ER Probes: Continuous Corrosion Monitoring

Advanced Electrical Resistance Technology for Real-Time Metal Loss Measurement & Equipment Protection

Corrosion can significantly impact the safety, reliability, and operational efficiency of industrial assets. Early detection is critical to preventing unexpected failures, lowering maintenance expenses, and optimizing asset integrity programs.

Electrical Resistance (ER) probes deliver a proven, highly reliable online corrosion monitoring solution. Operators continuously measure metal loss and corrosion rates in real time while equipment remains fully operational—eliminating the need for process interruptions, lab analysis, or probe removal.

1. Operating Principle & Key Insights

An Electrical Resistance (ER) probe is an electronic monitoring device that measures changes in the electrical resistance of a metal sensing element exposed to the process environment. As corrosion reduces the cross-sectional area of the element, electrical resistance increases proportional to metal loss. ER technology operates effectively across diverse environments, including gases, vapors, hydrocarbons, soils, and non-conductive fluids where electrochemical methods fail.

- **Sensing Element:** Directly exposed to the corrosive process media to measure cumulative metal loss.
- **Reference Element:** Sealed inside the probe body and protected from corrosion to compensate for ambient and process temperature fluctuations, maintaining measurement precision.

> **Key Insights Provided by ER Monitoring:** Total Metal Loss • Corrosion Rate Trends • Process Upsets • Long-Term Integrity

2. Probe Configurations & Sensing Elements

Tailored configurations and element geometries ensure reliable performance across variable pressure, temperature, flow, and chemical conditions. Element metallurgy can match actual plant equipment for realistic field measurements.

Category	Available Designs & Options
Flexible Operating Designs	Fixed Installation Probes • Retractable Probes (online replacement) • High-Pressure Retrievable Probes • Flush-Mounted Probes • Custom Corrosion Monitoring Solutions. *Retrievable/retractable systems allow servicing without process downtime.*
Sensing Element Geometries	Wire Loop & Tube Loop Elements • Strip Loop & Spiral Loop Elements • Cylindrical & Flush-Mounted Elements—selected to optimize sensitivity, response time, and operating lifespan.

3. Real-Time Data for Asset Integrity Management

Integrating ER probes into data acquisition systems transforms corrosion management from reactive repairs to a proactive integrity strategy:

- **Detect Trends Early:** Identify corrosion rate spikes before structural failure occurs.
- **Validate Mitigation:** Continuously evaluate corrosion control and chemical inhibitor programs.
- **Optimize Maintenance:** Extend inspection intervals confidently based on actual field data.
- **Maximize Asset Life:** Improve plant uptime, operational safety, and equipment longevity.

Reliable Corrosion Monitoring for Demanding Industries

Proven in pipelines, refineries, chemical processing, and water systems. ER technology makes corrosion visible, measurable, and manageable in real operating conditions.