

#7661 TIP TYPE FLUORIDE ION ELECTRODE INSTRUCTION MANUAL

1. Structure of the Tip Type Ion Electrode

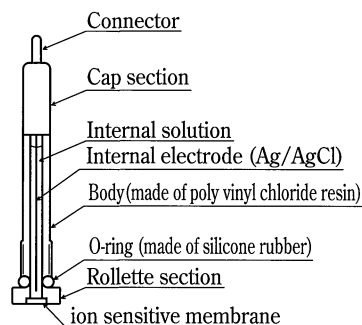


Figure 1. Structural diagram

3. Preparations of the Standard Solutions.

Accurately weigh out 3.058 g of commercially available guaranteed reagent grade potassium fluoride and dissolve it in pure (deionized) water. Add enough pure water to make 1 L. This solution is your 1000 mg/L F^- standard solution. Dilute 100 mL, 10 mL, and 1 mL of this solution with pure water to produce 100 mg/L, 10 mg/L and 1 mg/L F^- standard solutions. Add 0.1 mol/L of potassium nitrate (10 g/L KNO_3) as a supporting electrolyte to each of these solutions. In addition, add the same concentration of supporting electrolyte as the standard solution to the test sample to obtain an even higher level of accuracy in your measurements.

Transfer the standard solutions to sealed plastic containers for storage.

4. Precautions

- (1) If the pH of the test sample is not within the correct range, or metal ions (Fe^{3+} , Al^{3+} , etc.) coexist in the test sample, add some buffer solution (Total Ionic Strength Adjustment Buffer) to both the standard solution and the test sample. Use a buffer solution given in JIS K0102-1993, or a commercially available TISAB solution. When using a buffer solution, there is no need to add the supporting electrolyte (potassium nitrate) described above.
- (2) Use the plastic beaker when measure of the low concentration sample solutions.
- (3) Because of heat generated from the stirrer, the temperature of the solution is slowly rising, causing a drift in the electrode potential. If this is the case, lay a sheet of adiabatic material such as styrofoam between the stirrer and the beaker in order to prevent temperature changes.
- (4) If there is a drift in the electrode potential, or you are unable to get an electrode reading, take the following steps and try again.
 - Oil may have become attached to the membrane. Clean the resin by lightly

2. Replacing the Electrode

- Replacement method

Attachment and removal of the tip electrode from the main unit is via a single screw. Grip the rollette part of the tip electrode with your fingers and rotate it.

- Precautionary notes

Do not rub or hit the ion sensitive membrane of the electrode. It may damage the membrane and degrade its special characteristics.

wiping the ion sensitive membrane with gauze or tissue paper that has been soaked in ethyl alcohol.

- Air bubbles may have become attached to the ion sensitive membrane inside the electrode. Grip the cap at the top of the tip firmly with your fingers and shake the electrode as you would shake a thermometer to release the bubbles.

- (5) To store the electrode, wash it first with pure water and wipe away any drops with gauze or tissue paper. Store in the open air.

5. Electrode Characteristics

- (1) Calibration characteristics

- (2) The influence of pH

Figure 2 shows the relationship between the concentration of the fluoride ion and the output electrode potential.

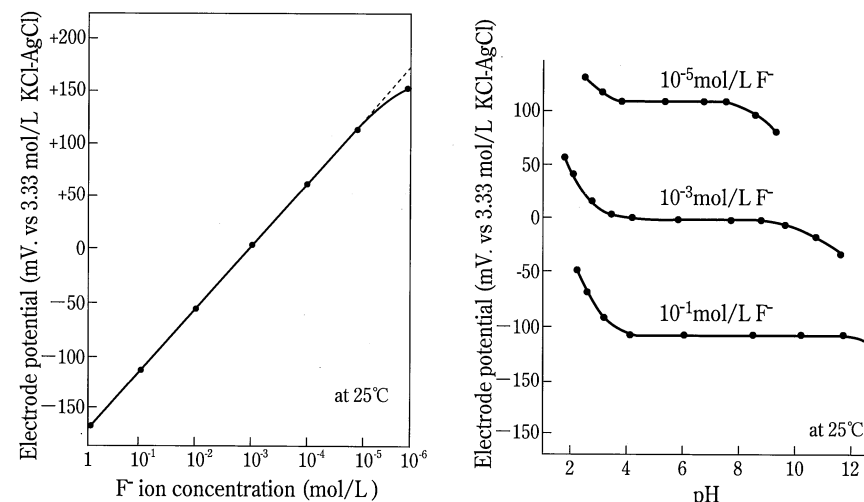


Figure 2.

- (3) Influence of temperature

The calibration curve of the electrode varies with temperature. You must maintain the standard solution and the sample solution at the same temperature during measurement.

- (4) Influence of coexisting ions

The fluoride ion electrode is not affected by any anions other than the OH^- anion. However, if there are any high value metal ions (Fe^{3+} , Al^{3+}) in the solution, they will form compounds with the fluoride ion. This will reduce the concentration of free fluoride ions causing a low concentration reading. In this case, use the buffer solution described in 4.(1).