

EC, CF and TDS

What do all those letters mean?

Answer: Standard reference solutions are used. The bottles are marked with the conductivity (EC) value in microSiemens/cm and the corresponding ppM values for sodium chloride (NaCl) and potassium chloride (KCl) solutions, and sometimes for a "442" reference mixture. The conductivity of sodium chloride solutions is close to that of hydroponic mineral nutrients, so a "1000 ppM NaCl" standard is most frequently used when calibrating the meter for hydroponic solutions. You should follow the calibration instructions in the manual which the manufacturer of your meter provided.

What does a TDS or EC meter measure?

Answer: The electrical conductivity (EC) of your nutrient results from motion of mineral ions when the meter applies an electrical voltage. The ppM value of a sodium chloride solution happens to be very close to half of its conductivity value (in microSiemens/cm), so many meters display the conductivity as an equivalent NaCl amount.

What does the term parts per million (ppm) mean?

Answer: It is a common unit for measuring the concentration of elements in the nutrient solution. One ppm is one part by weight of the mineral in one million parts of solution.

How do I convert between TDS and EC readings?

Answer: To obtain an approximate sodium chloride TDS value, multiply the EC reading (in microSiemens/cm) by 1000 and divide by 2.

To get an EC value, multiply the ppm reading by 2 and divide by 1000.

Thus, if your EC is 1:

$1 * 1000 / 2 = 500$ ppm.

And if your ppm is 500:

$500 * 2 / 1000 = 1$ EC

Is it better to use an EC or a TDS meter?

Answer: If you have plant nutrient recommendations in EC units, an EC meter is convenient. If your plant nutrient recommendations are in ppM values, a sodium chloride TDS calibration is easier to use.

Why is conductivity of the nutrient important?

Answer: Conductivity is a measure of the strength of the nutrient solution. The higher the conductivity, the more dissolved solids there are in the solution. Delicate plants, cuttings, and seedlings can experience fertilizer burn if the conductivity is too high.

Once the plants begin growing, they need a stronger nutrient solution, so conductivity must be increased by adding concentrated nutrient. Some plants prefer a milder nutrient strength, while others grow better and produce better quality fruit with a higher concentration.

How does conductivity affect plant growth?

Answer: Conductivity is really a measure of the nutrients in the solution. Low conductivity implies a low nutrient concentration, which usually results in nutritional deficiencies and slow growth rates of your plants. One can look at the situation as a higher conductivity is more food for your plants. However, be careful of very high levels as this can burn and or kill the plant.

What about water temperature?

Answer: Temperature of the nutrient solution should be in the range of 65 to 80 degrees Fahrenheit (18 to 26 degrees Celsius). Before adding water to your reservoir, it is a good idea to allow it to come to the same temperature as the water in the reservoir. Plants do not like rapid temperature changes, especially in the root zone. Aquarium heaters can be used to warm the nutrient solution in the winter, and look for "chillers" to cool the solution in the summer if high temperature becomes a problem.

What about fresh air?

Answer: Ventilation is often overlooked as a problem. Plants absorb nutrients when the water molecules in the leaves respire (i.e. evaporate). Better ventilation aids a high transpiration rate, which translates into a greater rate of nutrient uptake. Remember that ventilation means changing the air, not just blowing it around the room (circulation).