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# Upstream Materials Selection and Lifecycle Cost Training Course

11 – 15 January 2027
Singapore

# Upstream Materials Selection and Lifecycle Cost Training Course

**Ref:** 2839_108919 **Date:** 11 – 15 January 2027 **Location:** Singapore **Fees:** 9300 GBP

Upstream Materials Selection and Lifecycle Cost is a 1-week training course for materials, mechanical and integrity engineers who prepare a materials selection report for wells, flowlines and production facilities. Harsher reservoirs, longer field lives and pressure on capital budgets make the choice between carbon steel, corrosion resistant alloys and non-metallics a decision that fixes both first cost and decades of operating spend. Jupiter Prime Training places this choice within asset life planning.

## Why Upstream Materials Selection and Lifecycle Cost Matters Now

Three pressures shape upstream materials choices today. New developments produce hotter, deeper and more sour fluids, which narrows the window where plain carbon steel is safe. Operators extend old fields with water injection and gas recycling that change the corrosivity of existing lines. Finance teams ask engineers to defend expensive alloys against cheaper steel with chemical treatment. A sound selection avoids early leaks, unplanned replacements and lost production; a weak one either overspends on alloys that were not needed or leaves wells and flowlines exposed to cracking and wall loss.

## Who Gains Most from Upstream Materials Selection and Lifecycle Cost

- Engineers who define service conditions and design envelopes for wells and flowlines
- Specialists who choose tubing, casing and line pipe grades for sour and sweet duties
- Engineers who assess non-metallic pipe, liners and composite repairs for water and gas service
- Integrity staff who track degradation and judge when a material change is needed
- Project engineers who compare capital and operating cost of material options

A project or asset engineering group gains most when its materials, mechanical and integrity engineers attend together.

## Upstream Materials Selection and Lifecycle Cost Capabilities

Participants translate fluid chemistry, temperature, pressure and design life into defensible material choices for each part of an upstream system.

- Specify service condition envelopes from produced fluid data — design basis sign-off
- Assess sour service cracking risk for steels and alloys — grade acceptance
- Weigh carbon steel with inhibition against corrosion resistant alloys — capital approval
- Test non-metallic options against temperature, pressure and permeation limits — water and gas line design
- Calculate lifecycle cost of competing material options — project and asset leadership
- Build a materials selection report with assumptions and residual risks — integrity handover

## Key Upstream Materials Selection and Lifecycle Cost Terms

- Service Envelope — the temperature, pressure and fluid chemistry a material must withstand over its design life.
- Sour Service — operation in fluids containing hydrogen sulphide, which can cause cracking in susceptible steels and alloys.
- Corrosion Resistant Alloy — stainless or nickel-based material chosen to resist wall loss without chemical treatment.
- Corrosion Allowance — extra wall thickness added to carbon steel to absorb expected metal loss over design life.
- Non-Metallic Pipe — glass-reinforced or thermoplastic pipe used where metal loss is likely and limits allow.
- Lifecycle Cost — total cost of a material choice, from purchase and installation to treatment, inspection and replacement.

## Upstream Materials Selection and Lifecycle Cost Day by Day

### Day 1: Service Conditions and Design Basis

- Produced Fluid Chemistry — Water, Carbon Dioxide And Hydrogen Sulphide Content
- Temperature And Pressure Profiles — From Bottomhole To Facility Inlet
- Field Life And Injection Changes — How Duty Shifts Over Time
- Damage Mechanism Screening — Wall Loss, Cracking And Erosion Threats
- Materials Design Basis Document — Agreeing Inputs With Operations

### Day 2: Steels and Sour Service

- Carbon And Low Alloy Steel Grades — Strength, Toughness And Hardness Limits
- Sour Service Qualification Principles — Cracking Tests And Hardness Controls
- Corrosion Allowance Setting — Wall Thickness For Expected Metal Loss
- Inhibitor Availability Assumptions — Linking Chemical Treatment To Steel Choice
- Tubing, Casing And Line Pipe Grade Choice — Matching Grades To Duty

### Day 3: Corrosion Resistant Alloys and Non-Metallics

- Stainless And Duplex Alloy Families — Chloride And Temperature Limits
- Nickel-Based Alloys And Clad Pipe — Severe Sour And Hot Wells
- Glass-Reinforced And Thermoplastic Pipe — Water Injection And Low-Pressure Gas
- Liners And Internal Coatings — Extending Existing Carbon Steel Lines
- Elastomers And Seals Selection — Gas Decompression And Chemical Compatibility

### Day 4: Lifecycle Cost and Risk-Based Choice

- Lifecycle Cost Model Build — Purchase, Treatment, Inspection And Replacement
- Option Comparison Matrix — Weighing Cost, Risk And Availability
- Failure Consequence Ranking — Safety, Environment And Deferred Production
- Supply Chain And Lead Time Factors — Alloy Availability And Fabrication
- Material Change Triggers — When Integrity Data Calls For Reselection

## Day 5: Practising the Materials Selection Report

- Well And Flowline Case Definition — Applying Service Envelope Methods
- Grade And Alloy Shortlist — Applying Sour Service And Allowance Rules
- Cost Comparison For Shortlisted Options — Applying The Lifecycle Cost Model
- Residual Risk And Monitoring Needs — Agreeing Controls With Integrity Staff
- Materials Selection Report — Completing The Report For Design Review

## Applying Upstream Materials Selection and Lifecycle Cost After the Course

- Rebuild the service envelope for one ageing flowline using current produced fluid data.
- Run a lifecycle cost comparison for one pending material decision.

## Upstream Materials Selection and Lifecycle Cost Questions FAQ

### What is Upstream Materials Selection and Lifecycle Cost and why does it matter now?

It is the practice of choosing steels, alloys and non-metallics for wells, flowlines and facilities by service condition and total cost. It matters now because harsher fluids and longer field lives raise the price of a wrong choice.

### Which roles gain most from Upstream Materials Selection and Lifecycle Cost?

Materials, mechanical, integrity and project engineers gain most. Each sees how fluid data, grade limits and cost models combine into one defensible decision.

### How does Upstream Materials Selection and Lifecycle Cost differ from a corrosion control course?

It focuses on choosing the material at the design stage rather than treating and monitoring corrosion once a line is running. This course decides what metal or polymer to install.

### What do you bring back from Upstream Materials Selection and Lifecycle Cost?

You bring back a draft selection report built during the course, covering envelopes, shortlists, costs and residual risks.

## Upstream Materials Selection and Lifecycle Cost: The Way Forward

The materials selection report first informs the grade and alloy choices put to design review for the next well or flowline. Materials and project engineers use it to defend capital spend, and integrity staff use it to plan monitoring. After the first year of operation, revisit the service envelope and cost assumptions against actual fluid data and inspection results.