

PF-CURVE DETERMINATION (CERAMIC PLATES)

Water relations are among the most important physical phenomena that affect the use of soils for agricultural (effective irrigation and fertilizer practices for the commercial growing of food stuffs) or engineering purposes. Determination of soil moisture characteristics can be done by many methods. One of them is the method of determination of pF-curves (pF 2.0 - 4.2) with ceramic plates.

08.25.SA Set for pF-determination with ceramic plates, minimal standard set

08.25.SB Set for pF-determination with ceramic plates, comprehensive standard set

The equipment is suitable for determination of pF-curves in the range pF 2.0 - 4.2 (0.1 - 15 bar of suction). Furthermore the sets are suitable for the calibration of soil moisture blocks or soil moisture measurement equipment.

The standard set contains amongst others: two extractors with ceramic plates (0.1 MPa, 0.3 MPa and 1.5 MPa, resp. 1.3 and 15 bar) and accessories, soil sample rings, a pressure control panel and a

compressor. Several ceramic plates with soil samples can be placed in the extractor at the same time.

The pressure control panel is standard equipped with two manometers 0 - 2 MPa and 0- 0.4 MPa (resp. 0 - 20 bar and 0 - 4 bar).

The included compressor (220V - 50 Hz) is specifically designed for this purpose: maximum pressure 2.0 MPa (20 bar), built-in safety precautions, completely guarded and quiet.

Principle

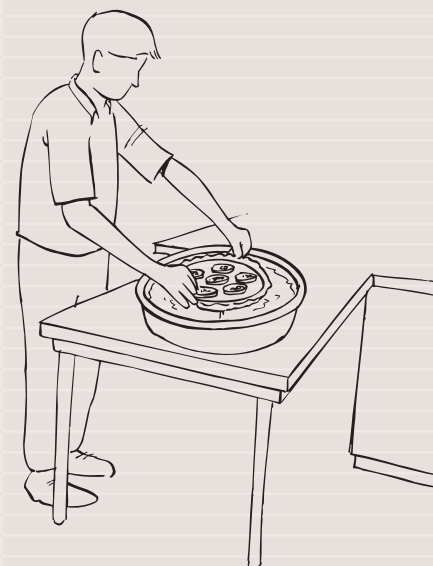
Soil moisture is removed from the soil samples by raising air pressure in an extractor. A porous ceramic plate serves as a hydraulic link for water to move from the soil to the exterior of the extractor. The high pressure air will not flow through the pores in the plate since the pores are filled with water. The smaller the pore size, the higher pressure can be before air will pass through.

During a run, at any set pressure in the extractor, soil moisture will flow around each of the soil

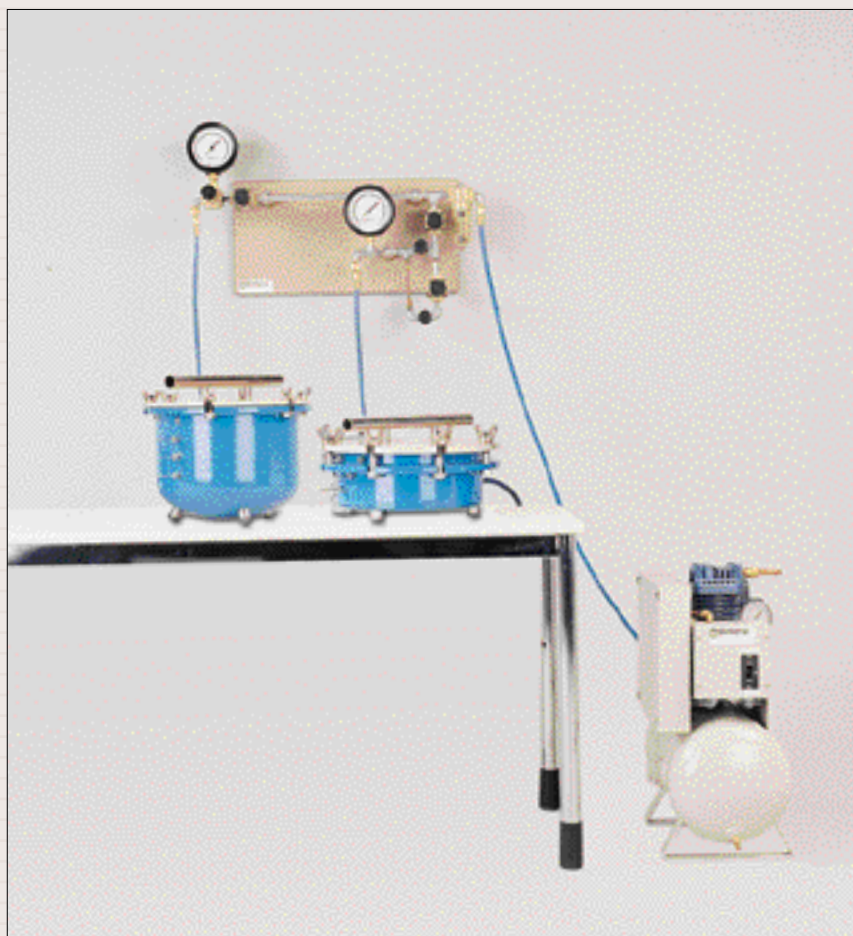
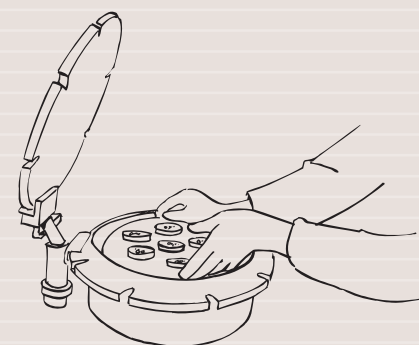


