

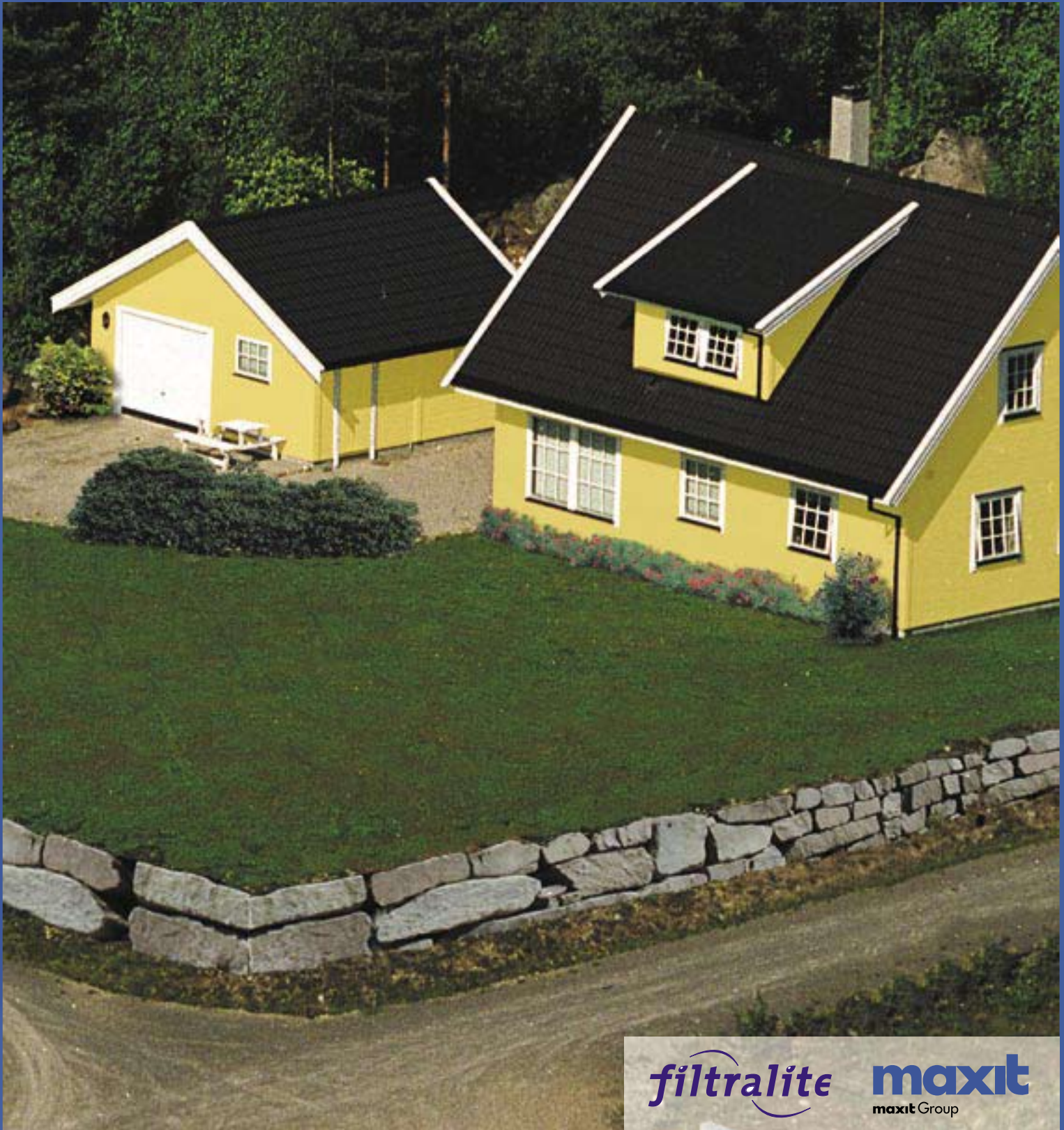
# Onsite wastewater treatment for small communities and rural areas

## Infiltration trench / Infiltration system

infiltration

soil

sewage treatment



**filtralite**

**maxit**  
maxit Group

# Onsite wastewater treatment for small communities and rural areas

## Infiltration trench / Infiltration system

- Norway has many scattered settlements and has a great requirement for good onsite sewage treatment solutions.
- Infiltration systems are robust, efficient systems that can be used at locations where there is soil suitable for infiltration. Since this treatment method utilises existing sand and gravel in the soil as a filter medium, these systems are generally cheaper than treatment systems that employ other treatment methods. At the same time infiltration systems give highly successful treatment performance.
- Infiltration systems can be built as treatment plants for sewage from toilets and/or showers, washbasins etc. They can be constructed as systems for individual houses, or as joint systems for several users located in the same area, e.g. small communities, schools, kindergartens or small companies.
- This brochure shows what an infiltration plant might look like for a single house with installed water and water toilets.
- The treatment performance of an infiltration system is dependent on the system having the right dimensions and being built properly. We recommend that an expert is responsible for the planning and construction work. Please contact our head office for a list of companies that possess the necessary expertise for designing and constructing infiltration systems.

