Technical Specifications for the Barium Ion-Selective Electrode
ELIT 8081

**Introduction**
The Barium Ion-Selective Electrode has a solid-state PVC polymer matrix membrane. The electrode is designed for the detection of barium ions \((\text{Ba}^{+2})\) in aqueous solutions and is suitable for use in both field and laboratory applications.

The Barium Ion is a divalent cation. One mole of \((\text{Ba}^{+2})\) is 137.327 grams; 1000 ppm is 0.007 M. Dissolve 1.779g Barium Chloride di-hydrate (\(\text{BaCl}_2.2\text{H}_2\text{O}\)) in 1 litre deionised 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

**Chemical / Operational Specifications**
- Preconditioning / Standard solution: Normally 1000 ppm \(\text{Ba}^{+2}\) as \(\text{BaCl}_2\) (But see General Operating Instructions)
- Preconditioning time: at least 5 minutes
- Optimal pH range: pH 3 to pH 10
- Temperature range: 0 to 50°C
- Recommended ISAB: NONE - Use Standard Addition Method
- Recommended reference electrode: Single junction AgCl (**ELIT 001**)
- Electrode slope at 25°C: 21 ±3 mV/decade
- Concentration range: 0.5 to 13,700 ppm (4x10^{-6} to 0.1 Molar)
- Response time: < 10 seconds
  *(Defined as time to complete 90% of the change in potential after immersion in the new solution.)*
- Potential drift (in 1000 ppm): < 3 mV/ day (8 hours)
  *(Measured at constant temperature and with ISE and Reference Electrode continually immersed)*

**Analytical Note:** Best measured in still (un-stirred) solutions.

**Interference:**
The following ions cause interference to the Barium measurement (selectivity coefficients (SC) in brackets): Strontium (0.09), Potassium (0.02), Sodium (0.02), Magnesium (0.006), Ammonium (0.003), Calcium (0.002), Lithium (0.002).

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:

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\text{(% increase)} = \frac{(\text{expected concentration}) \times (\text{SC})}{(\text{expected Ba concentration})} \times 100
\]

Strontium has the highest interference but is unlikely to be present in significant concentrations in most samples. Any Potassium or Sodium ions present will cause a significant positive error if they have concentrations of greater than ten times that of the Barium. Magnesium can be tolerated up to about twenty times the Barium, and Calcium & Lithium up to about fifty times.

For more information see: www.nico2000.net.