

Dimensioning with percolation test in pipes

To assess which type of sewage system is the most suitable, you need information about the land and water on your plot.

HOW DOES THE WATER STAND?

If the groundwater is high, a eventual infiltration must be raised and the wastewater may need to be lifted with a pump. If the test pit is dry all the way down to 2 meters, it is possible to lay the infiltration plant below the ground surface. However, for the best durability and function, it should be as superficial as possible.

TEST PIT

If a technology is used where the wastewater should be allowed to infiltrate through the ground, a sample pit should always be dug, and a soil sample should be taken. This is done to check that the soil and the site are suitable for infiltration.

From the bottom of the dispersal layer, at least 1 meter down is needed to a rock or maximum groundwater level. This is so that there is enough soil, that the water can slowly seep down through and be purified in.

If the groundwater is too high, untreated water can reach there and then be carried long distances under ground.

It is important that groundwater does not enter the infiltration, as an oxygen-free environment is created. In an oxygen-free environment, it can grow bacteria that causes the infiltration to be re-set.

The most common cause of error, is that the plant has been placed too deep, that the wrong technology has been used and that the installation is incorrect. Please ask us for advice in doubt.

DIGGING TEST PITS

The test pit should always be >2 meters deep, or down to groundwater/rock, and dug a few meters outside the intended infiltration/ground bed. This is done so that the ground not will be destroyed, where the sewage plant is planned to be located.

At this image you can see distance to groundwater/mountains and soil storage. The second type of test pit is relevant if you, in the deep test pit, are able to infiltrate. Then you should examine the real conditions where the infiltration should be located. Due to the fact that soil conditions may vary, 3 test pits should be made. A pit at each end of the bed and one in the middle.

A test pit is therefore preferably made when the ground is at its wettest, e.g. during spring or autumn. Otherwise, there should be a margin larger than 1m between infiltration and the bottom of the sample pit.

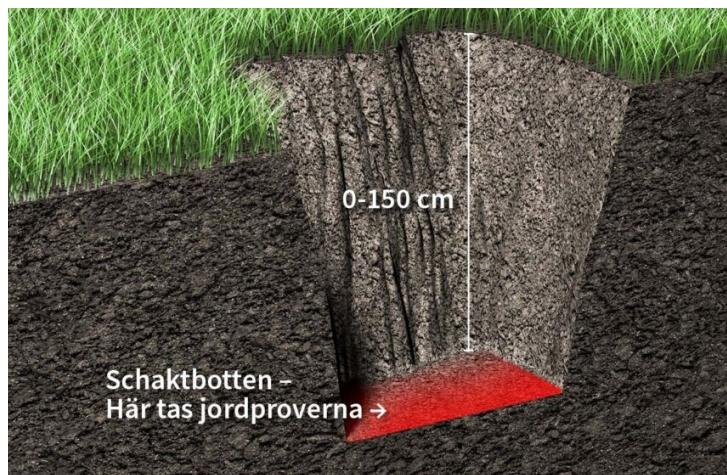


SOIL TEST

The soil sample should be taken in the same level as the intended excavation bottom.

Take the sample from the densest layer. If it is difficult to assess which layer is the densest, a soil sample is taken from each layer.

We recommend always making at least three test pits over the intended infiltration area.



PERCOLATION TEST

A percolation test shows how good the soil is at infiltrating water for a long time.

The test gives a so-called LTAR value (Long Term Acceptance rate), which describes the soil's ability to absorb a certain number of litres of water per m² and day. This value is then used to dimension the sewage plant.

It is the lowest LTAR value that is used when dimensioning.

Repeat the test at least twice on the same test, if the sink time is less than 5 minutes.

The results of the percolation test shall be completed in the table below in this document.

Then the surface of infiltration can be calculated by dividing a normal water consumption for a household for 24 hours with the LTAR value. The surface of the infiltration bed should never be less than 30 square meters.

You should estimate about 750-1000 liters of water per day for a household of 5 people for WC water.

For example, 850 liters of water divided by LTAR value 25 provides an infiltration area of 34 square meters using conventional technology.

If you want to reduce the surface area, you can use Biomoduer, treatment plants, etc., Please ask us for advice and guidance when choosing a product or how to interpret the result.

