

SOIL WATER PERMEABILITY TEST

The planning and execution of hydrological- and soil technical projects (for instance drainage and irrigation) is almost always preceded by geo-hydro-logic research. The water and air permeability of the soil to a large extent determines how efficient an irrigation- or drainage system functions.

Determining the saturated water permeability (horizontal as well as vertical) can be executed in the field (see P1.60) or in the laboratory with a soil water permeameter.

In case of the laboratory soil water permeameter use is made of undisturbed soil samples taken in soil sample rings with the soil sample ring kit (see also P1.31).

09.02 Soil water permeameters

In principle it is possible to design the soil water permeameters in any required size. The size is determined by the number of soil samples of which the saturated water permeability is to be determined simultaneously.

Designs for 5 up to 25 soil sample rings can be supplied.

The permeameters are available for soil sample rings with an external diameter of 53, 60 or 84 mm.

A closed or an open system can be applied. In case of a closed system a storage cistern, a circulation pump and a filter are provided.

If an open system is applied these attributes are not needed, as in this case the setup allows a connection to the main water supply and drainage to take place in a washing basin.

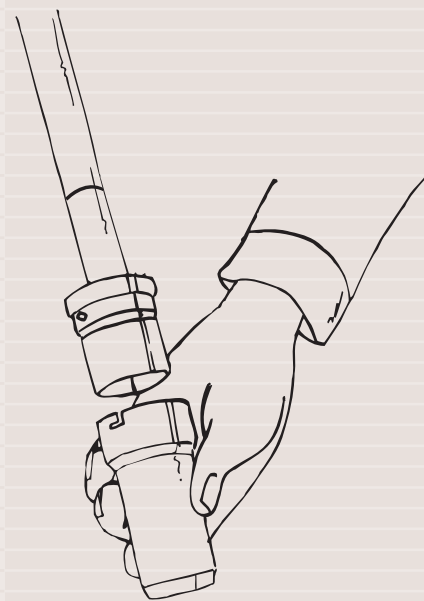
A closed system offers the facility to measure other fluids than water from the main water supply.

In case of samples from a salty environment, for instance, salt needs to be added to the water.

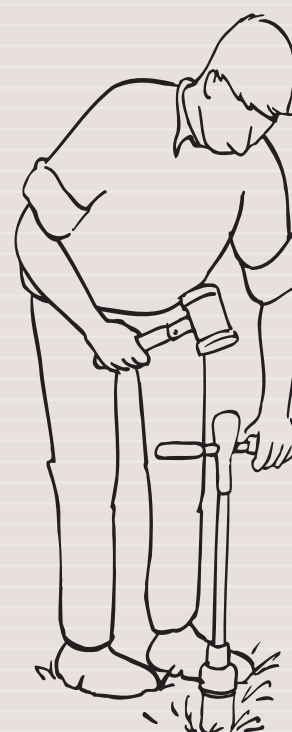


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For laboratory tests undisturbed samples in sample rings are necessary: before sampling the cutting shoe (with sample ring in it) is connected to the ringholder.



An undisturbed sample is taken with the ringholder, whereafter it will be analysed in the permeameter.



Soil water permeameter for 10 samples, closed system

Eijkelkamp
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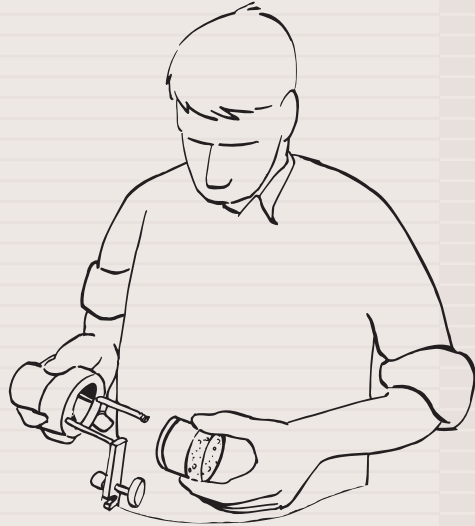


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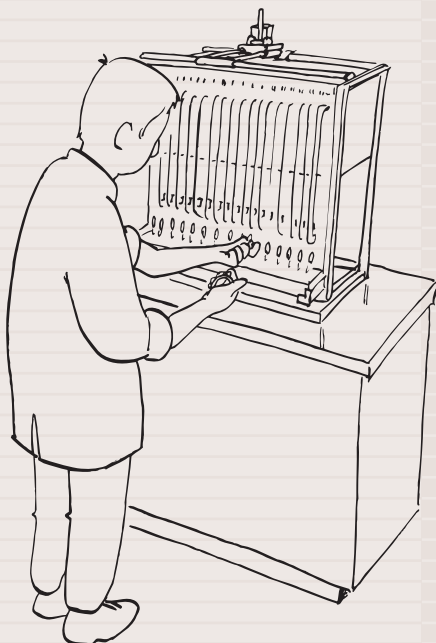


SOIL WATER PERMEABILITY TEST

The soil sample ring fitted with a sieve disc and filter gauze is placed in the sample ring cartridge of the permeameter.



By catching the drained water in a burette during a fixed period of time (cm³/min) and applying a certain formula, the K-factor (=permeability factor) of the soil sample involved, can be determined.



Advantages

The advantages of a closed permeameter compared to an open system are:

- Location independence as no drainage is needed.
- Constant water temperature, equal to the temperature in the laboratory, guarantees constant viscosity.
- Always the same water quality.
- Saves water.

Applications

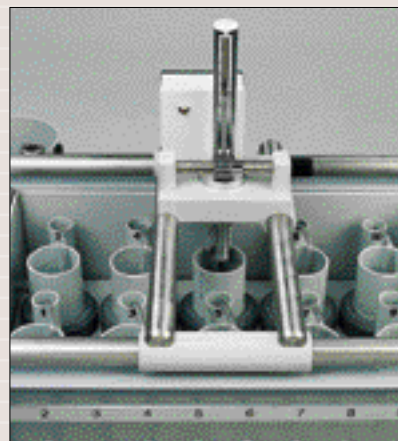
The soil water permeameter is used for measuring the saturated permeability of undisturbed soil samples in sample rings.

The permeability factor (K-factor) gives accurate information about:

- The presence of disturbing soil layers which prevent a speedy outflow of precipitation.
- The correlation between permeability and other soil properties such as porosity, granular composition, etc.
- The vertical and horizontal permeability.

With these data one can derive further conclusions for the benefit of:

- Irrigation and drainage systems.
- Well pumping.
- Subsidence phenomena.
- Predictions concerning the spread of polluting fluids resulting from calamities.
- Soil improvement- and maintenance advice.



Measuring bridge of permeameter



Soil sample ring kit, complete set



Sample ring cartridge