

# WATER & SOIL

## Tensiometer Testing

Tensiometers should always be filled with freshly boiled and cooled, deionised water. Boiling the water removes most of the dissolved air and gases. If unboiled water is used, the gases can come out of solution under the low pressure inside the tensiometer, causing a large 'air' bubble gap inside the instrument.

It is important when installing the tensiometer, to make sure that the ceramic bulb makes good contact with the soil. Any trapped air pockets between the ceramic and the soil can cause measurement problems.

It is also important not to let the installed tensiometer 'dry out' during measurements. In particularly dry soils, water is constantly draining from the tensiometer as it equilibrates with the soil suction levels, and so it needs to be regularly topped up. If the water level drops down to the ceramic, air is able to enter the ceramic pores and again causes measurement problems. If this happens, the tensiometer must be removed, drained, and refilled with freshly boiled and cooled, deionised water as if for a new installation.

If trouble still persists, follow these instructions to check the instrument's integrity:

Suspend the empty tensiometer in a holder or stand so that the ceramic tip is in free air and not touching anything.

Fill the tensiometer with freshly boiled and cooled, deionised water. Fill gently, lowering the green tube from the tensiometer to-up kit down into the ceramic, do not squirt water quickly into the tensiometer as this can add air to the water. Do not seal (either with the screw in the case of electronic tensiometers, or with the rubber stopper for septum tensiometers), but let the water drip through for about one hour (this will force the trapped air out from the ceramic pores).

Refill the tensiometer to the top and seal (with the screw or rubber stopper as appropriate). Take a pressure reading.

Make a note of the size of the increasing 'air' gap and take a pressure reading at 1, 2 and 3 hours. There should be approximately a 5-6 mm 'air' gap after one hour, which will increase to 10-12 mm after 3 hours. The pressure reading should increase to around 200 hPa after 3 hours.

If this pressure reading is not reached, empty the tensiometer and repeat the test, making sure the top seal is good (i.e. make sure the rubber 'O' ring is clean and in place and that the screw is tightened firmly - but not too hard, or the rubber stopper is firmly home). It often happens that a better seal is made the second time.

If the pressure reading reaches approximately 200 hPa, fill up again and install the tensiometer in the soil as soon as possible. (If there will be a short delay before installation, wrap the ceramic bulb temporarily in clingfilm polymer.)

If, after the second attempt, the pressure reading is still very low, place a piece of plain paper behind the ceramic and lower portion of the tensiometer. Look carefully at the water just above the ceramic line. A stream of very fine bubbles may indicate an air leak. This could be from a hairline crack in the ceramic, a leak in the glued joint, tensiometer head or top seal. If these bubbles are seen, please contact Skye, giving the results of the above tests, with times, air gap sizes and pressure readings and we can advise accordingly.

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