Some More Hints .
Ensure that the temperature of all standards and samples are the same to reduce errors.

Using a magnetic stirrer for laboratory analysis is recommended but not essential. It is however important to have the stirrer set on a low constant speed which must be reproducible for all measurements.

Prior to sample measurement ensure that the electrode is thoroughly rinsed with deionised water. It is worth performing this rinse twice given the possibility of carryover being greatest in high concentration solutions.

Prepare standards by serial dilution.

Make sure your electrode is conditioned by leaving the tip in the lowest concentration standard for 1 hour prior to analysis.

Methods of Analysis.
Direct Potentiometry is described above. This method is simplified by using a direct reading ion meter. There are several other methods, which are useful.
Known Addition: An incremental technique where the potential of the sample solution is measured followed by addition of a small volume of a higher concentration standard solution.
Sample Addition: An incremental technique where the potential of a dilute standard solution is measured followed by the addition of a small volume of more concentrated sample. .
End Point Titration: ISE's are ideal end point indicators and will produce a significant potential change at the equivalence point. The Ion in question must be contained in the titrand or the titrant and must therefore be in excess or absence at the end point.

3221USB - Fluoride ISE

Overall length	155 mm
Body Diameter	12 mm
Cap Diameter	16mm
Connector	USB
Cable length	1000 mm
Resistance at 25°C	< 2.5 Meg Ohm
Concentration Range	0.02 to 1,900 ppm
Slope	-54 to -59 mV/decade
Potential Drift	2 mV per day
Operating pH range	2 to 8
Temperature range	5 to 50°C
Endpoint time	Typically 10 to 30 seconds
Interferences: Ions with coefficients above 0.001.	Hydroxide (OH-)

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Instruction Manual

3221USB - Fluoride ISE

The traditional BNC connector has been dispensed with and replaced with an active USB interface for this ISE.

The EDT directION ion selective electrode has a solid-state crystalline membrane with an integral dri-tek reference. The electrode is designed for the detection and analysis of Fluoride ions in aqueous solutions and is suitable for use in the field, in the laboratory and in on –line analysers.

Installation

Connect the ISE to the PC or Notebook. Remove the black protective cap and keep it in a safe place.

The ISE can be used immediately but pre soaking for 5 minutes in a 100ppm Fluoride solution is recommended.

The ionic strength of the standards and solutions should be kept constant between all standards and samples. This is achieved by the simple addition of an Ionic strength adjustment buffer known as TISAB. The strength of TISAB varies so always read the label for information on the appropriate quantity to add.

No temperature correction is necessary however standards and samples should be measured at the same temperature.

Begin calibration from the lowest concentration standard to avoid cross contamination. Calibration should cover the anticipated range of the samples.

Rinse tip with deionised water between measurements.

Avoid strongly acidic or alkaline samples, strong detergents and organic solvents.

Storage and Maintenance

After use rinse with deionised water, wipe clean with a tissue or lint free cloth, replace protective cap and store dry in its box.

If performance becomes sluggish rinse with dilute detergent, rinse with deionised water and immerse the tip in a 1000ppm Fluoride solution for 1 hour.

Tips For Successful Analysis.
The Fluoride USB ISE can be connected directly to a PC, notebook or Windows tablet without the need for a dedicated Ion meter.

Meters with a 0.1 mV resolution are recommended whilst dedicated Ion meters will provide direct concentration readouts saving time and effort in constructing calibration curves and performing calculations. Your EDT directION distributor can advise on the most suitable meter.

Magnetic stirrer/stirrer bars are recommended for laboratory analysis. Please operate at the lowest constant speed available.

Semi-logarithmic (4-cycle) graph paper is required for preparing calibration curves when you are using a mV meter.

Required Solutions.
Distilled or deionised water will be required to prepare Standards, ISABs and to rinse the electrode between measurements.

1000 ppm Stock Standard solution. Used for preparation of Standards. (Prepared by customer)

ISAB. Used to adjust the Ionic strength of all standards and samples. Typical addition is 10 ml of ISAB to 100ml of all standards and samples.

Operation

1. Connect the electrode to the PC being used for analysis and open the connectION software.
2. Click 'Calibrate' to enter calibration mode.
3. Prepare a series of 2 standards that bracket the expected sample concentration. This is best done by serial dilution of the stock solution. Ideally standards should be a decade in concentration apart e.g. 1, 10, and 100 ppm.
4. Dispense 50 ml of each standard into analytically clean beakers. (100 to 150 ml size is perfect)
5. Add ISAB in the appropriate ratio. As a guide with sample concentrations in the 1 to 1000 ppm range 1ml of a 2 Molar ISAB to 50 ml sample is satisfactory.
6. Rinse the electrode with deionised water and blot dry with a lint free cloth and place in the lowest standard. Press Start Low Cal to calibrate in this standard.
7. Rinse the electrode with deionised water and blot dry with a lint free cloth and place in the highest standard. Press Start High Cal to calibrate in this standard.
8. Rinse the electrode in deionised water and blot dry. Place the electrode in the sample and then take a sample reading.

The connectION software is easy to download and operate and is supplied free of charge. Calibration and logging are selectable with the option of collecting the data in csv and HTML formats. The software includes one and two point calibration and auto endpoint detection. The calibration data is displayed along with results in direct concentration units.