

# SOIL MOISTURE SAMPLING

Soil moisture sampling is the sampling of soil moisture in the unsaturated zone of the soil. There are mobile systems and setups with a permanent location for continuous sampling. Depending on the purpose of the research it is possible to select between samplers in which the sampling is done via a polymer tube or via a ceramic cup.

Both samplers are available in various diameters and designs. With these soil moisture sampling systems the soil moisture is extracted directly and undiluted from the soil.

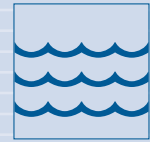
## 19.21 Rhizon soil moisture sampling set

With the Rhizon soil moisture sampler we supply a range of disposable miniature soil moisture samplers. The porous plastic material wets spontaneously and has standard 0.1 micron pores. The samplers are supplied with coextruded tubing (PE inside/PVC outside) 1 mm internal diameter, luer connector and protective cap. The sampler is reinforced by a wire. Dissolved organic and inorganic matter will not absorb on the soil moisture sampler.

The wetted sampler is placed preferably horizontally in moist soil. Water acts as a lubricant during inserting. Due to the minimal disturbance the soil will quickly settle, resulting in a good sampler-soil contact. The standard Rhizon soil moisture samplers are inserted through the wall of undisturbed soil columns and pots with plants. A sample is obtained by placing the sampler under vacuum. The vacuum is obtained using a vacuum tube or a syringe.

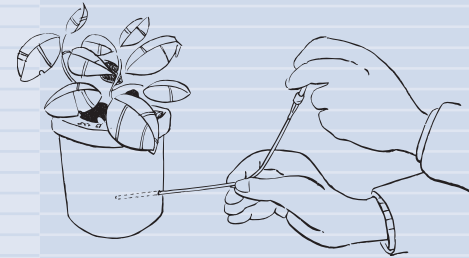
The Rhizon soil moisture sampler is available in a standard set with: Rhizon soil moisture samplers with a length of 10 cm (complete with PVC/PE tubing connectors and protective caps), a set needles with protective caps and a set of glass vacuum tubes with a 9 ml contents.

The standard set can be extended with various accessories such as: short Rhizon soil moisture samplers with a length of 5 cm porous material, syringes (to be used instead of vacuum tubes) connectors for connecting the syringes (including spacers for

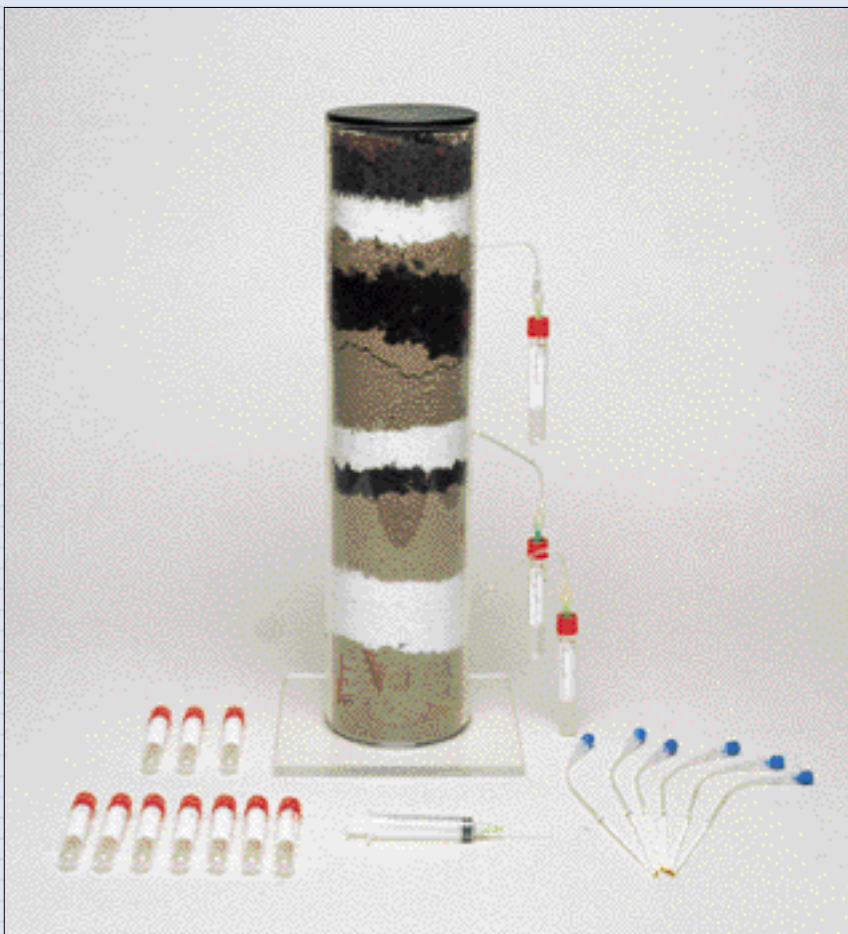
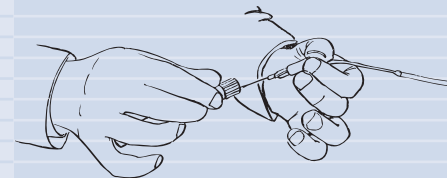


