

R e p l y f o r m

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Please send me more information/a quotation about:

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- 09.02.02.10 Soil water permeameter
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- Send me the complete Eijkelkamp catalogue

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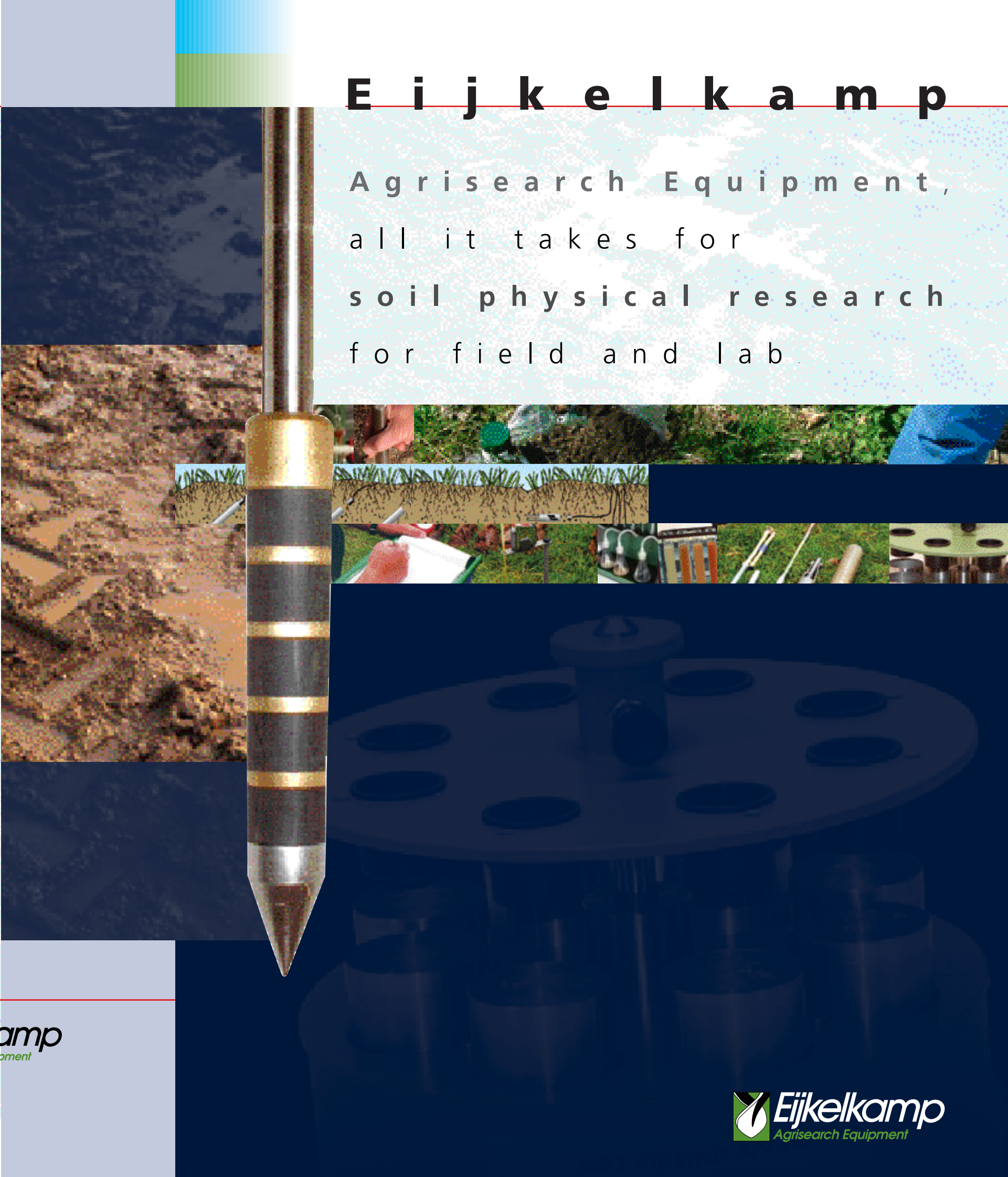
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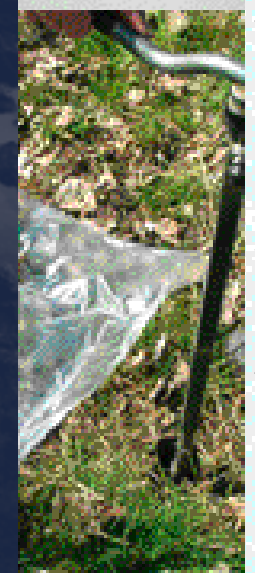
Eijkelkamp Agrisearch Equipment, all it takes for soil physical research for field and lab

