

How to Carry Out a Percolation Test – for a Storm Water Soakaway

Test Methodology

There are two different types of soakaway, Stormwater soakaways which are designed to deal with large volumes of rainwater in a short period of time and Foul Water Soakaways (often referred to as Drainage Fields) which take the discharge from a septic tank or treatment plant and deal with smaller volumes over a longer period.

The percolation test explained in this document is for stormwater soakaways ONLY as detailed in the BRE Digest 365.

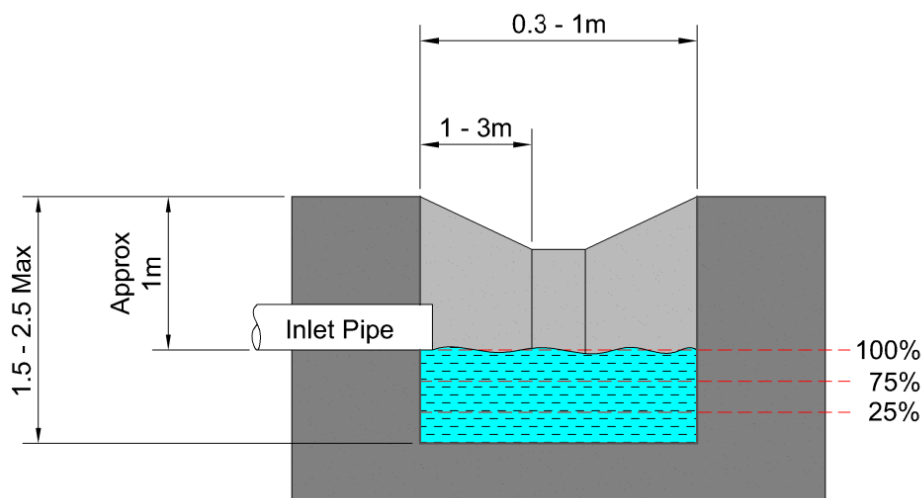
Percolation Test Guide

Step 1 – Excavate a trial pit

- Excavate a trial pit to the same depth as the anticipated full size soakaway.
- Overall depth of excavation will typically be 1.5 to 2.5m deep.
- The trial pit should be 0.3 to 1m wide and 1 to 3m long. (record the exact trial pit measurements)
- It should have vertical sides trimmed square. If necessary for stability should be filled with granular material. When granular material is used a full height perforated, vertical observation tube should be positioned so that water levels can be monitored.

Step 2 – Carry out test

- Fill the pit with water to its maximum effective depth (up to the invert level of the inlet pipe), this needs to be done as rapidly as possible to reflect a real storm event.
- Repeat this filling process 3 times allowing the pit to drain to near empty on each occasion.
- Each time record the water level and time from filling at sufficiently close intervals to clearly define water level versus time.
- The 3 fillings should be done on the same day or consecutive days.
- If the design of the planned soakaway exceeds 10m in length then a second trial should be carried out at a different location along the line of the planned soakaway.



Step 3 – Calculate the Soil Infiltration Rate

$$\text{Soil Infiltration Rate, } f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

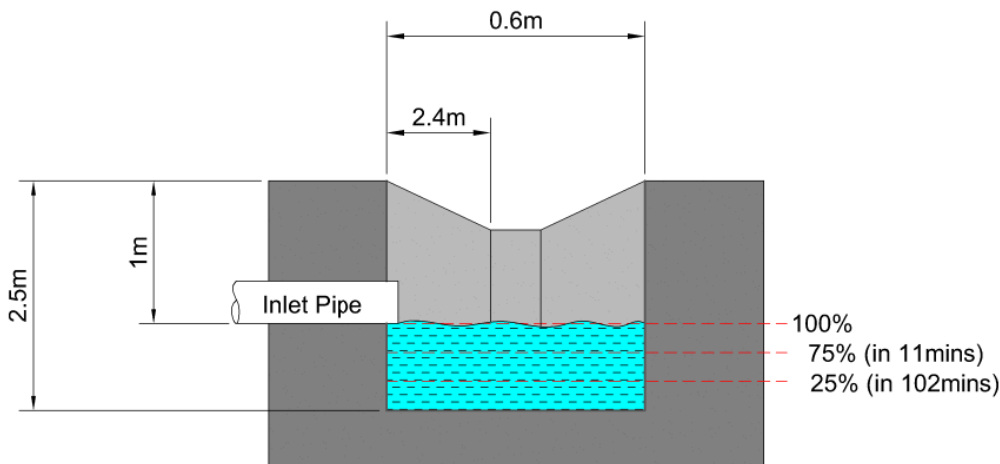
Where:

V_{p75-25} = the effective storage volume of water in the trial pit between 75% and 25% effective depth

a_{p50} = the internal surface area of the trial pit up to 50% effective depth and including the base area

t_{p75-25} = the time for the water level to fall from 75% to 25% effective depth in seconds

Worked Example:



The invert of the inlet pipe was known to be at 1m below the ground surface. An effective storage depth of 1.5m was adopted. When trimmed and clean, the trial pit measured 2.5m deep, 2.4m long and 0.6m wide. It took 11mins for the water to drop to 75% of the effective storage depth and 102mins to drop to 25%.

Volume outflowing between 75% and 25% effective depth:

$$V_{p75-25} = 2.40 \times 0.6 \times (1.125 - 0.375) = 1.08\text{m}^3$$

The mean surface area through which the outflow occurs, taken to be the pit sides to 50% effective depth and including the base of the pit:

$$a_{p50} = (2.40 \times 0.75 \times 2) + (0.6 \times 0.75 \times 2) + (2.40 \times 0.60) = 5.94\text{m}^2$$

The time for the outflow to drop from 75% to 25% effective depth:

$$t_{p75-25} = 102\text{mins} - 11\text{mins} = 91 \text{ minutes}$$

$$\text{Soil Infiltration Rate Formula, } f = \frac{1.08}{5.94 \times (91 \times 60)} = 3.33 \times 10^{-5} \text{ m/sec}$$



Please fill in the relevant information below.

1. Please specify the size of the trial pit:

Width (m) 1 Length (m) 0.5 Depth (m) 0.5

2. Please specify the proposed invert level of the drain: _____ m

3. Below is a table for you to input the data (times) gathered from the Soil Infiltration Rate tests:

Test Number	75%	25%	25%-75%
1	11 minutes	89 minutes	78 minutes
2	13 minutes	92 minutes	79 minutes
3	10 minutes	87 minutes	77 minutes

Key:

75% The time taken in minutes for the water level to fall to 75% full

25% The time taken in minutes for the water level to fall to 25% full

25% - 75% The 25% time minus the 75% time. (This will give the time for the water level to fall from 75% full to 25% full.)

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