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Hydraulic conductivity test kit



The standard Hydraulic conductivity test set is suitable for measurements to a depth of 6.6 feet (2 meter). The Hooghoudt variant goes up to 16.4 feet (5 meter). The complete set can be transported in the field in a strong carrying bag.

- Infiltration and soil permeability research
- Ideal tool to determine drain spacings
- Perfect for K-values below groundwater table
- Perforated casing can be extended

Description

Method

When measuring hydraulic conductivity of soil, the auger hole method according to Hooghoudt can be applied for direct measurement in the field. With this method, the permeability of soil can be determined relatively fast and with a limited number of instruments.

The principle of this method is quite simple: a hole is bored in the ground to a certain depth below the groundwater level. After some time, the hole will fill with water up to said water level. This water is consequently bailed out. The time it takes for a new water level to establish itself is recorded. Using formulas and/or nomograms, this speed with which the water rises can be translated into the average permeability factor of the various soil layers.

The depth of the bore hole is dependent upon the groundwater level and the thickness and the permeability of the successive layers in the ground profile. **Product variants**

The standard set (09.01.SA) is suitable for measurements to a depth of 6.6 feet (2 meter). For measurements to a depth of 16.4 feet (5 meter) there is the Hydraulic conductivity test kit, Hooghoudt set (09.01.SB). This set includes the same items as the standard set; however, the 1-meter-long filter has been replaced by an extendable filter with a total length up to 16.4 feet (5 meter) (also including extension rods for the auger).

Applications

- Infiltration research
- Soil permeability research

Set contains

- Augers and bailers with extensions accessories
- Measuring tape with holder
- Floats with storage bag
- Stopwatch, including batteries
- Extendable casing/filters
- Spatula
- Carrying bag

Specifications

Hydraulic conductivity test kit	
Maximum measuring depth	6.5 feet 2 meter
Reading accuracy	1 mm
Registration type	Manual
Package size	46 x 10.6 x 9 inch 117 x 27 x 23 cm
Weight	57.3 lbs 26 kg

Guelph constant head permeameter 09.07



The Guelph constant head permeameter is used to determines the permeability in the root zone for measurements to a depth of 5.9 - 29.5 inch (15-75 centimeter). This is a complete set.

- Steady stat principle for optimum accuracy
- Easily transported, assembled, and operated by one person
- Measurements can be taken in 1/2 to 2 hours, depending on soil type

• Many additional accessories to add

Description

Method

The Guelph permeameter is a constant head permeameter that operates in accordance with the principle of the "Mariotte bottle". After making a borehole to the desired depth, the instrument is installed; the water slowly flows from the meter into the bore hole and will penetrate the soil. At a certain moment a saturated bulb is formed and the outflow of water from the permeameter reaches a constant value; this value is measured. Measurements can be taken in 1/2 to 2 hours, depending on soil type, and require only about 2.5 liter of water

The bulb is very stable, and its shape depends on the type of soil, the radius of the well and the head of water in the well. The shape of the bulb is included in the value of the C-factor (Reynolds et al., Groundwater Monitoring Review 6:1:84-95, 1986) used in the calculations. The set is equipped with 31.4-inch (80-centimeter) attachments that can increase the working depth. The maximum practical working depth is 10.3 feet (3.15 meter).

Accessories are available to expand the measuring possibilities of the permeameter. Measurements with the Guelph permeameter are meant for above the groundwater table. **Applications**

- Soil Permeability
- Environmental Monitoring
- Mining
- Soil Physics

Set contains:

- Guelph constant head permeameter
- Field tripod
- Augers
- Well brush
- Water container
- Vacuum test handpump, etc.
- In carrying case

Specifications

Guelph constant head permeameter	
Depth Range, Standard Unit	5.9 to 29.5 inch 15 to 75 cm (note: with Extension Tubes, measuring depths can be increased)
Auger Cutting Diameter	6 cm (2-3/8 inches)
Well Height Range	0.98 to 9.84 inch 2,5 cm to 25 cm
Hydraulic Conductivity Range	10-4 to 10-7 m/sec (10-2 to 10-5 cm/sec)
Collapsible Water container Capacity	11,36 liters

Guelph constant head permeameter	
Maximum Permeameter Capacity	3,18 litres Combined Reservoir cross-sectional
Combined Reservoir cross-sectional area (X value)	35,22 cm2 (±0,18 cm2 standard deviation)
Inner Reservoir cross-sectional area (Y value)	0,16 cm2 (±0,04 cm2 standard deviation)
Package size	53.9 x 5.9 x 7.0 inch 137 x 15 x 18 cm
Weight	46.3 lb 21 kg

Mini rainfall simulator for erosion test 09.06



The Mini rainfall simulator for erosion test, type LUW is a standard set for field use. It consists of a sprinkler with a built-in pressure regulator, a support for the sprinkler and a stainless steel bottom frame with gutter.

- Small weight; no trucks needed
- Long-lasting calibrated glass nozzles
- Supplies rain storm for comparative research

Description

Sensitivity to erosion is hard to measure as absolute values cannot be obtained. It is, however, possible to obtain a reasonable indication by means of a relative measurement. For such a measurement a rainfall simulator can be applied.