Eijkelkamp Agrisearch Equipment BV is an international company that supplies all types of equipment in the area of environmental and agricultural research. The parcel of products that Eijkelkamp has to offer can best be described as equipment used for researching soil, water, plant, climate, land surveying and sludge and slurry. This all is for the benefit of agricultural, hydrological and environment-related studies. This brochure gives an overview of a range of equipment for soil physical research for field and lab, which are becoming more and more important with the growing interest in the parameters of the soil and soil water.



Sampling

01.11.SE Ergonomical soil auger set
In view of the limited scientific knowledge burdening the body and the lack of proper regulations with regard to Ergonomics, the awareness of the importance of ergonomically sound ways of working mostly has to come from the business world itself. For this reason Eijkelkamp Agrisearch Equipment developed the ergonomical soil auger set:



The ergonomic hand auger set for heterogeneous soils is used to carry out manual drilling and sampling in a great variety of different soils in an ergonomically sound way. It is particularly suitable for general soil investigation (description of the layering, geology, archaeology) as well as taking samples for such activities as environmental research. For every type of soil above or under the groundwater table there is an auger type that is specifically suited to that situation. The auger set can be applied for soil research up to a depth of 5.0 meters.



04.01.SB Single gouge auger for hard soils
Gouge augers are fitted with an almost half cylindrical operational part with parallel cutting edges running vertically, justifying the name gouge auger. The selection of the most suitable diameter depends on the composition and the structure of the soil and on the purpose of the research. In general a smaller diameter is applied in soils with a fine and/or dense structure, by comparison to soils with a loose structure.

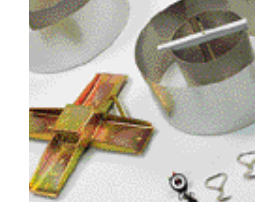


Because of the minimal disturbance of the sample, the gouge auger is frequently applied in profile research for: soil mapping, soil suitability reviews, educational purposes, root research, soil sampling for fertilization research, clay distribution research, paleontological research. Single gouge augers can be applied for depths up to 1.0 meters. The single gouge augers can not be extended and are supplied in various lengths and diameters. The set 04.01.SB is the set for sampling of tougher layers with a gouge auger

of a heavier design with standard diameter 30 mm, an impact absorbing hammer and accessories plus a carrying bag.

07.53.SC Sample ring kit
Soil research is a very important aspect of the planning as well as the execution of agricultural and civil engineering projects. The basis of a soil research is making a study of the soil profile and the physical properties of the soil. The physical properties of soils are largely determined in the laboratory. Such laboratory studies usually require undisturbed soil samples, preferably with uniform dimensions. To meet these needs, soil samples are taken in rings of known volume and diameter. For the collection of undisturbed soil samples in soil sampling rings, various sampling sets have been developed.

The sample ring kit can be used to take samples in rings with a diameter of 53 mm in virtually all soils. The samples can be taken on the surface, in auger holes or in profile pits, above as well as under the groundwater level. The closed ring holder in this set is fitted with a conical threaded connection, which means that the ring holder may also be hammered into the soil with an impact absorbing hammer (for hard soils).