**P2.30**  
Parts List  
Pg 378

**A Rhizon soil moisture sampler is placed in a pot.**



**To extract a sample the soil moisture sampler is connected to a needle. Next the needle is pushed in the vacuum tube.**



Rhizon soil moisture samplers

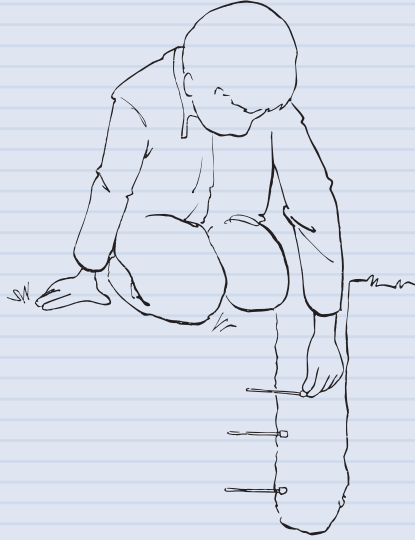


**P2.30**  
Parts List  
Pg 378-379

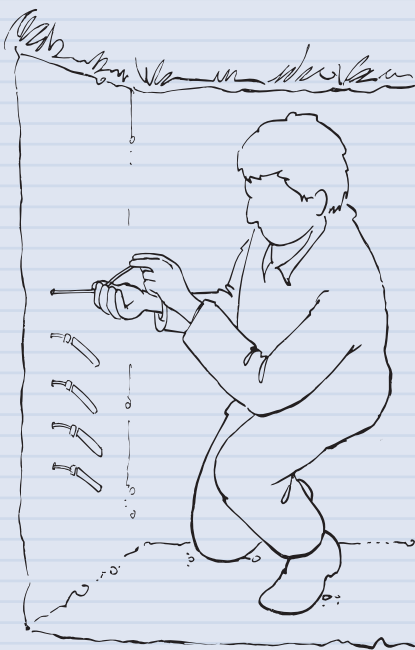


# SOIL MOISTURE SAMPLING

The Rhizon soil moisture samplers are placed in the wall of a bore hole.



Soil moisture samplers in a profile pit.



blocking the pistons of the syringes), connectors to connect the extension tube to the soil moisture samplers and (black) polyethylene extension tube.

For sampling metals a special Rhizon soil moisture sampler type **MOM** is available, with a length of 10 cm and a diameter of 2.5 mm, with glassfiber reenforced strengthening wire and 10 cm coextruded tubing.

For inserting in pots during filling, the Rhizon soil moisture sampler type **FLEX** with nylon strengthening wire is available.

The **Macro** Rhizon soil moisture sampler is especially suited for use in the field. The sampler has a length of 9 cm and a diameter of 4.5 mm. For installation at greater depths a PVC extension pipe can be used.

