

Soil Tensiometer

The amount of water in the soil in **large part** determines how well trees will establish and grow. Lack of water is one of the leading causes of failure of newly planted trees. Likewise, mature trees with root damage from construction injury, root rot, or other factors also may die during drought periods due to their inability to take up adequate amounts of water. At the other end of the water spectrum, trees that receive excess amounts of water experience root loss and disease due to a lack of oxygen in the water saturated soil.

Determining available soil moisture is difficult and often inaccurate without the aid of a moisture-measuring instrument. While there are many different devices available, the most practical is the **soil tensiometer**. RTS uses and recommends the **MEA GDot** system. It is an easy to use, reliable, and low-maintenance soil tensiometer that measures soil water tension within the 10 - 100 kilopascal (kPa) range.

The following are approximate interpretations of the **MEA GDot** display readings. However, since the amount of water available to the tree is a function of soil water tension *and* soil type, these generic interpretations may need to be modified over time for each unique setting.

0 - 10 kPa: The soil is completely saturated with water. **No irrigation should be applied.** If this condition persists for more than a couple weeks during the growing season, some trees will be damaged. On the other hand, during dormant season rainy periods, readings in this range are common and not a problem for most trees.

10 - 20 kPa: This range is referred to as “field capacity.” **No irrigation is necessary.** There is adequate moisture and oxygen at this level to provide tree growth.

20 - 40 kPa: For **clayey** and **loamy** soils, **no irrigation is needed.** There is adequate soil moisture and oxygen. For **sandy** soils, irrigation should be started.

40 - 60 kPa: For **clayey** soils, **no irrigation is needed.** There is still adequate soil moisture and oxygen. For **loamy** and **sandy** soils, irrigation should be started.

60 - 100 kPa: Available soil moisture is low and irrigation should be started for **all** soil types.



Installed **MEA GDot** system pictured above

MEA

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GDot

GDot Soil Moisture Display

MEA's GDot displays soil moisture tension, a measure of how hard it is for the plant to extract water from the soil. Seven yellow flip dots means it's easy for the roots to access water. Falling yellow dots indicate that the plants are having to work harder. When only a few yellow dots remain, most horticultural crops are on their way to experiencing water stress, and that's your cue to irrigate. It's that simple.

- Suitable for most horticultural crops
- Low maintenance device
- Easy-to-read high contrast display

The GDot can easily be read at a glance from up to 15 metres away. GDots are tough, scratch- and UV-resistant and their brilliant chilli-red base prevents them from disappearing into the background of the crop foliage.

The GDot costs little more than a tensiometer with none of the maintenance issues.

The GDot can be installed in minutes with the most unsophisticated equipment. Auger a hole, bury the sensor in the active root zone and hang the GDot from a wire, screw it to a post or mount it on a length of 33mm pipe.

The standard 1.5m cable can be extended so you can fix your GDot to the end of a crop row, outside a fence line or at the edge of a centre-pivot crop, up to 100 metres from the sensor.

Applications

The GDot can be used in horticulture, vines, vegetables, tree and cereal crops. It can be used under drip, centre pivot, lateral and surface irrigation.



Specifications for GDot

Sensor Type	Granular matrix gypsum block
Measurement Range	<10 to 100 kPa
Output Signal	7 high-contrast flip-dots
Calibration Interval	Calibration not required
Dimensions (mm)	200 x 90 x 50
Weight (gm)	216

Gypsum Blocks

Gypsum Block Soil Moisture Sensors

Gypsum blocks are reliable, inexpensive sensors for measuring soil moisture tension. Gypsum blocks are a maintenance-free alternative to tensiometers. Soil moisture tension is a measure of how tightly water is bound to soil particles and indicates how hard the plant roots have to work to extract water out of the soil. Soil moisture tension is displayed as a pressure value, in Kilo Pascals (kPa).

- **Reliable, inexpensive**
- **Maintenance-free sensors**
- **No calibration required**

Gypsum block sensors are quickly and easily installed with unsophisticated equipment. Simply auger a hole to the required depth, insert the block and backfill the hole with a mix of sand, Bentonite and dirt.

The expected life of a buried sensor is 5 years (although this can vary according to soil type and typical moisture levels of your soil).

Moisture values can be recorded and displayed using MEA's Bug system of loggers, Retrievers and Bug software. Gypsum blocks can also be used with Plexus, MEA Radio and SML.

Applications

MEA distributes two types of gypsum block sensors - the GBLite and the GBHeavy - to suit different soil profile and irrigation needs.

GBLites are most suited for light soils however they can be used in all soil types.

Where deficit irrigation is required or the soil is poor draining, as is the case with heavy clays, GBHeavys are used.

Gypsum blocks can be used as single sensors, or in vertical arrays to provide soil moisture profiling.



Specifications for GBHeavy

Measurement Range	50 to 500 kPa
Suitable for	Heavy clay soils, deficit irrigation regimes or as a drainage sensor below GBLites.

Specifications for GBLite

Measurement Range	0 to 200 kPa
Suitable for	Most soil types and where greater resolution is required at low tension values.

