



## **TDS Meter General Usage and Calibration Instructions**

### **Proper Usage**

- Immerse the meter in the water/solution up to the maximum immersion level (2").
- Lightly tap or stir the meter to remove any air bubbles.
  - *Pockets of air between the electrodes may interfere with the electrical current.*
- Wait 10-20 seconds for the reading to stabilize.
  - *In hot (or ice cold) water, wait 20-30 seconds for the meter to compensate for temperature. As the water temperature will adjust to room temperature, the reading will change to accommodate the proper compensation.*
- To ensure greater accuracy, turn the meter off and on for each reading.
- Shake any water off the meter after each use.
  - *This is to remove the droplets of water that may adhere to the surface between the sensors and the housing around them. These drops may interfere with readings.*
- Rinse in de-ionized water or other filtered water after use to ensure proper readings.
- Rinse in alcohol or acid after use in high-TDS beverages.
- The meter is not waterproof: Do not drop or submerge the entire unit in water.
- Do not store the unit in high temperature or direct sunlight.

### **Calibration**

- HM Digital meters are factory-calibrated at 342ppm NaCl and designed to stay consistent.
  - *However, you may need to recalibrate your meter from time to time, or for certain applications. TDS meters are most accurate when calibrated as close as possible to the sample to be tested.*
- To ensure accuracy and consistency, recalibrate your meter using a commercial standard solution. This can be done prior to usage and should be done after prolonged usage.
- For drinking water, we recommend calibrating within a range of 90ppm to 700ppm

**Step 1:** Measure the level of the solution (follow usage instruction above).

**Step 2:** If the meter does not read within 2% of the solution, adjust the reading by inserting a mini screwdriver into the trimmer pot (small hole on the rear of the meter). Gently turn the trimmer clockwise to increase the reading and counterclockwise to decrease the reading.

- *Make sure the screwdriver fits evenly into the groove of the screw.*
- *Note that the trimmer pot is very sensitive! Remove the screwdriver carefully.*
- *Try to keep the meter vertical.*

**Step 3:** Once the meter reads within 2% of the solution, gently release pressure on the screwdriver and remove from the trimmer pot.

- *If the screwdriver is retracted abruptly, the reading may jump.*

**Step 4:** With the meter in the solution and the reading at the correct level, press the 'HOLD' button. Let the reading hold for approximately 10 seconds to fully stabilize.

**Step 5:** Remove the meter from the solution. Shake it to remove any water drops that may adhere to the probes and casing, creating air gaps.

- *Water droplets or air gaps may cause the meter to display an incorrect reading.*

**Step 6:** Turn the meter off, wait a moment and turn the meter on again.

**Step 7:** Insert the meter into the solution and verify the reading. If the reading is accurate, calibration is complete. If not, repeat the procedure.



### TDS

Total Dissolved Solids correlates to the ability of water to conduct electricity. It is also an index used to determine the concentration of dissolved minerals. The more minerals that are dissolved, the more conductive the water will be. A TDS meter is calibrated to read in parts per million (PPM). TDS is the concentration of a solution as the total weight of dissolved solids. (1 ppm = 1 milligram/litre. TDS is a mass estimate and is dependent upon the mix of nutrients as well as the concentration.

### Conductivity

Electrical conductivity is a measure of the ability of a solution to carry a current and depends on the total concentration of ionized substances dissolved in the water. (the electricity flows by ion transport). Although all ions contribute to conductivity, their valences differ, so their actual and relative concentrations affect conductivity. When the concentration of ions is high, conductivity is high, and the resistance to electrical passage is low. No meters have the ability to distinguish between different types of ionic salts. Conductivity measurements are also complicated by the fact that not all salts conduct an electric current equally

### How the TDS meter works

TDS meters are, in reality, conductivity meters. They work by applying a voltage between two or more electrodes. Positively charged ions will move toward the negatively charged electrode, and negatively charged ions will move toward the positively charged electrode. Because these ions are charged and moving, they constitute an electrical current. The meter then monitors how much current is passing between the electrodes as a gauge of how many ions are in solution. This measure of conductivity,  $\mu\text{S}/\text{cm}$  is then converted to ppm by a factor of approximately 0.5, on a curve ranging from 0.46 to 1, depending on the level. The factor is related directly to the level of conductivity. This meter is built and calibrated according to an NaCl standard. Other meters may be calibrated to either a KCl standard or the 442 standard.

### What the TDS meter actually detects

Since TDS meters are often used to test water "purity," it is important to understand what they do not detect. As conductivity meters in disguise, TDS meters will only detect mobile charged ions. They will not detect any neutral (uncharged) compounds. Such compounds include sugar, alcohol, many organics (including many pesticides and their residues), and unionized forms of silica, ammonia, and carbon dioxide. These meters also do not detect macroscopic particulates, as those are too large to move in the electric fields applied. So if you see "rusty" looking water from iron oxide particulates, that won't be measured. Neither will anything else that makes the water look cloudy. Bacteria and viruses also won't be detected.

Total charged ions" is likely a much better term for what the meter measures. Fortunately, a measurement of total charged ions is good enough for most purposes.

### Temperature Compensation:

The conductivity of ions in water depends upon temperature. The ions are naturally moving around faster as they get warmer. When the same numbers of ions are moving faster, the apparent conductivity is increased.

Our meters are capable of compensating for temperature by simultaneously measuring the conductivity and the temperature. The internal electronics then take the temperature into account, and normally provide a value that is "corrected" to what the conductivity would be at a standard temperature (25°C).

### How external factors may affect readings

While pure water has a TDS well below 1 ppm, uncertainties from carbon dioxide in the air (which gets into the water and ionizes to provide some conductivity) and the TDS meter itself may yield results of 1 or 2 ppm even from pure water

The entire electrode assembly must be submerged in the sample without a lot of bubbles or solids present between the electrodes. So, for example, you cannot typically get a good reading by holding it in a stream of tap water because air often gets between the electrodes that way (resulting in an artificially low reading).