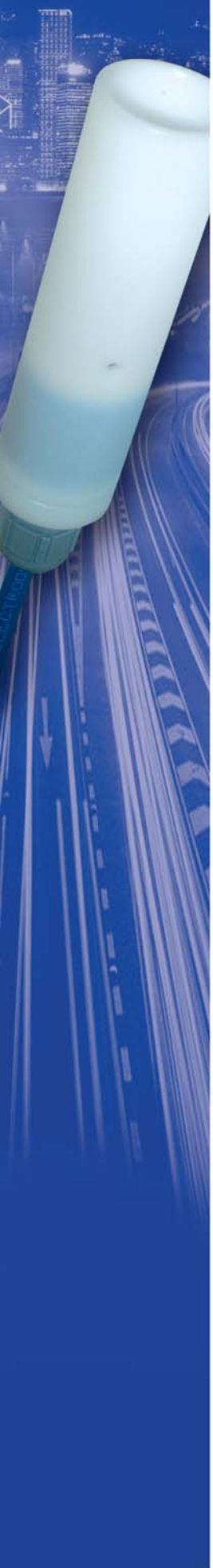

LD25W SILVER/SILVER CHLORIDE/SEAWATER REFERENCE ELECTRODE

General Description

The LD25W is a long life silver/silver chloride reference electrode with a stable reference potential specifically for permanent installation in seawater to monitor steel potentials. The essential components are silver metal, silver chloride, soluble silver ions and chloride ions from the seawater.

$$Ag, AgCl(s), Cl^-, Ag^+$$

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:

$$Ag <> Ag + e^-$$

$$Ag^+ + Cl^- <> AgCl(s)$$

$$Ag + Cl^- <> AgCl(s) + e^-$$

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

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

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 white nylon barrel, white nylon inserts.

Specification

Element Type:	Ag, AgCI(s), CI^-, 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:	75 mm long x 24mm diameter Cable gland 20mm long x 15mm diameter
Housing:	White Nylon Barrel White Nylon Inserts Cable Gland
Cable:	Supplied to order
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 installation if the electrode potential is required.

Calibration check:

Description:	In this test the potential of the electrode is measured against a saturated calomel standard reference electrode in a controlled environment.
Apparatus:	Thermometer. Plastic or glass container. 10^{10}Ohm input impedance voltmeter. Seawater solution. Saturated calomel reference electrode.
Procedure:	Place the electrodes in the seawater bath and soak the electrodes for a minimum of two hours. Measure and record the potential between each LD25W electrode and the saturated calomel electrode noting whether it is positive or negative. The values obtained and seawater temperature should be recorded for future reference.

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Phone: (+44) 01672 810851 Fax: 0870 479 3615 Email: mail@castle-electrodes.com