
Corrosion-Resistant Material Selection for Plant Assets Training Course

31 May – 4 June 2027
Tokyo





Corrosion-Resistant Material Selection for Plant Assets Training Course

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Programme Summary

Corrosion-resistant material selection is the subject of this five-day training course for engineering and asset leaders at applied level, ending in a material selection decision pack for one plant asset. Material choices fix maintenance cost and failure risk for decades, yet are often made late and on purchase price. The approach moves from corrosion mechanisms and material families, through sour service and specification wording, to procurement and inspection control. Mars Training Centre UK delivers this programme in corrosion-resistant material selection.

The Business Case

Process plants lose output and carry safety exposure when materials fail early in corrosive service. Leaders who approve materials seldom see the full trade between capital cost and life-cycle cost. Structured decisions tie material choice to service conditions, specification wording and inspection, so that spending is justified and failures are anticipated.

- Unplanned Corrosion Failures: Fall as materials are matched to service conditions before purchase.
- Life-Cycle Maintenance Cost: Declines as selection weighs lifetime cost rather than purchase price alone.
- Procurement Rework: Reduces as specification clauses state testable material requirements.

Principles and Evidence Base

- ISO 15156: Its requirements for materials resistant to cracking in hydrogen sulphide service frame the screening and specification work in Session 3.
- ISO 13703-2: Its coverage of materials for piping systems shapes the piping material scope and checks in Sessions 1 and 4.

Intended Participants

- Leaders who approve materials for process equipment and piping.
- Project managers who control specification, purchase and delivery of plant items.
- Asset owners who carry the cost of corrosion over the life of a plant.
- Procurement leaders who evaluate suppliers against material requirements.

The programme serves oil and gas, chemicals, water treatment and power generation organisations.



Learning Outcomes

1. Participants will be able to diagnose the corrosion mechanisms that apply to a given service condition.
2. Participants will be able to compare material options by performance and life-cycle cost.
3. Participants will be able to evaluate a sour service risk screening against a recognised standard.
4. Participants will be able to construct specification clauses that state testable material requirements.
5. Participants will be able to prioritise inspection and monitoring effort for installed materials.
6. Participants will be able to justify a material recommendation to a governing approval body.

Programme Structure

Day 1: Corrosion-Resistant Material Selection Foundations

Which corrosion mechanisms threaten the plant, and who decides what material is acceptable?

- Corrosion Mechanisms and Service Condition Register
- Material Selection Decision Rights Matrix
- Materials of Construction Families and Limits
- Corrosion Allowance and Design Life Logic
- ISO 13703-2 Piping Materials Scope

Day 2: Metallic and Non-Metallic Options for Process Duty

Which material families suit which process duty, and what do they cost over life?

- Carbon Steel, Stainless Steel and Nickel Alloy Comparison
- Non-Metallic Lining and Polymer Options
- Coating and Cladding Decision Tree
- Life-Cycle Cost Comparison Model
- Material Options Shortlist Template

Day 3: Sour Service and Specification Requirements

How are material requirements written so that suppliers can be held to them?

- ISO 15156 Sour Service Requirements Overview
- Hydrogen Sulphide Cracking Risk Screening
- Material Specification Clause Checklist
- Supplier Data Sheet and Test Evidence Review
- Material Traceability and Inspection Hold Points



Day 4: Procurement, Inspection and Integrity Governance

How is a material decision controlled from purchase order to in-service monitoring?

- Procurement Requirements and Bid Evaluation Matrix
- Inspection and Test Plan Review
- Corrosion Monitoring Programme Design
- Material Change and Concession Approval Route
- Risk-Based Review of Existing Piping Materials

Day 5: Applying Material Selection to a Plant Asset

Is the material recommendation ready for approval, and what remains open?

- Applying the Day 1 Corrosion Register to a Plant Asset
- Testing the Day 2 Shortlist With Life-Cycle Costs
- Applying the Day 3 Clause Checklist to a Specification
- Running the Day 4 Approval Route on a Concession Request
- Completing the Material Selection Decision Pack

Methodology

The programme rests on case analysis and structured exercises. Participants work with redacted data sheets, specification extracts and inspection records from refinery, chemical and water plants, compare options and defend recommendations before a simulated approval panel.

- Suggested activity: Shortlisting materials for a corrosive duty and costing each over its life.
- Suggested activity: Marking up a material specification to close gaps in test evidence.
- Suggested activity: Presenting an approve or defer recommendation to a simulated approval panel.

Capstone Output

Each participant completes a material selection decision pack for one live or sample plant asset. It holds a corrosion register, a shortlist with life-cycle cost comparison, specification clauses, an inspection and monitoring outline and a recommendation record. It is used to brief the approval body, to guide the procurement team and to explain later why the material was chosen.

Frequently Asked Questions

Is corrosion-resistant material selection suitable for managers who are not materials engineers?

Yes. It is set at applied level for leaders who approve, buy or own plant equipment and piping. You need project or asset experience, not metallurgy training; technical terms are explained as they arise.



Which standards does corrosion-resistant material selection rest on?

It rests on ISO 15156 for materials in hydrogen sulphide service and ISO 13703-2 for piping system materials. Both are used as review references for screening, specification and inspection decisions.

How is the decision pack from corrosion-resistant material selection used at work?

You use it to brief the approval body, guide procurement and record why a material was chosen. It also gives inspection teams the monitoring points to follow.

How does corrosion-resistant material selection differ from a plant inspection course?

It concentrates on choosing and specifying materials before purchase. Plant inspection courses concentrate on finding and assessing damage once equipment is in service.