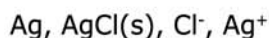


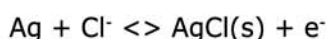
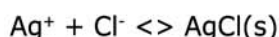
LD200W SILVER/SILVER CHLORIDE/SEAWATER REFERENCE ELECTRODE

General Description

This is a very robust portable reference electrode with a weighted end. It is lowered into the seawater to measure steel potentials for corrosion and cathodic protection monitoring. The essential components are silver metal, silver chloride, soluble silver ions and chloride ions from the seawater.



A sparingly soluble salt, silver chloride, is in equilibrium with a saturated solution of this salt which precipitates in the course of electrolysis. The reversible electrode reaction consists of silver ions going into solution and then combining with the chloride ions to form silver chloride. Thus its potential is determined by the following reactions:



The potential is dependent on temperature and the concentration of chloride ions in accordance with the following equation:

$$E = E_0 - \frac{RT}{F} \ln [\text{Cl}^-]$$

Where E_0 , R, F and T are the standard potential, gas constant, Faraday Constant and temperature respectively. The reaction has been proved to obey these equations in solutions with pH's of between 0 and 13.5. The potential is however very sensitive to traces of bromide ions which make it more negative.

The electrode element has been prepared by electrolytic precipitation of silver chloride onto silver metal. The housing consists of a red polyacetal, red polyacetal inserts.

Specification

Element Type:	Ag, AgCl(s), Cl ⁻ , Ag ⁺ Typical 3g silver per electrode
Drift:	Less than 3mV in 24 hours. Typically less than +/-10mV expected in 20 years Note: The potential drift is subject to temperature.
Dimensions:	200 mm long x 35mm diameter
Housing:	Red polyacetal impact resistant body and inserts IP68 cable gland Integral 450g weight
Cable:	2.5mm ² stranded copper wire with rubber core insulation and black neoprene rubber outer sheath
Expected life:	More than 57 years at a leakage current of 1μA will result in the loss of 0.7 grams of silver. The functional life of the electrode will most likely to be determined by the life of the associated cables.

Calibration Prior to Installation

The following calibration may be undertaken prior to use if the electrode potential is required.

Calibration check:

- Description: The unit can be calibrated prior to use by measuring against a saturated calomel standard reference electrode.
- Apparatus: Plastic or glass container.
 10^{10} Ohm input impedance voltmeter.
Seawater solution.
Saturated calomel reference electrode.
- Procedure: Place the LD200W electrode in the seawater solution. Measure and record the potential against the calomel electrode noting whether it is positive or negative.

17 May 2004

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