

Advanced Cathodic Protection Design and Monitoring Training Course

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Overview

Advanced Cathodic Protection Design and Monitoring Training Course is a one-week course for corrosion, pipeline, electrical, integrity, inspection, and technical-authority functions who leave with a Cathodic Protection Design and Monitoring File. Participants convert asset, coating, soil, water, electrical, and service data into galvanic-anode or impressed-current designs, commissioning tests, survey plans, and performance decisions. The course uses traceable calculations, system drawings, measurement controls, and fault diagnosis. Agile Leaders Training Center presents cathodic protection design and monitoring.

Who Should Attend

- Corrosion functions responsible for cathodic protection criteria, calculations, and technical assurance
- Pipeline and tank functions responsible for buried or submerged metallic assets
- Electrical functions responsible for rectifiers, groundbeds, cables, bonds, and isolation
- Integrity and inspection functions responsible for surveys, monitoring evidence, and remediation
- Technical-authority functions responsible for design review, commissioning, and lifecycle records

The course assumes participants interpret engineering drawings, electrical measurements, and corrosion data at work, and it leaves out corrosion fundamentals, port-specific asset management, regulated electrical installation, diving, and professional certification.

Departments and Industries

The course supports departments and industries that design or monitor cathodic protection for buried and submerged assets.

- Oil and gas pipeline transportation and terminal engineering
- Storage-tank, refinery, and petrochemical integrity
- Water, wastewater, and industrial utility networks
- Marine, offshore, coastal, and buried infrastructure
- Corrosion consulting, engineering design, and inspection services

Learning Objectives

By the end of this course, participants will be able to:

- Analyze asset, environment, coating, and electrical design inputs
- Calculate current demand, anode quantity, capacity, and design life
- Compare galvanic and impressed-current system configurations
- Build commissioning, potential-survey, and monitoring plans
- Diagnose isolation, continuity, interference, and distribution problems
- Evaluate design and monitoring evidence against specified criteria

Course Agenda

Day 1: Establish the Protection Design Basis

- ISO 15589-1 Asset Boundary and Requirement Review
- Structure, Coating, Electrolyte, and Service Data Register
- Soil Resistivity and Water Environment Characterization Method
- Electrical Continuity, Isolation, Bond, and Crossing Map
- Cathodic Protection Criteria and Design-Basis Sheet

Day 2: Design Galvanic Anode Systems

- Protected Surface Area and Coating Breakdown Calculation
- Current Density and Total Current Demand Worksheet
- Anode Material, Driving Voltage, and Resistance Selection Matrix
- Anode Mass, Utilization, Quantity, Spacing, and Life Calculation
- Galvanic Anode Layout and Cable Schedule Drawing

Day 3: Design Impressed Current Systems

- Rectifier Voltage, Current, Capacity, and Control Sizing Sheet
- Groundbed Type, Anode Resistance, and Distribution Model
- Cable, Junction Box, Test Station, and Connection Schedule
- Touch Voltage, Fault, Surge, and Personnel-Safety Review
- Impressed Current Single-Line and Installation Specification

Day 4: Commission and Monitor Performance

- Reference Electrode, Meter, Contact, and Measurement Control Checklist
- Native, On, Instant-Off, and Polarized Potential Survey Method
- Close-Interval Potential and Coating-Anomaly Survey Plan
- ISO 21857 Stray-Current and Interference Evaluation Matrix
- Commissioning, Baseline, Remote Monitoring, and Record Plan

Day 5: Practice Design and Diagnosis

- Suggested Exercise: Calculate Galvanic Anode Quantity and Life
- Suggested Exercise: Size a Rectifier and Distributed Groundbed
- Suggested Exercise: Interpret Potential and Interference Survey Evidence
- Suggested Exercise: Diagnose Underprotection and Distribution Faults
- Capstone Exercise: Complete the Cathodic Protection Design and Monitoring File

Practical Exercises

The course uses suggested activities to convert asset and electrical evidence into auditable protection decisions.

- Suggested activity: define system boundaries, coating condition, environment, continuity, isolation, crossings, and protection criteria.
- Suggested activity: calculate current demand and compare galvanic-anode and impressed-current configurations for pipelines, tanks, and water assets.
- Suggested activity: prepare commissioning and monitoring points, measurement controls, potential surveys, acceptance records, and trend rules.
- Suggested activity: diagnose shielding, shorts, reference-electrode error, interference, coating change, anode depletion, rectifier faults, and poor distribution.

FAQs

Who suits cathodic protection design and monitoring training, and what does it assume?

Cathodic protection design and monitoring training suits corrosion, pipeline, electrical, integrity, inspection, and technical-assurance personnel. It assumes participants can interpret drawings, basic electrical quantities, coating information, and field measurements.

How does cathodic protection design training differ from corrosion-control fundamentals?

Cathodic protection design training develops current-demand, anode, rectifier, groundbed, circuit, commissioning, and monitoring decisions. Corrosion-control fundamentals compare mechanisms and a wider set of material, coating, chemical, environmental, and inspection controls.

How is cathodic protection current demand calculated?

Cathodic protection current demand combines protected surface area, coating condition or breakdown, environment, specified current density, allowances, asset geometry, continuity, isolation, and lifecycle assumptions in a traceable calculation.

What evidence is used to monitor cathodic protection performance?

Cathodic protection monitoring uses controlled potential measurements, reference-electrode records, current and rectifier outputs, continuity and isolation tests, close-interval surveys, interference evidence, coating information, asset changes, trends, and corrective-action records.

How are cathodic protection interference problems diagnosed?

Cathodic protection interference diagnosis compares synchronized source cycling, structure potentials, current direction, bonds, crossings, isolation, foreign structures, alternating-current exposure, and spatial survey patterns before selecting mitigation and verification actions.

Conclusion

Participants take back a Cathodic Protection Design and Monitoring File linking design inputs, criteria, calculations, drawings, commissioning tests, surveys, interference evidence, monitoring rules, and actions. It changes separate electrical and corrosion data into a traceable lifecycle decision record. The file supports design review, procurement, installation assurance, commissioning, operation, and integrity management.

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