Fieldwork equipment

06.01. Hand penetrometer Eijkelkamp. Set to a depth of 1 meter (06.01.SA) or 3 meter (06.01.SB)

Penetrometers are used to determine the resistance to penetration (bearing capacity) of a soil. The Eijkelkamp penetrometer is delivered in two different sets. Both sets can be used for probing to a depth of between 1 and 3 meter. Because of their depth range the devices can be applied for the following:

- General soil research
- Basic advise for foundations
- Checking artificial compaction of the soil
- Research of the growing circumstances (to be expected) of plants in the soil
- Tracing compacted layers in the soil

06.15 Penetrologger

The resistance of penetration is a means of determining the ground load-bearing capacity, and the ease with which roots will grow through the ground (important when agricultural, rural- and civil engineering techniques are involved). The resistance to penetration is a mechanical characteristic that, given a certain texture, depends on changing parameters such as degree of humidity, density and the strength of the connection between mineral particles. The penetrometer is a versatile instrument for in situ measurement of the resistance to penetration of the soil. Continuous measurements can be made with the penetrometer recording each layer of the ground profile up to 80 cm on the chart. The penetrometer can be applied in the agricultural - as well as in the civil engineering sector:

- General soil science research
- Foundation technology
- Checking whether or not the soil is suitable for agricultural purposes
- Research into (expected growing conditions for plants)
- The detection of compacted sub-soil layers
- Research into poor growing conditions of for instance trees in the city or in parks
- Checking artificially-made compactions
- Checking the suitability of soils for carrying vehicles or pedestrians

09.01 Hydraulic conductivity test kit, model Hooghoudt

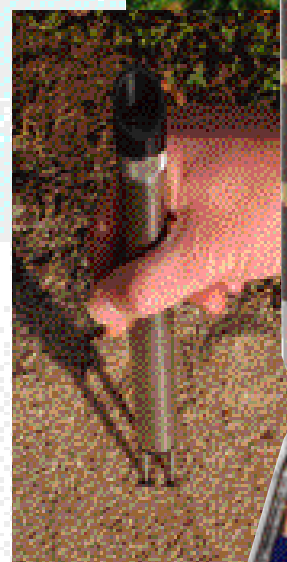
Determination of the water permeability, also called hydraulic conductivity, is important for

agricultural- as well as for environmental soil research. On the basis of the permeability factor (K-factor) irrigation- and drainage systems are designed. The permeability of the soil can be determined in the laboratory as well as directly in the field.

In case of direct measurement in the field the auger hole method according to Hooghoudt can be applied. Following this method the determination of the permeability to water of a soil takes little time, requires a limited number of instruments and the procedure is simple. The Hooghoudt set has been developed especially for use in soils under the groundwater table. The test kit can also be applied for determination of hydraulic conductivity of the unsaturated zone for septic system design, landfill design, and retention pond construction.

09.11 Ksat constant head permeameter

The Ksat constant head permeameter is an instrument that provides the means to collect data for determining in situ saturated hydraulic conductivity of the vadose (unsaturated) zone easily and conveniently. The main unit is used for measuring hydraulic conductivity to a depth of 2 m. The depth of measurement can be easily increased to 4 m by attaching a set of constant head tubes to the main unit. To measure below 4 m depths, a special flow measuring reservoir and a pressure transducer (available as optionals) are required.



The Ksat constant head permeameter can be used for:

- In situ permeability tests for drainage and/or irrigation
- Determination of hydraulic conductivity of the unsaturated zone for septic system design, landfill design, and retention pond construction.

09.06 Rainfall simulator

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. The sensitivity to erosion is hard to measure. Absolute values can not 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.

09.04 Double ring infiltrometer

The measure of infiltration of water into the soil is an important indication concerning: the efficiency of irrigation and drainage, optimizing the availability of water for plants, improving the yield of crops and minimizing erosion. The double ring infiltrometer is a simple instrument that is used to determine the rate of infiltration of water into the soil. The ring infiltrometer may be used for determining the rate of infiltration and capacity for irrigation and drainage projects, studying drainage, determining the intensity of artificial precipitation and the effect of treatment of the soil.