## Applications

The Rhizon soil moisture samplers are very suitable for pot-, cylinder- and column research (Macro

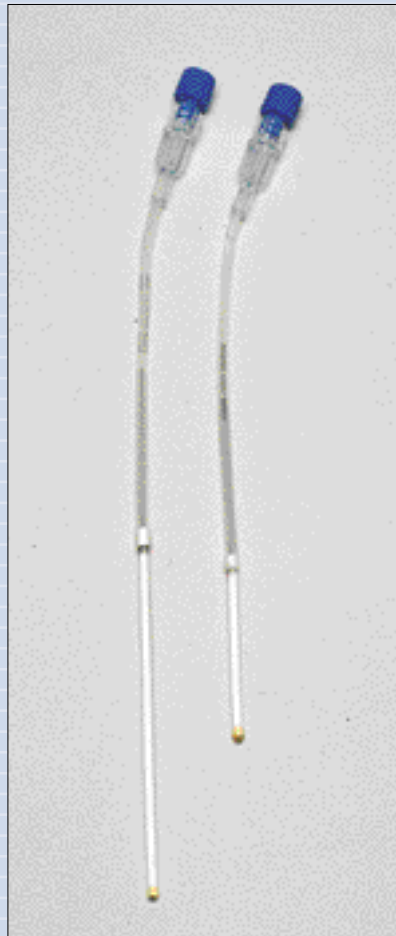
Rhizons for field research). Rhizon samplers are used when several soil solution samples are needed of the same soil volume in research of:

- Plant uptake of soluble nutrients as nitrate.
- Solubility of metals in soil.
- Transport of soluble components in soil.
- Accumulation of salts, etc.
- Environmental research.

## Advantages

- Minimal disturbance of hydraulic properties of the soil.
- Low dead volume < 0.5 ml.
- Minimal ion exchange capacity (less than soil).
- pH is not changed by sampling.
- Complete sampling systems (can be cleaned before use to suit specific demands).
- Inexpensive.

On special request we can supply custom-made samplers and accessories.



Rhizon soil moisture samplers



Rhizon with vacuum tube



Rhizon with syringe and spacer

# SOIL MOISTURE SAMPLING

**12.01.SA Soil moisture sampler system, minimal set for singular sampling to a depth of 1.5 m**

**12.01.SB Soil moisture sampler system, standard set for multiple sampling to a depth of 1.5 m**

Because of the small diameter of the ceramic cup applied and the fact that the probes can be extended, these are fast and mobile systems for sampling in different places and at various depths. Both sets operate according to the same principle. A hollow porous tube is placed in the soil. By creating an under pressure on the inside of the porous tube (with the vacuum pump or vacuum tank) the soil moisture will be drawn in.

The minimal set for singular sampling (12.01.SA) among other items, contains: an upper part, a gouge auger (for pre-drilling), a probe with porous cup, a stainless steel extension pipe for the probe, a push-/pull handle, a vacuum pump with manometer, teflon tube, a silicon stopper and

a case with sampling bottles, various accessories and a carrying bag.

In addition to the above mentioned, the set for multiple sampling (12.01.SB) also contains: an extension piece for the gouge auger, a number of extra insertion probes with extension pipes, suspension clamps for sampling bottles, a vacuum tank with pump suitable for connection of a maximum of 5 insertion probes, a utility rod (for safe detection of cables, lines and pipes) an aluminium carrying-/transport case.

## Applications

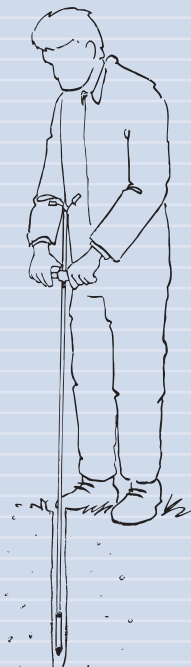
The sets are applied for the determination, among other facts, of:

- Salinity measurements in the soil after irrigation or the application of fertilizers or manure.

