Cole-Parmer®

Delivering Solutions You Trust™

FLUORIDE AND SODIUM ION SELECTIVE ELECTRODES (ISE)

www.coleparmer.com
info@coleparmer.com

Toll Free (800) 323-4340

COLE-PARMER
FLUORIDE AND SODIUM ELECTRODES
QUICK START INSTRUCTIONS

Required Equipment & Solutions

1. An Ion Meter.
2. Fluoride or Sodium Electrode (supplied in electrode box).
3. Deionized or distilled water for standard preparation.
4. Reference Filling Solution (30ml supplied in electrode box).
5. Standard 1000ppm
6. Ionic Strength Adjuster (ISA) Solution
7. Pipets for preparing standards and samples.

Ion	Laboratory Glass Electrode	Economy Epoxy Electrode	ISA Solution 475 ml	1000 ppm Standard 475 ml	Reference Fill Solution 125 ml
Fluoride F^-	K-27502-19	K-27504-14	K-27503-58	K-27502-69	4M KCl
Sodium Na^+	K-27502-43	K-27504-30	K-27503-54	K-27502-93	0.1M NH_4Cl

Electrode Preparation

Remove the black shipping cap from the bottom of the electrode and remove the rubber insert covering the filling hole of the reference chamber. Fill the electrode with the Reference Solution. Prior to first usage, or after long-term storage, immerse the electrode in deionized water for thirty minutes. The electrode is now ready for use.

Measuring Hints

1. All samples and standards should be at the same temperature for precise measurement, preferably 25°C. Temperature should be less than 80°C. A difference in 1°C in temperature will result in approximately a 2% error.
2. Constant, but not violent, stirring is necessary for accurate measurement.
3. Always rinse the electrode tip with deionized water and blot dry with a fresh tissue between readings to prevent solution carryover. Do not wipe or rub the sensing membrane.
4. Check the electrode for air bubbles adhering to the membrane surface after immersion in solution. Agitate the electrode gently to remove the air bubbles.
5. A slow or sluggish electrode response may indicate surface contamination of the membrane. For Fluoride electrodes, use a toothbrush and some toothpaste to lightly scrub the membrane surface, then soak in deionized water for five minutes to restore proper performance. For Sodium electrodes, soak the electrode in deionized water for five minutes, then soak for five minutes in 100 ppm standard solution with ISA added to restore proper response.
6. Use fresh standards for calibration.
7. Re-calibrate every few hours for routine measurement.
8. All samples and standards must be aqueous. They must not contain organic solvents.

Measurement using an Ion Meter (in the Concentration mode)

1. Connect the electrode to the meter.
2. By serial dilution of the 1000 ppm standard, prepare two standards whose concentration is near the expected sample concentration. For example, to make a 100 ppm standard, pipet 10ml of the 1000 ppm standard into a 100ml volumetric flask and dilute to volume with deionized water. Next to make a 10 ppm standard, pipet 10ml of the newly-made 100 ppm standard into a 100ml volumetric flask and dilute to volume with deionized water. A 1 ppm standard is made by further dilution of the 10 ppm standard. Measure out 100ml of each standard into individual 150ml beakers.

3. Lower the electrode tip into the more dilute solution. Begin stirring at a constant rate. Add 10ml of ISA to the solution and continue stirring.
4. After 1 minute, fix the value in the memory according to the meter manufacturer's calibration instructions.
5. Rinse the electrode tip with distilled water and blot dry.
6. Lower the electrode tip into the more concentrated solution. Begin stirring at a constant rate. Add 10ml of ISA to the solution and continue stirring.
7. After 1 minute, fix the value in the memory according to the meter manufacturer's calibration instructions.
8. Add 100 ml of the sample and 10 ml of ISA into a 150 ml beaker. Lower the electrode tip into the solution. Begin stirring at a constant rate.
9. After 1 minute, read the concentration directly from the meter display.
10. The electrode should be re-calibrated every 1-2 hours. Simply repeat Steps 2-7 above.

Interferences

Electrode drift and slow response could indicate the presence of high interferences. See **SPECIFICATIONS**. For Sodium electrodes, soak the electrode in deionized water for five minutes, then soak for five minutes in 1 ppm standard solution with ISA added to restore proper response. For Fluoride electrodes, use a toothbrush and some toothpaste to lightly scrub the membrane surface, then soak in deionized water for five minutes to restore proper preformance.

Temperature Influences

Samples and standards should be at the same temperature, since electrode readings are influenced by changes in temperature. The electrodes can be used at temperatures from 0° - 80°C. Room temperature measurements are recommended, since measurements at temperatures quite different from room temperature may require equilibrium times up to one hour.

Electrode Response

The electrode response time, varies from one minute for solution concentrations greater than 10 ppm to several minutes for solution concentrations less than 10 ppm.

pH Effects

The electrode has a specific operating pH range. Use at other pH values can adversely affect the membrane. See **SPECIFICATIONS**.

Electrode Life

The electrode should last one year in normal laboratory use. On-line measurement might shorten operational lifetime. In time, the response time will lengthen and the calibration slope will decrease to the point calibration is difficult and electrode replacement is required.

Electrode Storage

The Electrode may be stored in 10 ppm standard for short periods of time. For storage more than two weeks, rinse and dry the membrane and cover the tip with the protective cap shipped with the electrode. The reference portion of the combination electrode should be drained of filling solution, and the rubber insert should be placed over the filling hole.

TROUBLESHOOTING

Remember to remove the black protective shipping cap on the bottom of the electrode and expose the fill hole underneath the electrode cap. Fill the electrode with the Reference Filling Solution shipped with the electrode to a level just below the fill hole.

Out of Range Reading

- Defective meter .....Check meter with shorting strap (see meter instruction manual)
- Reference chamber not filled .....Fill reference chamber to level just below the fill hole
- Air bubbles on membrane .....Remove air bubble by re-dipping electrode

Low Slope or No Slope

- Standards contaminated or incorrectly made .....Prepare fresh standards
- Air bubble on membrane .....Remove air bubble by re-dipping electrode
- Electrode exposed to interferences .....Polish membrane and repeat calibration
- Defective electrode .....Change to new electrode

Cole-Parmer
Toll Free: 800/323-4340
www.coleparmer.com · info@coleparmer.com

Drift (reading changing in one direction)

- Samples and standards at different temperatures ..... Allow sample and standards to come to the same temperature before measurement
- Electrode exposed to interferences ..... **See Interferences section** and repeat calibration
- Incorrect reference filling solution ..... Use recommended filling solution
- Incorrect pH ..... Adjust pH to correct operating pH range for the electrode

Noisy or Unstable Readings (readings randomly changing)

- Defective meter ..... Check meter with shorting strap (see meter instruction manual)
- Air bubble on membrane ..... Remove air bubble by re-dipping electrode
- Meter or stirrer not grounded ..... Ground meter or stirrer
- Electrode exposed to interferences ..... **See Interferences section** and repeat calibration
- Defective electrode ..... Change to new electrode

SPECIFICATIONS

Ion	Concentration Range (mol/L)	Concentration Range (ppm)	Interferences	pH Range	Slope (mV) 10 to 100ppm
Fluoride F^-	1 x 10^{-5} to Saturated	0.02 to 19,000	OH^-	5 to 8	52 to 59
Sodium Na^+	1 x 10^{-6} to Saturated	0.02 to 115,000	H^+, K^+, Li^+, Ag^+, Cs^+, Tl^+	10 to 12	52 to 59