Selecting TDS Calibration Solutions

A Total Dissolved Solids (TDS) standard calibration solution should contain the same types of dissolved solids known to be in the test solution. Failure to do so will result in significant discrepancies between the ppm or ppt reading and the actual ppm or ppt of TDS in the test solution.

The easiest way to obtain a TDS standard calibration solution is to use a ready-made standard solution that has the same types of dissolved solids as the solution to be tested. These ready-made solutions offer convenience and accuracy. They are commonly formulated with either KCl, NaCl, $CaCO_3$ or a 442 natural water formulation (40% sodium sulfate, 40% sodium bicarbonate and 20% sodium chloride) to meet the majority of applications. Choose a ready-made calibration solution according to the following guidelines:

- Choose a TDS standard calibration solution that contains the same types of dissolved solids to be tested.
- Choose a TDS standard calibration solution that has a ppm or ppt value as close as possible to the value of the solution to be tested. If this is not reasonable because of the variations in the test solution, it is best to calibrate the TDS standard that has a ppm or ppt value in the upper one-third of the TDS indicator's measurement range.
- The following is a list of ppm TDS standard calibration solutions available for Eutech Instruments, with their contents and applications described. Standardization values of the calibration solutions are based on conditions of 25^{o}C.

Application	Solution Code No.	Use With	Adjust Display to:
TDS of KCl solutions, brines, general purpose TDS measurements	EC-CON-2764BS	TDScan High	1380 ppm
TDS of lake, stream, well waters, boiler and cooling tower feed waters, general water treatment	EC-CON-447BS	TDScan Low	330 ppm (442); 220 ppm (NaCl for brines)

It is possible that the above list will not contain a calibration solution appropriate for some applications. One solution to this problem is to have "tailor-made" ppm TDS standard calibration solutions. This is done by formulating a mixture of salts in relative proportions that simulate the solution to be tested, then dissolving this mixture into distilled water. This should be performed according to the formula:

1 mg salt mixture/liter of distilled water = 1 ppm TDS, or in other words

X ppm TDS = X mg of salts + one liter of distilled water

Remember that "X" mg of salts is the number of milligrams of a mixture of salts that's proportions simulate your test solution, NOT "X" milligrams of each salt in the mixture.

An appropriate value for "X" is determined by the following rule:

Try to choose a ppm or ppt for a calibration solution as close as possible to the expected ppm or ppt values of test solutions. If the test solution's TDS value is expected to vary a great deal, it is best to choose a ppm or ppt value for the calibration solution that is in the upper one-third of the TDS indicators measurement range.

Note TDScan Low, TDScan High are like all other dissolved solids testers in that they use the detected conductivity of a solution to give a direct reading in ppm (parts per million) or ppt (parts per thousand) of TDS. The relationship between Conductivity and TDS is greatly affected by the types of dissolved solids or salts present in the solution. It is absolutely necessary to use a calibration solution similar in dissolved solids content to the solution to be tested in order to get acceptable accuracy. Also it is recommended that the calibration solution be at the same temperature as the test solution to minimize temperature effect errors.