Test pipe	Sampling depth	Lenght of the sample	Time 1	Time 2	Time 3	LTAR value
1						
2						
3						
4						
5						
6						

Exemple of dimensioning of infiltration surface

Teströr	Provtagningsdjup	Provets längd	Tid 1	Tid 2	Tid 3	LTAR-värde (liter/m ² och dygn)
1	Nivå 1	6	2 min 15 s	2 min 5 s	2 min 4 s	30–40
2	Nivå 2	5,5	2 min 30 s	2 min 23 s	2 min 20 s	30–40
3	Nivå 3	8	4 min 15 s	4 min 20 s	4 min 20 s	25–30

The lowest LTAR value should be used when dimensioning, in the example above that is LTAR 25.

The surface of infiltration is obtained by dividing a normal water consumption for a household for 24 hours 850 l with the LTAR value. The area of infiltration is then $850/25 = 34 \text{ m}^2$.

There is a difference between dimensioning what the soil can take up water and what is required to purify BDT or WC water. The surface of a conventional infiltration bed should never be less than 30 square meters to manage the purification of the water regardless of the LTAR value you get.

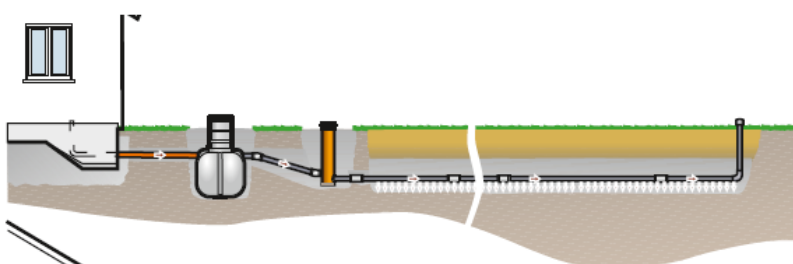
It is the surface of infiltration that counts, not running meters infiltration tubes.

Ground bed, infiltration or elevated infiltration?

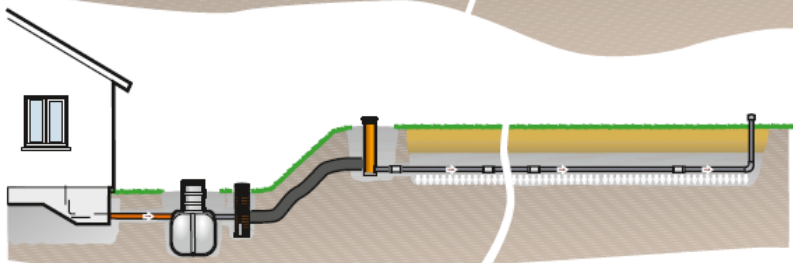
If the LTAR value is less than 15, a vertical or horizontal ground bed must be constructed.

If the LTAR value is between 15 and 70, a simple infiltration can be established if the protection distance between the diffuser pipe and the highest groundwater level is more than 1 meter. If the distance is less than 1 meter, an increased infiltration must be built.

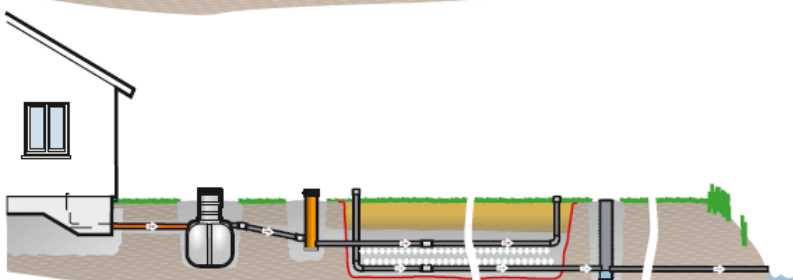
If the LTAR value is above 70, a reinforced infiltration must be applied. The safety distance between the diffuser pipe and the highest groundwater level must also be at least 1 meter in this example.



Infiltration



Elevated infiltration



Ground bed

Reduce the surface area, save installation time and gravel.

A conventional infiltration can be constructed where the permeability is LTAR 15-70, which gives about 30-45 m² infiltration surface.

Keep in mind that the service life of the infiltration is 10-15 years then it must be re-excavated. The old sand must be landfilled or remain in the ground and a new infiltration has to be made elsewhere.

With other technologies such as biomodules and treatment plants, the surface area can be significantly reduced and difficult soil conditions could be solved.

Baga Biomodul (infiltration area m² for wc + grey water 1 household)

If the LTAR value is less than 15, a vertical or horizontal ground bed must be constructed, 16-24 m² infiltration surface.