### The Plant

The plant consists of a septic tank, a pump well and infiltration trenches (in this case two trenches). The sewage initially runs through the septic tank where the largest and heaviest particles sink to the bottom. The water is then pumped to the trenches via the manifold and infiltration pipes (perforated distribution pipes), which spread the water evenly over the surface of the trench. The water trickles through the distribution network, through the Filtralite in the trenches and into the underlying soil. Treatment of the wastewater occurs in both the septic tank and trenches as well as in the underlying soil.

Traditionally infiltration trenches are built up in layers as shown on the schematic diagram: the trench (approx. 75 cm deep) consists of a 25 cm deep distribution layer consisting of Filtralite NR 10-20 mm. An infiltration pipe is laid on top of the distribution layer, followed by a 5-10 cm deep layer of Filtralite NR 10-20 mm. A soil separation barrier (fibre membrane) is laid on top of the

Filtralite material, and this is covered with the previously excavated soil (covering layer).

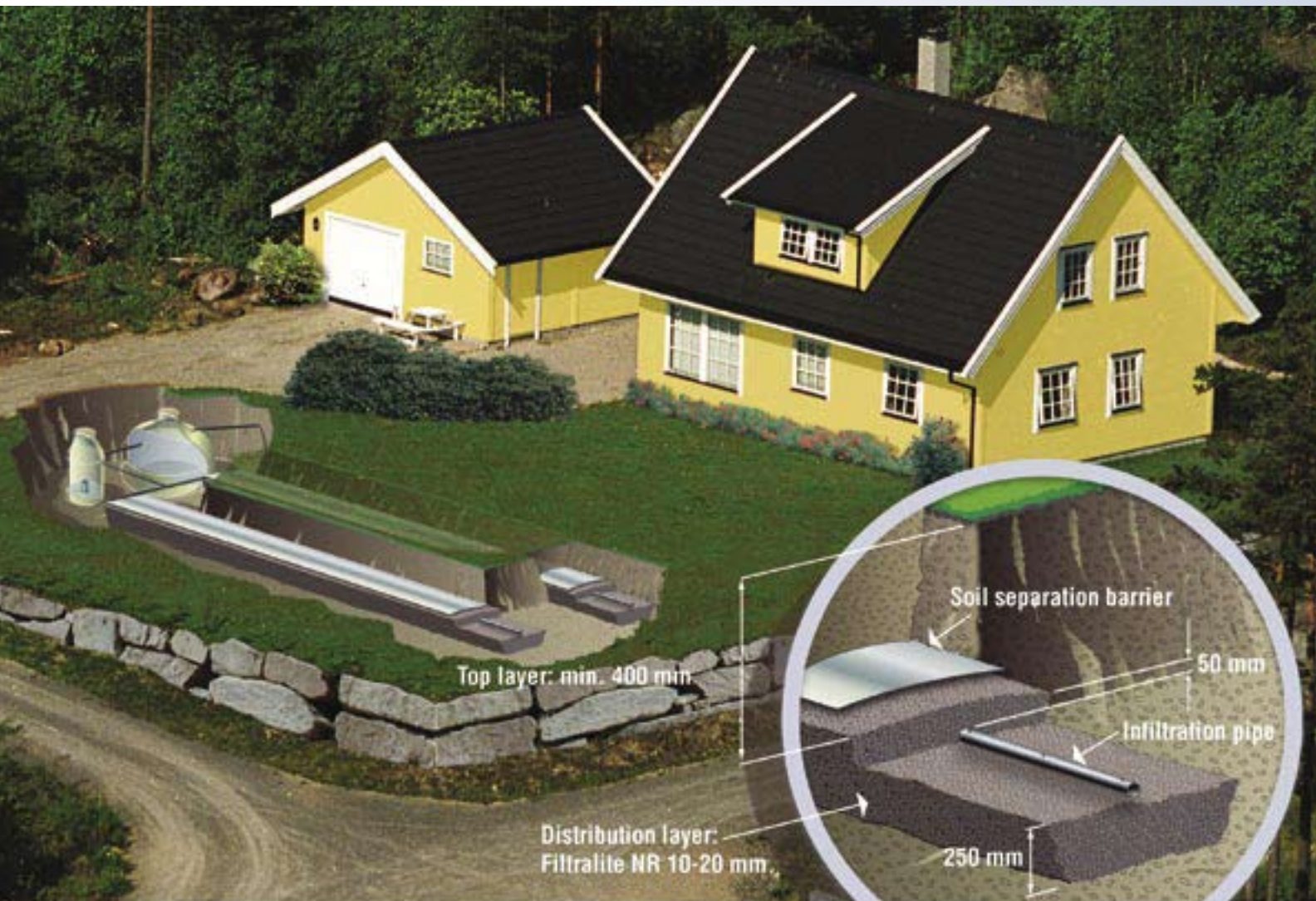
The top layer should be approx. 40 cm deep.

