

Document Title: <b>Description, AN, Measuring Water content in organic soils with ECH2O probes</b>		Part # and Rev. <b>13395-00</b>	
Rev.	Description	Revision By	Date

**Production Filename:** 13395 (In Product Library)

**Path to Working Files:** DecaDoc\Application Notes\Master

**Dimensions:** 8.5 inch wide, 11 inch tall

**Material:** Paper, 92 Bright White or better, 75g/m<sup>2</sup> or heavier

**Colors:** Color Print on White

**Printer:** HP Color LaserJet 8550-PS

**Finish:** None

**Adhesive:** None

**Special Notes:** Illustrations are Ref Only \*\* Not to Scale \*\* (Shown page 1 of 4)



Application Note

**Measuring Water Content in Soil-less Media Using  
ECH<sub>2</sub>O Probes**

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**Introduction**

Since the introduction of the ECH<sub>2</sub>O soil moisture probe, there has been considerable interest in using them to measure volumetric water content of soil-less media such as potting soils, rockwool, and perlite. While it was possible to measure volumetric water content with the EC-10 and EC-20, their insensitivity to changes in water content above about 50% volumetric water content (VWC) made their use difficult in high porosity media.

The introduction of the EC-5 and ECH<sub>2</sub>O-TE (-TE) probes has made this measurement easier, more accurate, and more repeatable. The multi-prong design of the EC-5 and -TE allows for easy insertion into organic media, while the space between the prongs helps maintain sensitivity to 100% VWC, and the higher frequency of the measurement circuitry reduces the probes sensitivity to electrical conductivity and media type. Applications of these measurements include potted plant and greenhouse studies, where planting media typically have a high organic component, and seasonally flooded wetlands.

Because of the unique makeup of various soil-less media, it is important to approach VWC measurement in these materials with caution. Calibrations that work for one media type may not work well for another. For this reason, if a high amount of accuracy is required, users are encouraged to follow the calibration procedure in this note to obtain their own calibration.

The objective of this note is to present the procedure and results of calibration tests on soil-less media including potting soil, rockwool, and perlite.

**Materials and Methods**

The ECH<sub>2</sub>O-TE and EC-5 probes were calibrated in three media types: potting soil (Nursery Blend (Bountiful Farms), Sunshine Mix, and Miracle Grow ("Potting Soil"), rockwool ("Master", Grodan), and fine perlite. The EC-5 was tested at two different excitation voltages. Because of the unique qualities of each material, calibration procedures were developed for each media type.

**Potting Soil**

The general procedure of the potting soil calibration was to incrementally wet up the soil while collecting probe output and actual VWC data across the important range of water contents. The potting soil had pore water electrical conductivities of 3.1, 5.3 dS/m (Bountiful Farms), <1 dS/m (Sunshine), and 8.3 dS/m (Miracle Grow).

Each experiment started with near air-dry potting soil. A sub sample of the material was gently packed into a 250 ml beaker to a volume of approximately 200 ml and the ECH<sub>2</sub>O-TE and EC-5 probes were inserted fully (up to the black overmold) into the media and a reading taken. The beaker of soil was then weighed, dried in an oven at 70 C and for 48 h, and weighed again.