



Milwaukee Instruments EC – TDS General Information Sheet

INFORMATION FOR MILWAUKEE CONDUCTIVITY METERS

TDS Meter				EC Meter	
CF	ppm	ppt	g/l	uS/cm	mS/cm
5	250	0.25	0.25	500	0.5
10	500	0.5	0.5	1000	1
14.1	706	0.76	0.76	1413	1.4
15	750	0.75	0.75	1500	1.5
16	800	0.8	0.8	1600	1.6
20	1000	1	1	2000	2
25	1250	1.25	1.25	2500	2.5
27.7	1385	1.38	1.38	2770	2.7
30	1500	1.5	1.5	3000	3
35	1750	1.75	1.75	3500	3.5
64.4	3220	3.22	3.22	6440	6.44
128.8	6440	6.44	6.44	12880	12.88
193.2	9660	9.66	9.66	19320	19.99

Milwaukee Conductivity Meters, Electrical Conductivity (EC) and Total Dissolved Solids (TDS) measure the ability of an aqueous solution to carry an electric current. It is measured with a small electrical current flowing between two probes set 1cm apart. The E.C. as it is known, flows faster when a greater amount of salts are in the solution. Microprocessor technology scales the measurement of electro conductivity into either microSiemens/cm (mS/cm) or milliSiemens/cm (uS/cm). Using inbuilt scaling the meters can also show in aqueous solutions levels as TDS in parts per million (ppm). TDS is the concentration of a solution as the total weight of dissolved solids. (1ppm = 1milligram/ltr). For Hydroponics, EC meters are favored over TDS by commercial growers, simply because they give the best estimate of the strength of a nutrient solution. TDS is a rough estimate while EC is exact. The total TDS is a mass estimate and is dependent upon the mix of nutrients as well as the concentration while EC is only dependent upon the concentration of nutrients.

When measuring a hydroponics solution in TDS it is recommended that the conversion formula TDS in ppm X .70 (442 Factor) instead of the usual .5 for aqueous solutions to obtain the equivalent EC reading.

To convert from uS/cm to mS/cm you divide by 1000

Example: 1,000 uS/cm = 1.00 mS/cm

EC meter display in uS/cm to convert to TDS -- If your TDS meter is calibrated using 1382 ppm or 6.44 ppt then the conversion is (uS/cm x .50 factor) = (TDS) ppm

EC meter display in uS/cm to convert to TDS -- If your TDS meter is calibrated using 1500 ppm then the conversion is (uS/cm x .70 factor) = (TDS) ppm

Other examples:

2.00 mS/cm = 2000 uS/cm = 1000 ppm on .50 factor scale

2.00 mS/cm = 2000 uS/cm = 1400 ppm on the 442 scale or .70 factor scale

CONDUCTIVITY FACTOR CALIBRATION – microsiemens per centimeter (uS/cm) or millisiemens per centimeter (mS/cm). When using the Waterproof C66 conductivity meter in a nutrient solution after calibration, the Liquid Crystal Display (LCD) reading will be in mS/cm. A reading of 2.00 in the LCD is 2.00mS.cm or 2000uS/cm. It is worth noting that some articles in magazines and books mention EC values without specifying units. If the values are 1 to 5, it is mS/cm (dS/m has the same value) units. If the values are 10 to 50, it is in cF units. If the values are between 1000 to 5000 it is in uS/cm units.

TOTAL DISSOLVED SOLIDS – in parts per million (ppm)

The total TDS is a mass estimate and is dependent upon the mix of nutrients as well as the concentration while EC is only dependent upon the concentration of nutrients. TDS meters are designed for sodium chloride (salt) solutions where the conversion factor is $1\mu\text{S}/\text{cm} = .5\text{ppm}$. Because nutrient ions are on average much heavier than salt ions the true TDS is under estimated by 30% in a typical hydroponics solution. The conversion formula is only an approximation.

When choosing a TDS Milwaukee conductivity meter, select the TDS meter that is most suitable for your needs. The Waterproof T75 has a range of 0 – 1999 ppm and the T76 has a range of 0 – 9999 ppm.

FAQ on EC/TDS Meters and Testers

Q. Should I store my EC/TDS meter in solution like I do my pH unit?

A. Do NOT store your EC/TDS meter in any type of solution. After use of a EC/TDS unit rinse in tap water or soapy water to neutralize the acidic fluid that was tested.

Q. Does the temperature of my EC/TDS test solution affect the reading?

A. Yes temperature has an effect on the reading unless you have an ATC unit. Almost all Milwaukee Instruments EC/TDS units are ATC (Automatic Temperature Compensation)

Q. Do I have to calibrate before each use?

A. No, most units hold calibration very well. If you are using your unit every day then check it once a week. If you get a reading that is above or below what you were expecting then check the calibration at that point and retest your solution.

Q. There are many different brands of EC/TDS calibration solution to choose from, can I use one made from a company other than Milwaukee Instruments?

A. Yes and No: All manufacturers of meters and testers will tell you to use their specific calibration solution. That being said then Yes; most meter and tester manufacturers use the same calibration solution mix and quality control for their own meters so a 1382 for Milwaukee and 1382 for Oakton or Hanna are close enough to the same quality to be interchangeable. No, in that companies that DO NOT manufacture their own line of meters and testers do not understand and do not have the quality control necessary for production of the correct calibration solution. As a manufacturer, the use of the wrong calibration solution by the public is one of our biggest problems.

Q. How do I know what calibration solution to use with my meter?

A. You can find a Calibration and Probe reference chart for all of our units under the Technical Tips tab on our web site at www.milwaukeeinstruments.com

Q. Can I reuse my EC/TDS calibration solution small starter packet?

A. No, evaporation and contamination quickly change the mix. Value on small vol. (20ml) starter packets

Q. What are the symptoms of weak batteries?

A. For the end user to be assured that the readings are accurate and not worry about battery strength all Milwaukee Instruments units are designed to shut down when the batteries become too weak to give an accurate reading.

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