ISE DATASHEET

Calcium Ion

ELIT 8041 · ELIT Ion Selective Electrode · Cation

Ca2+

>> View full ion guide: elyxir.co.uk/resources/ions/calcium

Order this electrode: elyxir.co.uk/products

PHYSICAL SPECIFICATIONS

Body Length	130 mm (excl. contact) / 140 mm (incl.)
Body Diameter	8 mm
DC Resistance (25°C)	< 2.5 MOhm
Min. Sample Volume	5 ml

ELECTRODE SPECIFICATIONS

Electrode Model	ELIT 8041
Ion	Calcium (Ca^{2+})
Ion Type	Cation
Valence	2
Membrane Type	Solid-state PVC polymer matrix membrane
Molar Mass	40.078 g/mol
1000 ppm equiv.	0.025 M

OPERATIONAL PARAMETERS

Preconditioning	1000 ppm Calcium standard
Preconditioning Time	Min. 5 minutes
Detection Range	0.02 to 4,000 ppm (5×10^{-7} to 0.1 M)
Electrode Slope	26 ± 3 mV/decade
pH Range	pH 3.5 to 11
Temperature Range	0 to 50 °C
Response Time	< 10 seconds (90% response)
Potential Drift	< 3 mV/day in 1000 ppm unstirred (8 hours)

REAGENTS & STANDARDS

Reference Electrode	Single junction (ELIT 001).
ISAB / Buffer	4M KCl — Add 2% v/v.
Standard Prep	Dissolve 2.769 g anhydrous calcium chloride ($CaCl_2$) in 1 litre deionised water.

TYPICAL APPLICATIONS

- Food & Beverage Analysis
- Water Quality Monitoring
- Agriculture & Soil Analysis
- Clinical Research
- Environmental Monitoring

SELECTIVITY COEFFICIENTS (INTERFERENCE DATA)

Interfering Ion	Selectivity Coeff.	Note
Aluminium (Al^{3+})	5	Strong interference — more sensitive to Al^{3+} than Ca^{2+}. Only tolerable at very low concentrations.
Iron (Fe^{2+})	0.02	—
Strontium (Sr^{2+})	0.008	—
Barium (Ba^{2+})	0.005	—
Copper (Cu^{2+})	0.002	—
Magnesium (Mg^{2+})	0.0006	—
Sodium (Na^{+})	0.0005	—
Potassium (K^{+})	0.00005	—
Ammonium (NH_4^{+})	0.00003	—

SC = approximate apparent increase in measured concentration caused by 1 unit of interferent. Error% = ((interferent conc × SC) / target conc) × 100.

CALIBRATION & SAMPLE PREPARATION

Calibrate with 1000, 100, 10, 1, 0.1 ppm Ca solutions. Add 2 ml of 4M KCl to each 100 ml standard for high ionic strength samples (> 0.001 M).

Low ionic strength: immerse in 50–100 ml sample. High ionic strength: add 2 ml ISAB to 100 ml sample and stir well.

SPECIAL ANALYTICAL PROCEDURES

Animal Feed

Ash 1 g finely ground sample at 320 °C for 3 hours. Dissolve ash in 50 ml 1M HCl + 5 drops conc. HNO_3 and boil gently for 30 mins. Adjust pH to ~7 with 4M KOH. Transfer to 250 ml volumetric flask, add 2 ml ISAB. Result: ppm × 250 ÷ sample weight = mg/kg Ca.

Beer and Fruit Juice

Use the Standard Addition method due to complex matrix and high ionic strength. Calibrate to find accurate slope, then enter slope and expected sample concentration into the Standard Addition software.

Soil

Shake ~4 g ground air-dried soil with 50 ml 0.5M sodium acetate for 2 hours. Centrifuge, pipette 10 ml supernatant into 100 ml flask, dilute to mark. Add 2 ml KCl ISAB. Result: ppm × 250 ÷ sample weight = mg/kg.

ANALYTICAL NOTES

- Divalent cation electrode — slope is approximately half that of monovalent electrodes (~26 mV/decade).
- Aluminium interference is severe and must be absent for accurate results.