

SOIL AIR PERMEABILITY TEST



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P1.88

The soil pore system is dependent on the quantity, shape and continuity of pores. It can be described by the water and air permeability of the soil. Permeability to fluids is quantified by hydraulic conductivity or air permeability, respectively.

Eijkelkamp Agrisearch Equipment supplies an comprehensive air permeameter set to measure air permeability, soil moisture tension and volume percentage soil moisture in the field and in the laboratory.

14.34 Air permeameter to measure and register the air permeability of soil and soil samples (in situ and in the laboratory).

The very comprehensive set includes a standard air permeameter for connection to various chambers. With a measuring range of 0.03 - 60 cm/sec. The air permeameter has a built-in datalogger and RS 232 output and is also equipped with a connection plug for a tensiometer and soil moisture sensor.

The instrument is supplied together with software

and charger. The stored data can be transferred to a PC for further processing.

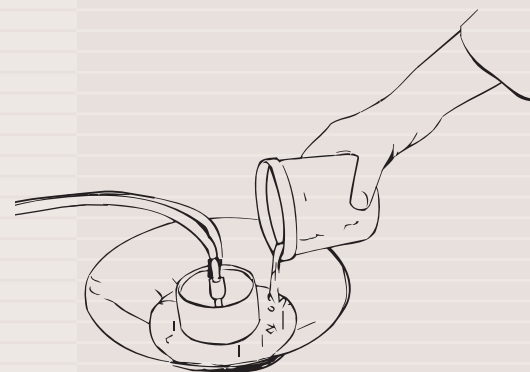
In the set 3 different chambers are included to measure:

- Homogeneous flow according to Darcy, with integrated pressure sensor. With connection tube and quick connect coupling. The measuring chamber is pressed several centimetres into the soil.
- Heterogeneous flow in undisturbed soil. The measuring chamber is placed on the soil (incl. ring screen).
- Air permeability in undisturbed samples in 250 cc soil sample rings (diameter 84 mm).

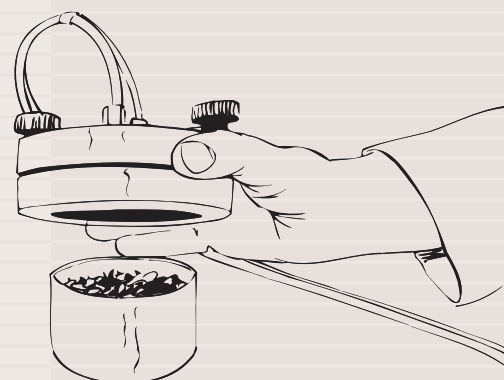
The set includes also an electronic tensiometer and a soil moisture sensor (TDR principle) for connection on the air permeameter.

An electronic balance is included to weigh the samples. A calibration measuring chamber for the air permeameter is also part of the set.

A viscous gel is applied to seal the space between the ring screen and the measuring chamber.



The sample ring is placed in the measuring chamber.



Air permeameter, comprehensive set

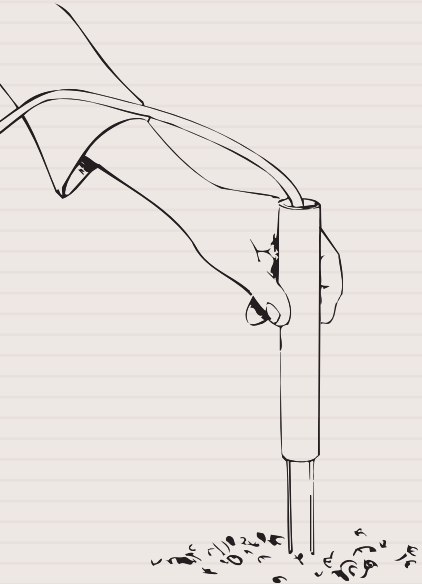


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The soil moisture sensor is pressed into the soil.



Reading out measurements in the field.



The data can be read out and processed on a PC.



Measuring principle

By analogy to hydraulic conductivity, air permeability is defined according to Darcy's equation as the factor of proportionality between the rate of air flow and the pressure gradient along the flow distance. The air permeameter realizes the respective flow forms with different measuring probes. A suitable measuring chamber produces a defined air flow in the test soil volume. Its flow rate is determined from the pressure gradient over a calibrated throat in the measuring device. The pressure difference over the soil volume that has been passed by the flow is recorded by another pressure sensor and provides the pressure gradient of that flow.

Advantages

- ❑ Air permeability exactly according to Darcy's definition.

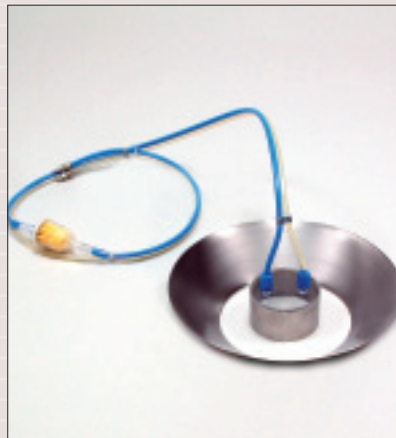
- ❑ Short measuring time, with low measuring pressure.
- ❑ No sampling.
- ❑ Various measuring chambers available.

Technical specifications

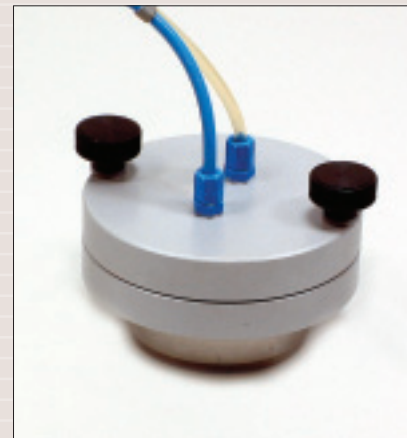
Measuring range	: 0.003 - 3 cm/s of air permeability
Measuring pressure	: 1 - 3 hPa
Stabilization time	: ca. 2 sec.
Chamber diameter	: 72 mm
Tension measuring range	: 0 - 800 hPa
Soil water measuring range	: 0 - 60 Vol. %
Data memory	: ca. 1000 measurements

Application

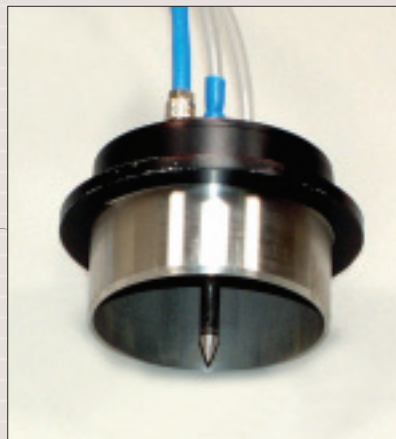
- ❑ Soil physics: permeability, compaction, rootability.
- ❑ Landfills: control of sealings and cover layers.
- ❑ Composting plants: process control via permeability with gas analysis.



Measuring chamber for heterogeneous flow



Measuring chamber for soil sample rings



Measuring chamber for homogeneous flow



Tensiometer and soil moisture sensor