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The ceramic plate and the soil samples are completely saturated with water.



The ceramic plate with the samples is placed in the extractor.



Set for pF-determination (SB)

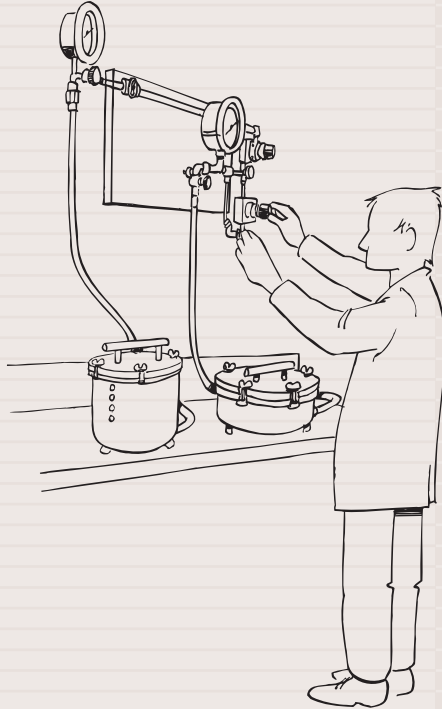


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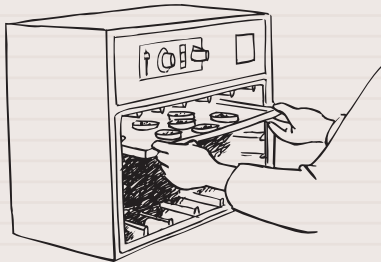


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**Adequate pressure adjustment
is possible with the control panel.**



**At the end of the run the samples
are weighed and oven dried to
determine soil moisture content.**



particles and out through the ceramic plate and outflow tube. Equilibrium is reached when water flow from the outflow tube ceases. At equilibrium, there is an exact relationship between the air pressure in the extractor and the soil suction (and hence the moisture content) in the samples. Accuracy of equilibrium values will be no more accurate than the regulation of the air supply, therefore the pressure control panel has independent double regulators.

Applications

When knowing the soil moisture characteristics it is possible to determine/calculate:

- The pore volume of the soil.
- The pore size distribution of the soil.
- The capillary-rise capacity.
- The air and moisture contents of the soil with a given groundwater level.
- Determination of field capacity and available soil moisture.

- Soil suction research in relation to germination time of seeds.

Advantages

Advantages compared to other methods, such as compaction, centrifugation, molecular absorption, etc. are:

- Relatively simple method.
- Reliable way of removing soil moisture, under controlled conditions, from soil samples without disturbing the soil structure.
- The method may be used on prepared samples or undisturbed soil cores.
- Soil structure is not disturbed

For each soil type the characteristic pF-curves may be developed. These curves relate the soil suction, at which moisture is held in the soil, to its moisture content. This relationship is important in studies of soil moisture movement and of quantity and availability of soil moisture for plant growth.



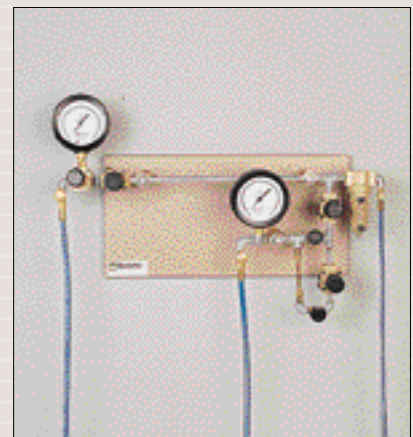
Extractor 15 bar



Compressor



Extractor 5 bar



Pressure control panel