14.01 EC-probe for soil conductivity measurements

In irrigation areas, one is often confronted with salinization problems. In order to acquire the necessary understanding regarding these issues, it is very important to check the salinity of the soil regularly. Also in examining ecosystems that are influenced by salt water, it is necessary that we know the salinity of the soil. In some countries, salinization problems

can occur in road shoulders, as a consequence of salt sprinkling in winter. The EC-probe enables its user to determine the conductivity of a soil electrically. Standard set for measurements to a depth of 1 meter.

11.41.11 e+ SOIL MCT sensor

The e+ SOIL MCT sensor measures Soil Moisture, Conductivity and Temperature. Measured data are stored internally and can be transferred to the user via the e-SENSE telemetry system or directly to a handheld readout or PC. The applications are:

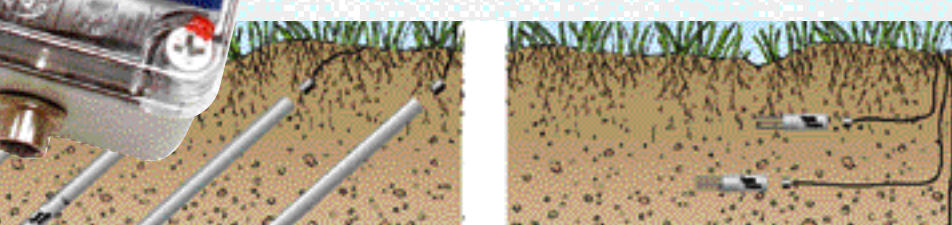
- Agri- and horticulture and plant science e.g. to monitor and control irrigation parameters
- Area's where the actual value or the change of water content is of importance
- Storage of foodstuffs before and during long-term storage

11.31 e-SENSE® field modems with 2 (11.31.12) or 8 ports (11.31.18)

With e-SENSE it is possible to configure and read data from various remotely located intelligent sensors (e+sensors). Popular intelligent sensors are e.g. Diver® or e+ SOIL MCT. Up to 8 e+sensors can be connected to the e-SENSE field modem. The modem sends the measurement data or alarms to the database on your desktop PC or to the database on an Internet site.

14.26 Thetaprobe soil moisture measuring system

The Thetaprobe soil moisture sensor measures the soil moisture volume percentage by applying the Frequency Domain technique. Soil moisture content is one of the factors determining optimal plant growth and crop production. The soil moisture content also plays an important part in environmental research for acidification and pollution.



Laboratory equipment

08.13 Wet sieving apparatus

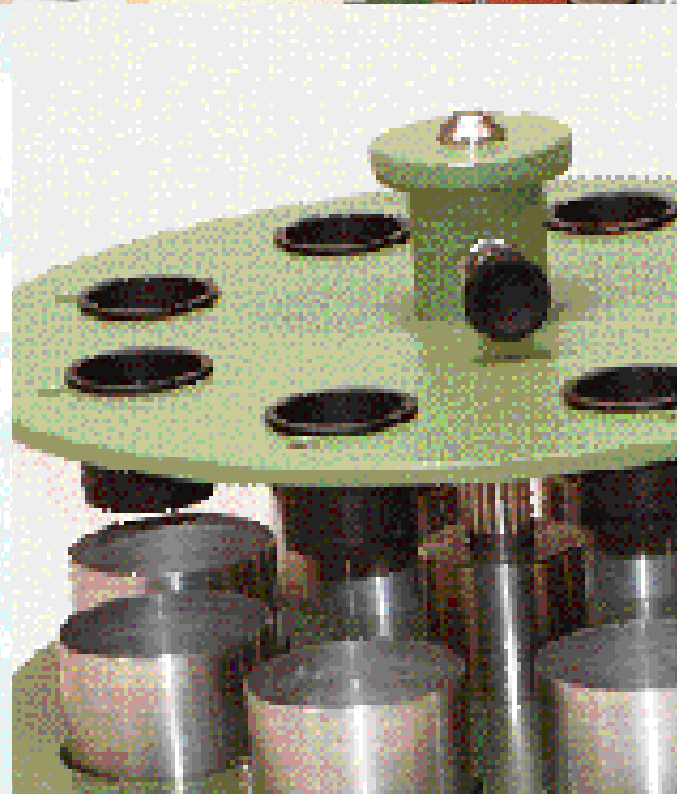
The aggregate stability of a soil is the resistance of soil structure against mechanical or physico-chemical destructive forces. Soil structure is one of the main factors controlling plant growth by its influence on root penetration, soil temperature and gas diffusion, water transport and seedling emergence and therefore it is an important soil characteristic for farmers. The wet sieving apparatus is used to determine the above mentioned aggregate stability. The wet aggregate stability is determined on the principle that unstable aggregates will break down more easily than stable aggregates when immersed into water. Applications of the wet sieving apparatus are the fields of agriculture and land conservation (research on soil erosion, land degradation / conservation, salinization, agriculture). Determining aggregate stability will give information on the sensitivity of soils to water and wind erosion, which might be prevented e.g. by mulching the soil surface. Information on soil aggregate stability can also improve tillage programs, adapted to the specific soil type and crop demands.