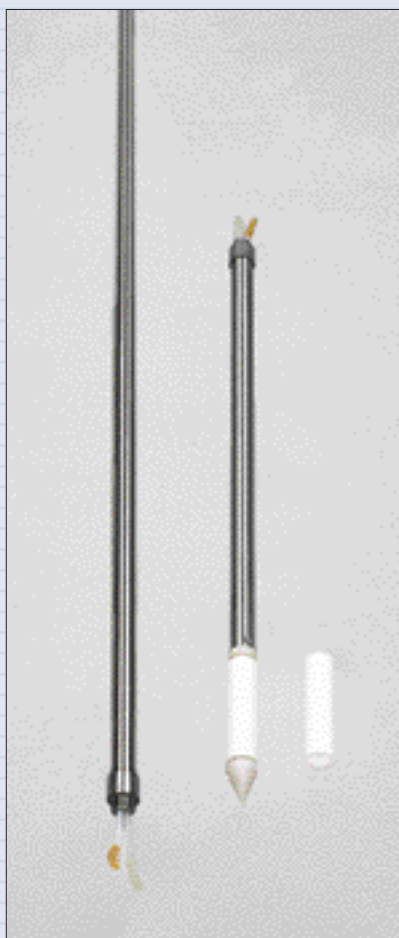
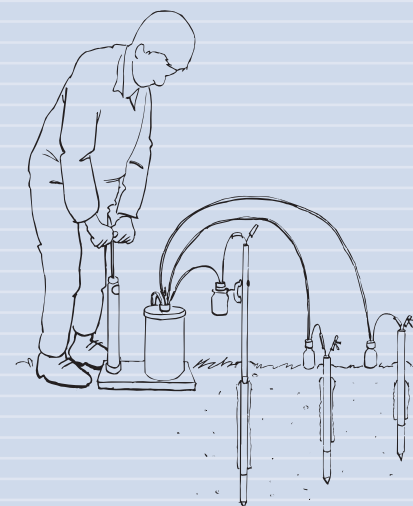


**P2.30**  
Parts List  
Pg 379-380

**Using the push-/pull handle the probe is pushed into the pre-drilled hole.**



**Using the vacuum tank several samples are placed under vacuum.**



Insertion probe and extension pipe



Soil moisture sampling system (SA)



Vacuum tank with vacuum pump

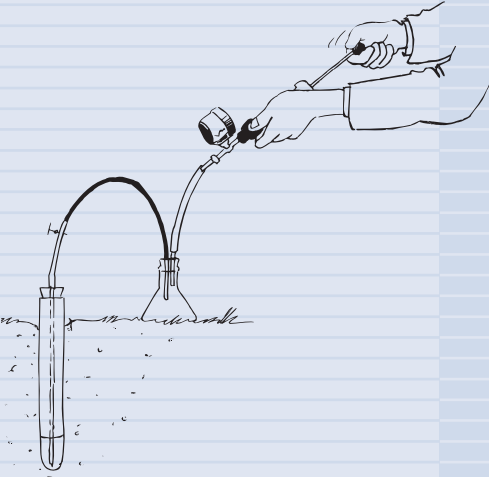


**P2.30**  
Parts List  
Pg 380-381



# SOIL MOISTURE SAMPLING

The soil moisture collected is pumped into the bottle using the vacuum pump.



The teflon/quartz probe is pushed into the pre-augered hole.



## 12.03 Soil moisture samplers with large ceramic cup

The soil moisture samplers with large ceramic cup are used for the same purposes as described previously. However, this type of sampler is buried permanently on a fixed location and at a fixed depth. Because of the larger cup it is possible to collect a larger amount of soil moisture in a relatively shorter period of time. The soil moisture samplers with a large ceramic cup are available in various lengths. An Edelman auger is used for pre-drilling the hole. In order to obtain proper contact between soil and sampler synthetic sand can be used. The under pressure is created using a vacuum pump fitted with a manometer.

The sample can be collected in a sampling bottle.

with gasket for glass bottle with 2 fittings for tubing 1.5 x 3.2 mm and a vacuum pump.

### Advantages

- Made of unbreakable and durable materials.
- Easy to install in the soil.
- Frost resistant.
- No contamination of the sample by porous material.
- Minimum sorption and interference.
- Individually tested to ensure correct function and high quality.
- Possible reinstallation at new sites after correct rinsing.

This soil moisture sampler combines the inert character of PTFE with the good hydrological conductivity of silica flour in a unique way.

The sampler works in all soil types, in all depths if the soil is sufficiently moist. All samplers are tested individually.

## 12.51 Soil moisture sampling system with teflon/quartz porous probes

Soil moisture sampling system with 3 inert teflon/quartz porous probes and 3 sample collection bottles contents 1 litre and 3 screw caps



Samplers with large ceramic cup and accessories



Soil moisture sampling system with teflon/quartz probes