

Manganese Dioxide Reference Electrode

The Manganese Dioxide (MnO_2) reference electrode is a solid-state, long-life half-cell, specifically designed for potential monitoring in reinforced concrete structures and buried metal facilities. In saturated Ca(OH)_2 solution, its annual potential drift is $< 10 \text{ mV}$, with a temperature coefficient of approximately $0.68 \text{ mV}/^\circ\text{C}$. It exhibits insensitivity to chloride ions and organic corrosion inhibitors, and demonstrates superior comprehensive performance compared to colloidal MnO_2 , NiFe_2O_4 , and graphite electrodes in simulated concrete pore solutions. Its fully encapsulated solid-state construction allows permanent embedment within concrete, repair mortar, or overlay systems without contaminating the substrate, while resisting stray current interference. It is ideally suited for cathodic protection monitoring of bridge decks, marine concrete structures, parking structures, piers, repair zones, and cross-country pipelines, complying with NACE and other international standards for long-term potential surveillance.



KEY FEATURES

1. Resistant to chloride ion interference
2. Adaptation to high-alkali concrete environments
3. Long-lasting stability
4. Optimal overall performance

PRODUCT SPECIFICATIONS

Reference Potential: $+0.222\text{V}$ (vs. SHE), $+0.085\text{V}$ (vs. CSE)

Potential Stability (Drift): $< \pm 10 \text{ mV} / \text{year}$

Temperature Coefficient: $\sim 0.68 \text{ mV} / ^\circ\text{C}$

Operational pH Range: $8.4 - 13$

Operational Temperature Range: 0°C to $+60^\circ\text{C}$

Polarization Resistance: Strong anti-polarization capability

Internal Resistance: $< 10 \text{ k}\Omega$ (typical)

Construction Type: Fully Solid-State, Hermetically Sealed

Installation Method: Embeddable (Concrete/Mortar) or Portable

Dimensions (Typical): $\Phi 16 \times 50 \text{ mm}$ (Probe type) / Customizable

Service Life (Design): > 50 years (Embedded)

Compliance Standards: NACE SP0290, ASTM C876

APPLICATIONS

1. Corrosion monitoring of reinforced concrete structures
2. Subway stray current protection
3. Cathodic protection potential control and detection