08.27. SA Set for pF-determination or pF-curve 0-4.2

The determination of the moisture characteristic (pF-curve) is essential when researching the quantity of water available in the soil for plants and trees. Depending on the desired measuring range underpressure (sandboxes) or overpressure (membrane apparatus) is used. For this task one uses undisturbed soil samples in sample rings taken with the sample ring kit (07.53.SC)

08.16 Pipette apparatus, table model (08.16.SA) or wall model (08.16.SB)

The particle-size distribution is one of the most important physical qualities of a soil. The division of soils (soil classification) is primarily based on particle-size distribution. A simple method for the determination of the particle-size is the pipette method. The method is based on the difference in sedimentation speed between small and large soil particles. The sedimentation of the particles is the result of two opposing forces: gravity and friction resulting from movement in a fluid medium.

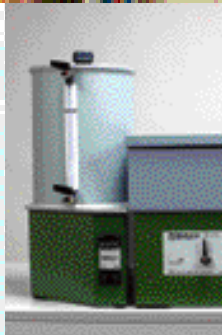


08.53 Calcimeter

The carbonate content of the soil is a sure indication of the fertility of the soil. To be able to determine the carbonate content of the soil Eijkkamp developed a calcimeter. The calcimeter works in accordance with the method of Scheibler. The method Scheibler involves a determination of the carbonate content in the soil based on a volumetric method.

08.60 Air pycnometer according to Langer

If the soil contains water and air there must be pores between the solid particles. For many reasons it is important in forestry and agriculture as well as in soil and water management studies to know the ratio of the different components. Growth is hampered if there is not enough water and air, and the soil is less suitable for agriculture if it is too porous; the strength of ground is reduced. It is important, therefore, to know the ratio between the amount of solid mass, water and air in a given volume. The air pycnometer has been developed to determine the volume and the density of the solid components (for instance soil). The apparatus is also extremely suitable to measure the volume of irregular shaped objects.



The pycnometer is applied where there is an interest in knowing the specific weight:

- Soil research, for instance the determination of the porosity of soil samples.
- Powder- and granulate research in the pharmaceutical industry.
- Measuring the pore volume of tarmac (road construction) or clay and bricks
- Volumes determinations of seeds, coffee beans, legumes, etc. in the food industry.

09.02 Soil water permeameter, standard apparatus for 10 samples (09.02.02.10)

The planning and execution of hydrological- and soil technical projects, such as drainage and irrigation, is almost always preceded by geo-hydrological 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 can be executed in the laboratory with a soil water permeameter.

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

Soil samples taken with the soil sample ring kit (07.53.SC) can be used for the soil water permeameter.

