Percolation test

A septic tank system comprises not just of a septic tank, but also, includes the subsurface drainage or irrigation system. The subsoil into which the drainage system is fitted must be capable of absorbing the daily effluent discharge.

You must assess the condition of the ground and the nature of the soil.

BS EN 752-4 1998 advises that the floor area of the soakaway is the critical parameter in the design of a treated effluent soakaway. British Standard 6297-1983 advises details of methods of determining percolation rates and advises carrying out the following percolation test to estimate the area of the drainage trench and the length of the land drain. This test should be completed before purchase or installation so that the suitability of the site and soil can be assessed for sub-surface irrigation and effluent disposal. However, other factors should also be taken into account, for example local knowledge about ground conditions, water table levels and seasonal variations. The following information is provided to aid your testing, or, please contact your local Klargester Certified Installer.

PERCOLATION TEST PROCEDURE

Excavate a hole 300mm square to a depth 250mm below the proposed invert level of the land drain. Where deep drains are necessary the test hole should be the same dimensions at the bottom but may be enlarged above the 250mm level to enable a safe excavation.

Fill the 300mm square section of the hole with water to a depth of a 250mm (minimum) and allow the water to seep away overnight. Next day, refill the test section with water to a depth of at least 250mm and observe the time taken, **in seconds**, for the water to seep away completely.

Divide the time by the depth (mm) of water in the hole. The answer gives the average time required for the water to drop 1mm (Vp in s). Take care, when carrying out the test, to avoid abnormal weather conditions such as heavy rain, severe frost or drought.

This test should be repeated at least three times, and an average calculated. If any of the results are 50%+/- the average, carry out a further three tests and calculate a further average.

A satisfactory result is an average value, Vp of 24s/mm or less. If the measured values exceed this, then carry out further tests at a minimum of three different locations on the proposed land drain route, or at least three tests on separate days on the site proposed for the soakaway.

Where deep excavations are necessary a modified test procedure may be adopted using a 300mm earth auger. Bore the test hole vertically to the appropriate depth taking care to remove all loose debris.

Make water level observations referring to a fixed datum using a dipstick or some suitable alternative water level indicator.

The value found In this way is called the percolation value (Vp in s) of the soil and can be used to determine the area of drainage trench floors required to disperse effluents. If the percolation value exceeds 140s then BS6297 considers that the soil is not suitable for a soakaway system. Please consult Klargester Technical Sales Department for further advice, (01296 633033) as we will be able to offer alternative solutions and equipment.

$$At = P \times Vp \times 0.25$$

At =	Floor area (m^2) of subsurface drainage trench
P =	The number of persons served by the tank
Vp =	The percolation value in sec/mm

The area determined should be used to calculate either the total floor area of the drainage trench and therefore the length of land drain, or alternatively the floor area of one or more shallow soakaways.

To obtain the linear pipe length, divide the drainage area (At) by the proposed trench width (normally 0.6 metre or 0.9 metre).

Interpretation of Results

The following table provides typical irrigation trench length in metres assuming a trench base width of 600mm.

Tank Capacity	2800	3800	4600	6000	7500	9000
No. of Persons	4	9	14	22	26	39
Rate of Fall, Vp (sec/mm)	Required length of irrigation drain, in metres					
0-5	9	19	30	46	54	81
6-10	17	38	59	92	108	162
11-20	34	75	117	183	217	325
21-24	40	90	140	220	260	390
25-30	50	113	175	275	325	487

Where the calculated result indicates the need for a drainage trench longer than 200 metres, serious consideration should be given to the use of a more economic alternative sewage treatment system such as a Klargester BioDisc. A BioDisc will produce a better quality of effluent which, with permission, may be fed into a water course or open culvert. Please contact us for further details.

We do suggest, irrespective of results and calculations, that a minimum trench length of 30m is installed.

BS EN 752-4 1998 advises that it is not desirable to position a soakaway nearer than 5m to a building, or position it so that ground beneath foundations is adversely affected. Further that if, in the winter the groundwater level rises to within 1m of the proposed invert level of the irrigation system, then sub-surface irrigation should not be used.

IRRIGATION SYSTEM DESIGN

Your Klargester Certified Installer should be consulted regarding the design and fabric of the sub surface irrigation system; the following guidance is offered.

BS EN 752-4 1998 advises that a sub-surface irrigation system should be very carefully designed and constructed using porous or perforated pipes laid in trenches with a uniform gradient not steeper than 1:200. The trenches should be between 300mm and 900 mm wide and 2 m wide strips of undisturbed ground should be maintained between parallel trenches. The pipes should be laid on a 150mm layer of clinker, clean gravel or broken stone of 20-50mm grade. The trenches should be filled with the same material to a level 50mm above the pipe and covered with plastic strip or geotextile material to prevent the entry of silt. The remainder of the trench can be filled with normal soil. Pipes should be laid at a minimum depth of 500mm below the surface.

For longevity the soakaway should be designed with facilities for inspection and maintenance. The life of a soakaway will be reduced if its waterways become clogged by silt or floating material.

Access points enable the point of discharge of the drain to be viewed and material cleared from the soakaway. Sub surface irrigation systems should have at least two inspection points on each length of straight pipe i.e. at least at both ends.

We would also suggest that the drainage system should be constructed from lengths of 110mm perforated clay or perforated rigid plastic pipe, preceded by approximately 3 metres of unperforated pipe connecting to the septic tank outlet. Corrugated pipes designed specifically for land drainage are not recommended. The layout should ensure even distribution throughout the absorption field, avoiding steep gradients on sloping sites. A closed circuit system is preferable.