Protective and Pipeline Coatings: Selection, Inspection and Failure Analysis

23 – 27 November 2026
Amsterdam - Zuidas business district hotel



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Ref: 532_17101 **Date:** 23 – 27 November 2026 **Location:** Amsterdam - Zuidas business district hotel **Fees:** 23500 SAR

Introduction:

Protective coatings on pipelines, structures and plant steel often fail early because the wrong system was chosen, steel was blasted or painted in poor conditions, or inspection missed low film build and holidays. This Core Concept course builds practical skill in protective and pipeline coatings, from generic coating chemistry and system selection by environment to surface preparation, application, quality control testing, field joint coatings, cathodic protection interaction and failure diagnosis. Participants produce a Coating Specification with an Inspection and Test Plan and a Coating Failure Diagnosis Report for a realistic asset.

Course Objectives:

- Select generic coating types and multi-coat systems for atmospheric, immersed and buried steel using ISO 12944 environment classes
- Specify surface preparation grades, blast profile and soluble salt limits and verify them before coating starts
- Control application by checking steel temperature, relative humidity and dew point and setting hold points for each coat
- Carry out dry film thickness, holiday, adhesion and cure tests and record results against acceptance criteria
- Diagnose blistering, cracking, delamination, undercutting and cathodic disbondment and trace each to its cause
- Write a coating specification and inspection and test plan for new construction and maintenance painting

Target Audience:

- Coating inspectors who witness surface preparation and application and sign off test records
- Corrosion engineers who choose coating systems and their interface with cathodic protection
- Integrity engineers who assess coating condition on pipelines, vessels and structures
- Maintenance engineers who plan and supervise maintenance painting campaigns
- Quality control staff at coating applicators and pipe coating yards who run production testing
- Project engineers who review coating specifications and contractor procedures

Course Outline:

Day 1: How Coatings Protect Steel and Why They Fail

- Barrier, Inhibitive and Sacrificial Protection Mechanisms of Paint Films
- Binder, Pigment, Solvent and Additive Roles in Liquid Coating Formulation
- Water Vapour Permeation, Osmosis and Film Ageing in Service
- Premature Coating Failure Statistics by Root Cause Group: Design, Preparation, Application
- Coating Condition Baseline Survey of an Existing Asset with Photographic Rating

Day 2: Generic Coating Types, Pipeline Systems and Environment Classes

- Epoxy, Zinc-Rich Primer and Polyurethane Topcoat Chemistry and Curing
- Fusion Bonded Epoxy Line Pipe Coating to ISO 21809-2
- Three-Layer Polyethylene and Polypropylene Systems with FBE Primer
- Cold-Applied Tapes, Heat-Shrink Sleeves and Wrap Systems for Buried Pipe
- ISO 12944 Environment Classification and Protective Paint System Selection

Day 3: Surface Preparation, Application Conditions and Quality Control Testing

- ISO 8501-1 Rust Grades and Blast Cleanliness Grades Such as Sa 2 1/2
- Abrasive Selection, Blast Profile Measurement and Soluble Salt Testing
- Steel Temperature, Relative Humidity and Dew Point Checks Before Coating
- Airless Spray, Brush, Roller and Powder Application with Wet Film Control
- Dry Film Thickness Gauges, Holiday Detectors, Pull-Off Adhesion and Cure Tests

Day 4: Field Joints, Cathodic Protection Interaction and Coating Failure Analysis

- Pipeline Field Joint Coating Selection, Application Records and Inspection
- Cathodic Disbondment, CP Shielding and Coating Compatibility with Protection Current
- Blistering, Cracking, Checking and Flaking Recognition with Standard Rating Charts
- Delamination, Intercoat Adhesion Loss and Undercutting at Damage Sites
- Maintenance Painting Strategy: Spot Repair, Overcoat or Full Removal Decision

Day 5: Coating Specification, Inspection Test Plan and Failure Case Work

- Case Study: Offshore Jacket Splash Zone Coating Breakdown Diagnosis
- Case Study: Buried Pipeline Field Joint Disbondment Investigation
- Coating Specification Drafting: Systems, Preparation, Application and Repair
- Inspection and Test Plan Build: Hold Points, Witness Points and Acceptance Criteria
- Coating Failure Diagnosis Report Presentation and Peer Review

Skills You Will Gain:

- Coating System Selection
- Surface Preparation Assessment
- Climatic Condition Monitoring
- Coating Thickness Measurement
- Holiday and Adhesion Testing
- Field Joint Coating Inspection
- Coating Defect Diagnosis
- Coating Specification Writing

Why Attend This Course:

- Return with a Coating Specification, an Inspection and Test Plan and a Coating Failure Diagnosis Report ready to adapt to your own assets
- Stop coating work at the right hold point before poor blasting, damp steel or thin film is buried under the next coat
- Explain to contractors and asset owners why a coating failed, with test evidence and photographs
- Compare coating practice with inspectors and engineers from pipelines, offshore, refining, power and water utilities

Conclusion:

A coating lasts when the system suits the environment, the steel is prepared and coated in the right conditions and inspection proves each step before the next begins. The course moves from protection mechanisms and failure causes, through generic coating types, pipeline systems and environment classes, to surface preparation, application conditions and quality control testing, then field joints, cathodic protection interaction, defect analysis and maintenance painting. The final day applies this to failure cases and produces a coating specification, inspection and test plan and failure diagnosis report.