

Installing tensiometers

A tensiometer is a simple tool for soil moisture monitoring and irrigation scheduling. It measures the water tension in the soil which provides a guide to how hard the crop has to work to extract that water.

Tensiometers need to be correctly installed and then maintained to keep the device working well and reading accurately.

Before installation

- Fill the tensiometer with clean, fresh water. Water that has been boiled (to remove air) and allowed to cool is best. Fill the tensiometer slowly to avoid adding air to the tube.
- Remove the reservoir cap and leave the tensiometer to soak overnight in a bucket of clean water, stand the tensiometers up in the bucket.
- Remove air from the gauge and tube using a vacuum pump or by pumping the reservoir of the 'jet fill' types.
- Refill the reservoir with clean water, add a few drops of chlorine to inhibit algal growth and replace the cap.
- Wrap the tip in a wet towel to prevent it drying out during transport.

Installation

- Ensure there are no air leaks. The gauge and ceramic tip should be screwed on firmly but not over tight.
- Check the ceramic tip is not blocked. Water should be able to move freely through the tip.
- Position the tensiometer correctly. The ceramic tip should be within the active root zone of the plant.
- Auger or drive a hole into moist soil within the drill with a piece of 13 mm pipe. This will ensure good contact with the soil and minimal root disturbance.
- If the soil is dry, prepare a slurry of soil and water and pour it down the hole.
- Insert the tensiometer, pushing on the reservoir, not the gauge making sure it reaches the bottom of the hole.
- Leave at least 50 mm between the bottom of the gauge and the soil.

- Hill up the soil around the tube and pack it firmly to ensure good soil contact and allow surface water to drain.
- Service tensiometer 2-3 times in the first week after installation and then every time a reading is taken.
- Fill the reservoir as required and ensure that the fluid level after an irrigation is no more than 2-3 cm below the gauge.

Number of tensiometers required

- The number and length of tensiometers needed at each site depends on the crop type and rooting depth. In sugarcane it is recommended that two tensiometers (one 30 cm and one 60 cm long) be installed 30 cm apart in the drill.
- The shorter tensiometer is installed in the root zone to monitor crop stress. The longer tensiometer is installed below the root zone to determine if water is being lost to deep drainage.
- The number of tensiometers required on a block or farm depends on soil types, the irrigation system used and the accuracy required.

Common problems

Gauge always reads zero

- Check that there is water in the tensiometer, or the suction may have broken due to a low water level. Refill with clean water.
- Check that one of the connections isn't leaking. The gauge, reservoir and ceramic tip connections should be firm. Check that the O rings haven't perished.
- The gauge could be faulty. Check and replace if necessary.

Tensiometer is not recording the true moisture content

- There may be poor contact between the ceramic tip and the soil. Reinstall the tensiometer.
- Air bubbles could be present in the tube or vacuum gauge. Remove bubbles with a vacuum pump or by inserting a piece of 3 mm tube into the tensiometer tube to dislodge bubbles.
- The gauge could be faulty.

Tensiometer requires frequent refilling.

- The connection to the ceramic tip could be leaking. Check that the connection is firm and that the O ring has not perished.
- Check for other seal leaks.

Tensiometer responds slowly to irrigations

- The ceramic tip may be blocked. Remove and check for algal growth or salts. Clean or replace.
- The gauge could be sticking. Tap the gauge to see if the needle moves. Replace if faulty.
- The irrigation system may not be effectively watering. Move the tensiometer to another section of the field and check the readings.

