

# Tensiometer

A water-saturated porous clay cell has an airtight connection via a water-filled acrylic glass tube to an interchangeable pressure gauge for measuring low pressure.

The water in the soil is under the influence of certain linkage forces with a corresponding water tension. Through contact between the water-saturated cell and the soil, the existing low pressure of the soil moisture is transmitted via the clay cell and the water filling to the pressure gauge, where the pressure level can be read off.

Mode of operation:

As soil moisture drops, the suction tension of the soil water rises, and this is displayed as low pressure by the pressure gauge. A necessary precondition is good contact between the clay body and the soil.

Measuring range:

0-600 mbar (=hPa)

Length:

30 cm and 60 cm

## Interpretation of the readings:

The optimal water content in the soil depends on the water suction and thus on the tensiometer reading. However, the suction varies very strongly according to the type of soil. For this reason there must be an own determination of the optimal suction value.

Optimal values :

**-100 up to - 300 mbar**

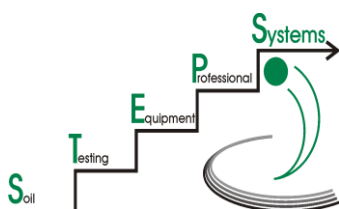
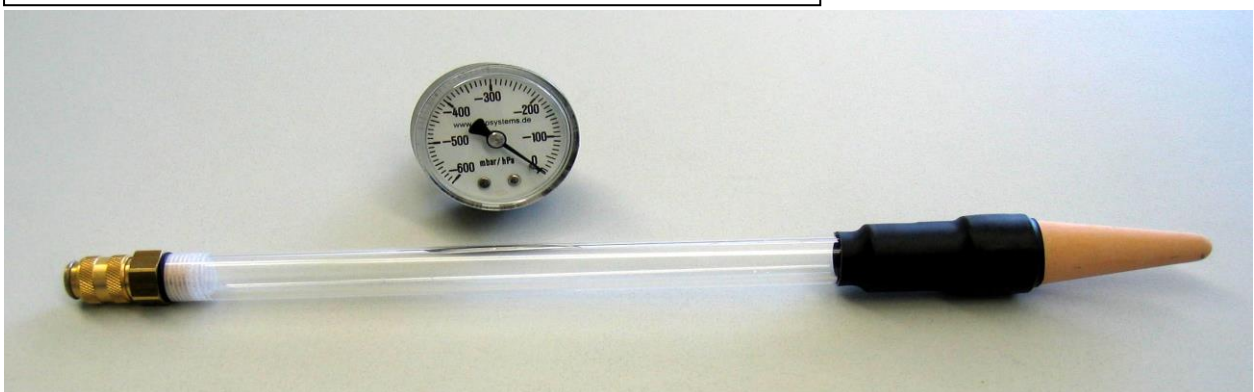
( -100 mbar start irrigation for sandy-soil,

- 300 mbar start irrigation for loamy, clayey soils)

## Attention:

The optimal values have to be adjusted to the conditions at the location, i.e. to the local, rainfall, climate, soil type, etc.

**Note:** the drier the soil, the higher the pressure on the manometer. A 100% water-saturated soil will indicate "0" on the display.



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# Operation Guide

To achieve optimal conditions for plant growing it is essential to know the amount of water available. This amount depends on the water suction capability of the soil. Thus, if the soil suction values are known from tensiometer readings, we will know when to irrigate.

## 1. Installation Preparation

Remove the plastic foil from the tensiometer. Put the porous clay tip in water for some time (about 12 h) that the air in the clay completely leaves the clay body.

## 2. Installation

Screw off the suction meter from the tensiometer tube. Fill the tube completely with tap water. Screw on the suction meter. No air may penetrate into the tube.

Place the tensiometer on a representative spot of the field. The porous clay tip should be in the same depth of the root zone. A close contact of the clay tip to the soil is very important. So, if necessary, prepare a hole by using a soil sampler, put the tensiometer inside and press the soil slightly against the tube. The whole surface of the clay tip must always be completely covered.

## 3. Maintenance

In general there is no maintenance required. Please check the water level in the tensiometer frequently. The level should be within the last quarter of the tube. If it is not the case, refill the tube with water. Check the tensiometer for tight sealing.

## 4. Recalibration

The pressure gauge must be able to react even to minimal force application; this means it is very sensitive. Through shock or strong temperature fluctuations however, basic settings can change. If the removed gauge does not return to zero, you can easily recalibrate it.

The protective glass on the bottom of the gauge has an approximately 5 mm milling. Sit a screwdriver at the milling and press the lid with a slight twist off. Put a pair of 5 mm open scissors under the pointer, to the left and right of the pointer shaft; cover the pointer with a film, because it can fly far off while pushing. Then pull lever-like the pointer off.

Set the pointer then on the pointer shaft back, so that it shows zero under the influence of atmospheric pressure. Finally re-insert the lid with gentle pressure.

## 5. Interpretation of the readings

The optimal water content in the soil depends on the water suction and thus on the tensiometer reading. However, the suction varies very strongly according to the type of soil. For this reason there must be an own determination of the optimal suction value.

### Typical Suction Tensions:

10 - 50 hPa	saturated to very moist
70 - 100 hPa	moist to moderately moist, for example, for peat substrate
150 - 200 hPa	moderately dry to dry
> 200 hPa	open field land, beginning dryness

