

Technical Specifications for the Nitrate Ion-Selective Electrode ELIT 8021

Introduction

The Nitrate Ion-Selective Electrode has a solid-state PVC polymer matrix membrane which is designed for the detection of nitrate ions (NO_3^-) in aqueous solutions and is suitable for both field and laboratory applications. The Nitrate Ion is a monovalent anion.

One mole of (NO_3^-) has a mass of 62.005 grams; 1000 ppm is 0.016 M

Dissolve 1.371g anhydrous NaNO_3 in 1 Litre de-ionised 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	< 5.0 MOhm
Minimum feasible sample volume	5 ml

Chemical / Operational Specifications

Preconditioning / Standard solution <i>(But see General Operating Instructions)</i>	Normally 1000 ppm (NO_3^-) as NaNO_3
Preconditioning time	at least 5 minutes
Optimal pH range	pH 2 to pH 11
Temperature range	0 to 50° C
Recommended ISAB	2M $(\text{NH}_4)_2\text{SO}_4$ (add 2% v/v)
Recommended reference electrode	Double Junction (ELIT 003)
Reference electrode outer filling solution	0.1M CH_3COOLi
Electrode slope at 25° C	54 ± 5 mV/ decade
Concentration range	0.3 to 6,200 ppm (5×10^{-6} 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:

The following ions interfere with the nitrate electrode (selectivity coefficients (SC) in brackets): Chloride (0.006) Bicarbonate (0.005), Nitrite (0.001), Acetate (0.0005), Fluoride (0.0001), Sulphate (0.00001). 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:

$$((\text{expected concentration}) \times (\text{SC}) / (\text{expected NO}_3 \text{ concentration})) \times 100.$$

This means that chloride and bicarbonate can be present in concentrations up to 10 times the nitrate before producing a significant error. If these ions are greater than this then the interference can be removed by using a special ISAB made by dissolving 10.5g Potassium Sulphate (A.R. grade) and 3.11g of silver sulphate in 800ml de-ionised water. The add 25ml of 0.1M sulphuric acid and make up to 1 litre. This is then added to standards and samples in equal volumes (1:1) instead of the normal ISAB.

Procedural Note: Best results will be achieved by measuring in still solutions, without a stirrer.

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