 3.5 |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 60 minutes | = | 60 | = | 15 min/inch |
| (6 - 2 inches) | 4 |

E. Soil Infiltration Rate

The soil infiltration rate (SI) is calculated at each site:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SI | = | 36 | = | inch/hour |
| min/inch |

Example

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SI | = | 36 | = | 2.4 inch/hour |
| 15 |

F. Average the soil infiltration rates from each testing site to calculate the SI value for the runoff field application area.

These tests must not be made on frozen ground and include a safety factor in Part E to compensate for inherent inaccuracies in this procedure.

3. Data from a modern U.S.D.A. – S.C.S. soil survey for the county where the runoff field application system will be installed. Use the Table of Engineering Properties - Physical and Chemical Properties for Permeability of the surface soil layer as follows:

1. Locate the soil name and map symbol for the field application area on the map sheets (example – 386A, Downs).

2. On the Physical and Chemical Properties Table locate the surface layer permeability rate.

Example

|  |  |  |
| --- | --- | --- |
| Table 15 – Physical and Chemical Properties of Soils | | |
| Soil and map symbol | Depth (inches) | Permeability (in/hr) |
| 386A, 386B | 0 – 7 | 0.6 – 2.0 |
| Downs | 7 – 30 | 0.6 – 2.0 |
|  | 30 – 60 | 0.6 – 2.0 |

3. At the surface layer (0 - 7 inches for the example) use the average value of the permeability range to obtain SI.

Example

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SI | = | 2.0 + 0.6 | = | 1.3 inches/hour |
| 2 |

Figure 1: Cylinder Infiltrometer

