



## A Quick Guide to ISE Measurements

1. Remove the black protective caps from the ISE and the reference electrode (note that the reference electrode cap contains liquid and must be kept upright) and insert the electrodes into the labelled sockets of the ELIT dual electrode head.
2. Install the electrode head in any standard electrode holder and connect the cable to the BNC socket of the ELIT Ion Analyser, or to a pH/mV/Ion meter.
3. Lower the electrodes into a 1000 ppm solution of the appropriate ion and leave to stand (stir occasionally) for at least 5 minutes or until the millivolt output reaches a stable reading. If the electrode had not been used for a longer time, it could be necessary to soak the electrode for a longer time - 1 hour to 24 hours.
4. Meanwhile, make up at least three standard solutions to cover the concentration range expected for the samples (say 10, 100 and 1000 ppm) Note that these are concentrations of the ion to be measured, not the salt containing the ion.
5. When the mV reading is stable, remove the electrodes from the preconditioning solution, rinse with a jet of de-ionised water and dab dry with a paper tissue. **WARNING:** Do not leave the electrodes soaking in de-ionised water.
6. Lower the electrodes into the lowest concentration standard, stir with a magnetic stirrer at approx 100 rpm, or stir by hand at approximately 1 turn per second. Stop the stirrer or the stirring by hand and wait for a stable reading (can take 2 or more minutes for the lowest concentrations of some ions) - then record the voltage.
7. Repeat this procedure for the other standard(s). Note that for positive ions the voltage goes up and for negative ions the voltage goes down for higher concentrations. To avoid "carry over" always insert the electrodes shortly in a beaker with distilled water when moving from one standard to another standard.
8. When all the standards have been measured, plot a graph of mV versus Log of Concentration (or mV versus concentration on semi-log paper) to provide the calibration data - this is done automatically by the ELIT ISE/pH Ion Analyser software.
9. Wash the electrodes as before and measure the samples in the same way as the standards.
10. Plot the sample data on the graph and read off the sample concentration - also done automatically by the ELIT software.
11. For optimum precision, recalibrate after every ten samples, or when the temperature changes by more than 1°C.

At the end of the analyses, wash and dry the electrodes and replace the caps - to prevent drying out of the external filling solution of the reference electrode and to protect the ISE from mechanical damage or atmospheric oxidation/corrosion.