

Technical Specifications for the Calcium Ion-Selective Electrode ELIT 8041

Introduction

The Calcium Ion-Selective Electrode has a solid-state PVC polymer matrix membrane. The electrode is designed for the detection of calcium ions (Ca^{+2}) in aqueous solutions and is suitable for use in both field and laboratory applications.

The Calcium Ion is a divalent cation .

One mole of (Ca^{+2}) has a mass of 40.080 grams; 1000 ppm is 0.025 M

Dissolve 2.769g anhydrous calcium chloride (CaCl_2) in 1 litre water.

Physical Specifications

Length of body excl gold contact	130 mm
Length of body incl. gold contact	140 mm
Diameter of body	8 mm
DC resistance at 25° C	< 2.5 MOhm
Minimum feasible sample volume	5 ml

Chemical / Operational Specifications

Preconditioning / Standard solution	Normally 1000 ppm Ca^{+2} as Ca Cl_2
<i>(But see General Operating Instructions)</i>	
Preconditioning time	at least 5 minutes
Optimal pH range	pH 3.5 to pH 11
Temperature range	0 to 50° C
Recommended ISAB	4M KCL (add 2% v/v)
Recommended reference electrode	Single junction (ELIT 001)
Electrode slope at 25° C	26± 3 mV/ decade
Concentration range	0.02 to 4,000 ppm (5×10^{-7} to 0.1 Molar)
Response time	< 10 seconds
<i>(Defined as time to complete 90% of the change in potential after immersion in the new solution.)</i>	
Potential drift <i>(in 1000 ppm)</i>	< 3 mV/ day (8 hours)
<i>(Measured at constant temperature and with ISE and Reference Electrode continually immersed)</i>	

Interference

Only Al^{+3} has a strong interference on the Ca electrode, with a selectivity coefficient (SC) of 5 (ie five times more sensitive to Al^{+3} than to Ca^{+2}).

The SC is the approximate apparent increase in the measured concentration caused by 1 unit of the interferent. Thus the likely effect of any interfering ion (% increase) can be calculated as follows: $((\text{expected concentration}) \times (\text{SC}) / (\text{expected Ca concentration})) \times 100$.

Other ions have a small effect (SC in brackets), but these would only be significant if they were at least ten times more concentrated than the Ca ion.

Iron Fe^{+2} (0.02) Strontium (0.008), Barium (0.005) Copper (0.002), Sodium, (0.0005), Magnesium (0.0006), Potassium (0.00005), Ammonium (0.00003), Lithium (0.00001)

For more information, see: www.nico2000.net.