MODEL LD25

# LD25 Silver / Silver Chloride / 0.5M KCl Reference Electrode

**ANTICIPATED SERVICE LIFE**
50+ years

**UNIT SIZE**
75mm long x 24mm dia

**INTERFACE**
> 450 $mm^2$

**CHEMISTRY**
Silver / Silver Chloride / 0.5M KCl

## OVERVIEW

The LD25 is a long life silver/silver chloride/0.5M KCL reference electrode for permanent installation in atmospherically exposed concrete structures. It is not suitable for submerged seawater or splash zones where we recommend using our RB15 manganese dioxide reference electrode. The essential components are silver metal, silver chloride, soluble silver ions and chloride ions.

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

## ELECTROCHEMISTRY

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:

$$Ag \rightleftharpoons Ag^+ + e^-$$

$$Ag^+ + Cl^- \rightleftharpoons AgCl_{(s)}$$

$$Ag + Cl^- \rightleftharpoons AgCl_{(s)} + e^-$$

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 E0, 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. This has then been embedded in a mortar containing a known concentration of chloride ions and an anti-drying agent. The housing consists of a white nylatron barrel, white nylatron inserts, and a cable gland rated at IP68.

## TECHNICAL SPECIFICATIONS

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| **ELEMENT TYPE** | Silver/silver chloride. **~3g** pure silver. |
| **POTENTIAL** | **Nominally −20mV ±10mV** wrt saturated calomel electrode (SCE) at 20°C. |
| **DRIFT** | **+/-3mV in 24 hours**. Typically less than **+/-10mV** expected in **20 years**. |
| **DIMENSIONS** | **75mm long x 24mm diameter**. |
| **HOUSING** | White nylatron barrel and inserts with IP68 cable gland. |
| **CABLE** | XLPE/XLPE or XLPE/PVC 2.5mm², blue/blue. These electrodes can be supplied without cable for cable to be attached on site. |
| **EXPECTED LIFE** | More than **50 years** at a leakage current of **1µA** will result in the loss of **1.0 grams** of silver. The functional life of the electrode will most likely to be determined by the life of the associated cables. |