The soil separation barrier is necessary to both prevent the top layer from becoming mixed with the Filtralite and to prevent surface water from running down into the trench.

There should be at least 50 cm between the bottom of the trench and ground water level.

Trench lengths (or the size of the infiltration surface) will be dependent on the quality of the soil in the ground. In order to calculate the necessary infiltration surface, a ground inspection has to be executed by an expert.

The type of soil that is most suitable for infiltration is sand. Your local municipality will usually have a rough idea about where to find soil that is suitable for the construction of infiltration systems. It will often be necessary to undertake an infiltration test at the site where you are planning to build an infiltration plant.



### Distribution layer consisting of Filtralite NR 10-20 mm

Filtralite NR 10-20 mm is often used as distribution layer in infiltration systems. The reasons for this are as follows:

- Filtralite does not need to be washed and is ready for use when you purchase it.
- Filtralite has a low specific weight and is therefore quick to lay and level out. Filtralite can be supplied in bulk and can

be blown directly from the delivery vehicle to the trench using a hose. The blow hose can be up to approx. 50 m long.

- Filtralite has greater insulation properties than the soil found on site and it is an advantage to use it to provide insulation above the soil separation barrier.
- Filtralite is highly porous and therefore provides good ventilation throughout the trench. This improves the treatment performance.

### Treatment performance

The following treatment performance can be achieved, provided good infiltration materials and correct design and construction methods:

PARAMETERS	% REMOVAL
Total phosphorus	> 95 %
Total nitrogen	> 35 %
Organic matter (BOD7)	> 95 %
Suspended solids	> 95 %
Bacteria (E.coli)	Very good

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## Filtralite

Filtralite consists of specially manufactured Leca granules designed specially for water and sewage treatment. The porous structure of the granules give a large, accessible surface that attracts pollutants in the water. This is one reason why Filtralite is eminently suitable for water treatment. There are a number of different types of Filtralite that are used in various types of treatment processes.

## Guidelines

The Norwegian foundation entitled «NKF og NOR-VAR's VA/Miljøblad» has produced «VA/Miljøblad No. 59» (magazine no. 59 for water, sewage and the environment): «Closed infiltration systems», which provide guidelines for design and construction of these types of systems. The system shown in this brochure is based on «VA/Miljøblad No. 59».

## «Ordinary» conditions

If the ground is suitable for infiltration, an approx. 50 m long trench is often adequate for a single house with installed water and water toilets. This means that there will be a requirement for approx. 15 m<sup>3</sup> Filtralite NR 10-20 mm, a septic tank, a pump well with a pump, miscellaneous pipes and the soil separation barrier.

Please contact our head office for help to find a consultant and supplier in your local area.

## Lawn

Infiltration systems are built under the ground, and grass can be sown on top of them. Trees must not be planted on top of or near systems.

## Long life

Infiltration systems generally last for more than 20 years, provided that they have the correct dimensions and are properly built and run.

## Maintenance

Infiltration systems are robust systems, which require little maintenance.

## Frost protection

Systems can be protected from the frost by

- increasing the depth of Filtralite above the infiltration pipe or
- laying a self-regulating heating cable.

Infiltration systems that treat a regular load (systems for houses which are inhabited throughout the year) will not normally require insulation.

Systems for holiday homes (houses only inhabited for part of the year) should be protected from the frost.

## Ground inspections

Please contact your municipality regarding possibilities of building infiltration systems.

Your local municipality will usually have a rough idea about where to find soil that is suitable for the construction of infiltration systems. It will often be necessary to carry out an infiltration test at the building site. In some areas your municipality might be able to carry out this test for you.