How to get the most from your Delta-T Devices WET Sensor

The WET Sensor is widely used in horticulture and it is a trusted tool for many growers for effective substrate and fertigation management.

But is the WET Sensor always used to its full potential and configured to give you the most accurate results?

This poster looks at a few aspects of the WET Sensor you may not be familiar with or fully appreciate.

Using the WET Sensor to measure fluid

Did you know that you can use the WET Sensor to estimate the EC of your nutrient solutions and drain water?

The WET Sensor is not specified for measuring EC in fluid, but it does a good job nonetheless.

As a simple test we compared measurements taken with two WET Sensors with a laboratory probe, EC probe (Oakton CON 100 Series).

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<td>NaCl</td>
<td>274</td>
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<td>NaCl</td>
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<td>NaCl</td>
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<td>Tapwater</td>
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<tr>
<td>Plant feed</td>
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<td>Plant feed</td>
<td>120</td>
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<td>118</td>
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For all the measurements the WET Sensors gave virtually the same reading as the laboratory instrument, and always well within its specified performance.

The WET Sensor can output pore water conductivity (ECp) and also bulk conductivity (ECb). For solutions under about 300mS.m⁻¹ both measurement options can be used. At solutions with higher conductivity levels the ECp option works best.

*The WET Sensor accuracy specification is based on a reading taken as the laboratory instrument, and always well within its specified performance.

How to test your WET Sensor

Is there an easy way to check that your WET Sensor is giving you an accurate EC reading?

Some growers use a certified calibration solution to test their sensor, such as the Conductivity Solution from Hanna Instruments (supplier code HE7830/35). This has a conductivity of 245 mS.m⁻¹ (245 mS.m⁻¹ at 25°C).

You will need to add the contents of two 20ml sachets together to get enough volume to completely cover the metal rods of the WET Sensor otherwise the reading will be inaccurate.

For the three substrates, WET Sensor measurement compared to the predicted EC of 245 mS.m⁻¹ for the solution at 25°C.

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<td>Coir (coco peat) and mineral wool</td>
<td>24.6</td>
<td>26.3</td>
<td>25.2</td>
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<tr>
<td>Oakton, 2015</td>
<td>132</td>
<td>135</td>
<td>135</td>
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<tr>
<td>Oakton, 2007</td>
<td>25.2</td>
<td>19.5</td>
<td>141</td>
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Neither probe in this case measured 141 mS.m⁻¹ exactly, but the WET Sensor was closest, its measurement again well within specified error. Perhaps check your sensor at the start of the season, and a couple of times during it. The WET Sensor is remarkably stable. Many of the tests in this poster uses a WET Sensor manufactured in 2007.

Effect of temperature on WET Sensor fluid EC measurement

For stable EC measurements in substrate it is clear that temperature compensation is needed. Without temperature compensation the measured pore EC varies significantly with changing temperature – charts for all three substrates show a similar trend to that observed with the Hanna solution (WET-Q). When the HH2 is set to a temperature compensated EC measurement (WET25 °C) the measurements become much more stable, denoted by grey shading on the chart which is an area covering ±5% of the estimated EC value at 25°C. Temperature compensated measurements falling within this grey area could be considered a more accurate estimate of pore water EC for that substrate at that temperature.

How to program your HH2 for temperature compensation

Press the ‘Set’ key in your HH2

Press Set key to select ‘Invert’

Press Set key to select ‘25°C’

Press Set key to confirm

The Hanna EC Calibration Solution has predicted EC values corresponding to temperatures from 0°C to 33°C.

For the Hanna calibration solution the EC at 0°C can range from 776 – 1575 µS/cm depending on temperature. (chart below is based on Hanna sachet table).

Pressure sensor can therefore range from 776 – 1375 µS/cm depending on temperature. (chart below is based on Hanna sachet table).

As a rule of thumb, depending on the dissolved salts, each degree C change in temperature can result in a change in EC measurement of 2% or more. This means that for an solution with an EC around 200mS.m⁻¹ a temperature change of just 10°C could mean an uncompensated EC measurement being wrong by perhaps 40mS.m⁻¹. Even in a well-managed polytunnel temperatures can easily fluctuate by more than 10°C in just 24 hours, and for a few weeks during a typical season temperatures can vary even more. This can have a huge impact on how you manage the EC of your substrate to maintain optimal growing conditions.

Effect of temperature on Hanna EC solution

This is important.

The EC that you measure will be subject to the temperature of your substrate or fluid, unless the measurement is compensated.