Method

With the rainfall simulator, the runoff and soil loss generated by a standardized rain shower is measured on a plot with standard surface area. The duration, intensity and kinetic energy of the shower are such that a high sensitivity of the test results for differences in soil properties is obtained.

The extent to which the soil is sensitive to erosion is determined largely by the composition of the soil. Knowledge of the sensitivity to erosion is important for the development of a certain plot.

Applications

• Erosion research

Set contains

- Rainfall simulator
- Soil wetting jar
- Water storage tank (20 liters)
- Sample collection box (2 liters)
- Sample bucket
- Stopwatch
- Accessories
- Aluminum transport case

Specifications

Mini rainfall simulator for erosion test	
Maximum measuring depth	0 m
Reading accuracy	1 mg
Registration type	Manual
Weight	48.5 lb 22 kg

Double ring infiltrometer 09.04



The double ring infiltrometer is a simple instrument that is used to determine the rate of infiltration of water into the soil. The rate of infiltration is determined as the amount of water per surface area and time unit, that penetrates the soil.

- Ideal for infiltration measurement of top soils
- Infiltration, irrigation and soil permeability research
- Triple rings to get a representative average
- Perfect for flood/furrow irrigation advice
- Stainless steel rings will last forever

Description

This standard double ring infiltrometer set is used for synchronous measurements in triplicate. Measurements are according to ASTM D3385-03 standard Test Method and DIN 19682. The measurement of water infiltration into the soil is an important indication for the efficiency of irrigation and drainage, optimizing the availability of water for plants, improving crop yield and minimizing erosion.

The double ring infiltrometer is a simple instrument used to determine the infiltration rate of water into the soil. The infiltration rate is determined as the amount of water per unit area and unit time that penetrates the soil. This rate can be calculated from the measurement results and Darcy's Law.

The standard set of the double ring infiltrometer consists of several sets of stainless-steel rings with different diameters (for transport reasons). Since vertically infiltrated water flows away to the sides, the outer ring of the infiltrometer serves as a barrier. Measurements are only taken in the inner ring through which the water flows almost vertically.

Applications

- Infiltration research
- Soil permeability research
- Irrigation research

Would you like more information or do you have any questions? Please download our brochure or contact our specialist.

Specifications

Double ring infiltrometer	
Measured parameters	Infiltration ratio
Reading accuracy	0.03 inch 1 mm
Registration type	Manual
Package size	25.5 x 25.5 x 19.6 inch 65 x 65 x 50 cm
Weight	123.5 lb 56 kg

Tension infiltrometer set



Measure the hydraulic properties of unsaturated soil with the Tension infiltrometer set. Suitable for on-site measurements.

- Adjustable tension settings
- Requires low volume of water
- Disc can be separated from- or mounted under the water tower
- Disc can be separated from- or mounted under the water tower
- On-site measuring

Description

Method

Tension infiltrometers are designed to measure the unsaturated hydraulic properties of soils. Water is allowed to infiltrate soil at a rate which is slower than when water is pounded on the soil surface. This is accomplished by maintaining a small negative pressure on the water as it moves out of the infiltrometer disc into the soil.

In contrast, the saturated hydraulic conductivity of surface soils is often determined with single or double ring infiltrometers. With single or double ring infiltrometers, water at atmospheric pressure is allowed to infiltrate soil, initially fast, and at a slower rate once the open spaces in the soil fill up with water. When the rate of infiltration has stabilized, the infiltration rate is measured and used to compute the saturated hydraulic conductivity.

However, because with ring infiltrometers water is pounded on the soil surface, a good portion of the water might infiltrate through cracks or wormholes, and a reduced amount will infiltrate through the soil matrix. By maintaining a small negative pressure on the water as it is infiltrating into the soil, water will not enter the large cracks or wormholes as much but will infiltrate through the soil matrix. The higher the negative pressure applied to the water, the more soil pores below the soil surface are without water, and thus the soil becomes more unsaturated. With the tension infiltrometer one can determine the unsaturated hydraulic conductivity.

The range of tensions that can be set is (for practical reasons) limited to tensions between 0 and 11.8 inch (0 and –30 centimeter) H2O. By setting the tension at or close to zero, one could obtain an infiltration rate that approximates the saturated hydraulic conductivity.

There are several methods that can be used to calculate the hydraulic properties from the tension infiltration data. One method assumes of a log-linear relationship between tension and hydraulic conductivity, as first described by Gardner (1958). This is a valid assumption for the optimum tension range of the infiltrometer. This method can be found in the literature and is described in detail in the manual that comes with the Ring infiltrometer.

Other methods to calculate the hydraulic properties from the infiltration data use inverse parameter estimation methodology to calculate the van Genuchten parameters (Simunek et al. 1994).

Applications

- Infiltration research
- Soil permeability research

Set contains

Ring infiltrometer

- Vacuum pump
- Manual

Specifications

Tension infiltrometer set	
Diameter disc	7.87 inch 20 cm
Inside diameter water reservoir	2 inch 5,1 cm
Inside diameter bubbling tower	1 inch 2,54 cm
Length water reservoir	31.9 inch 81 cm
Bubbling pressure membrane	11.8 inch 30 cm H2O
Reading accuracy	0.03 inch 1 mm
Weight	8.26 lb 3,75 kg

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