If the LTAR value is between 15 and 70, a simple infiltration can be established if the protection distance between the diffuser pipe and the highest groundwater level is more than 1 meter. If the distance is less than 1 meter, an increased infiltration must be constructed - 16 m² infiltration surface.

If the LTAR value is above 70, an enhanced infiltration must be constructed - 16 m² infiltration surface.

Baga Biotank manages all LTAR values, and the installation area is about 3 m²

FANN

IN-DRÄN Original infiltration could be built where the permeability is LTAR 10-100 - ca 10-50 m² infiltration surface.

IN-DRÄN Plus infiltration could be built where the permeability is LTAR 15-100 - ca 10 m² infiltration surface.

FANN conventional infiltration could be built where the permeability is LTAR 30-100 - ca 30-45 m² infiltration surface.

FANN Bio bed 5 handles all LTAR values and the installation area is about 3 m²

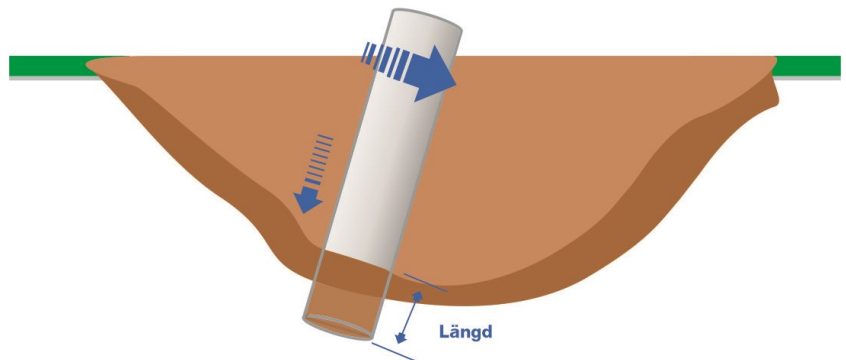
Biokube & Topas purifiers could all be connected to a sludge separator and has an installation area of 2-4 m² plus any emission surface.

Dont hesitate to contact us if you need help with dimensioning, products or if you need help to contact an installer.

How to do the Percolation Test

1)

1) The attached pipe is used to take a soil sample directly from the ground. The soil sample should be 5cm long. Make sure the soil sample is compact.



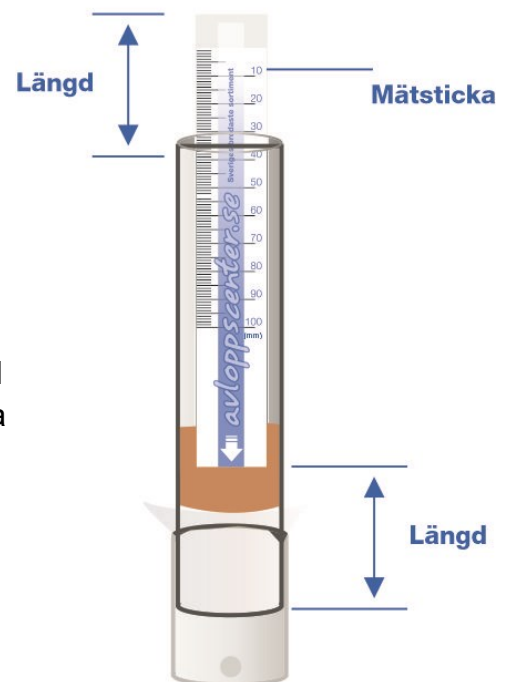
2)



2) Put the filled test tube in the holder. The filter is placed between the holder and the pipe. Slide the pipe all the way down to the bottom of the holder - make sure the holes are down.

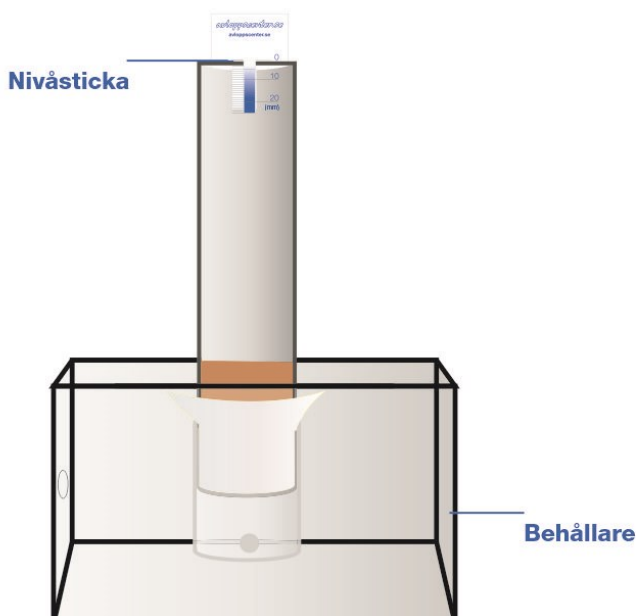


3)



3) Measure the length of the soil sample with the dipstick. Make a note of the length.

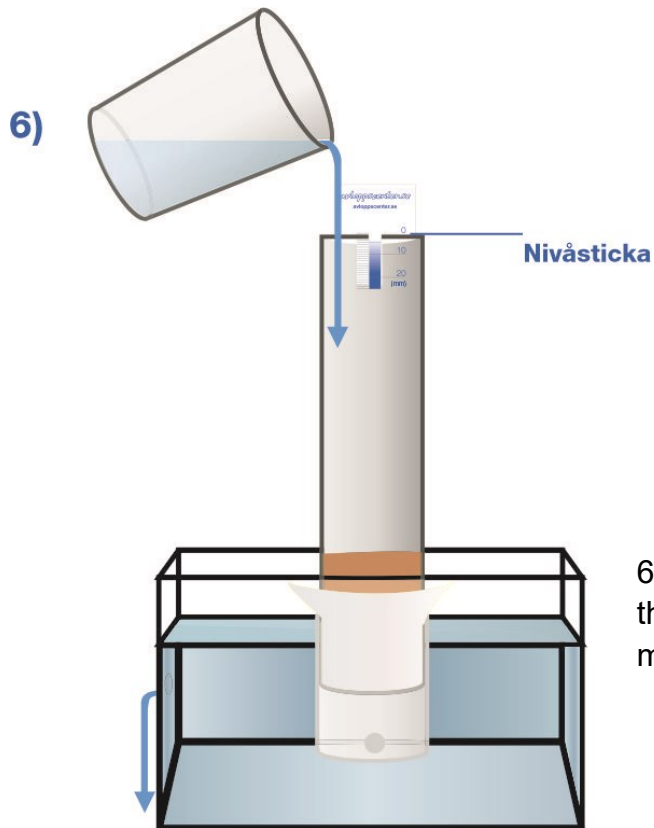
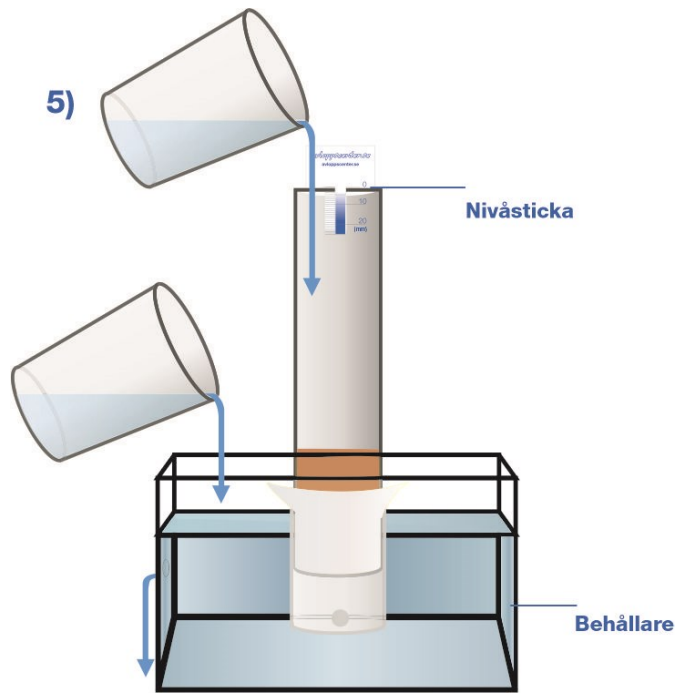
4)



4) Place the level stick on the top edge of the pipe. Place pipes and holders in the container.

How to do the Percolation Test

5) Fill the water in the box so that the water flows out of the holes. Fill the pipe with water so that the sample is completely saturated.



6) Fill with water so that it reaches up to the edge of the pipe - 0 mm on the measuring stick.

8)

Stoppa tidtagningen



7)

Starta tidtagningen



8) Stop the timing when the water reaches 25mm and record the time. Fill with water and repeat the timekeeping 3-5 times for a safer result.

Avläsning av LTAR sker genom att man ser inom vilka diagonala linjer, som resultatet hamnar.

