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COURSE BROCHURE

# Plant Piping Hydraulics and Lifecycle Cost Optimisation Training Course

10 – 14 May 2027
London

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**Ref:** 1683_61684 **Date:** 10 – 14 May 2027 **Location:** London **Fees:** 5900 GBP

Plant Piping Hydraulics and Lifecycle Cost Optimisation is a 1-week training course for piping, mechanical and process engineers, built around a Piping Improvement Case that each participant prepares for one existing line or header. Rising pumping energy costs, plant debottlenecking and ageing carbon steel networks now make line size, routing and material choices a lasting source of savings or waste. Jupiter Prime Training delivers this piping optimisation course for plant engineering staff.

## Why Plant Piping Hydraulics and Lifecycle Cost Optimisation Matters Now

Three pressures meet in plant piping today: operations teams pushing more throughput through lines sized for older rates, energy managers chasing the pumping and compression power lost to friction, and integrity groups replacing corroded spools faster than budgets allow. Plants that size and route lines on lifecycle cost rather than first cost run cooler pumps, fewer leaks and longer turnarounds. The course rests on Darcy-Weisbach friction methods, economic pipe diameter analysis and net present value comparison of material and layout options.

## Who Gains Most from Plant Piping Hydraulics and Lifecycle Cost Optimisation

- Those sizing new lines and checking existing ones for higher rates
- Those choosing pipe materials, linings and wall thickness allowances
- Those routing lines and placing supports, anchors and expansion loops
- Those estimating pumping energy and maintenance cost over plant life
- Those approving modification packages for debottlenecking projects

A plant engineering group that sends its piping, process and maintenance engineers together gains most.

## Plant Piping Hydraulics and Lifecycle Cost Optimisation Capabilities

Each outcome links a hydraulic or mechanical choice to its cost over the life of the line.

- Calculate friction and fitting losses for single and two-phase lines — process engineer
- Apply economic diameter analysis to balance capital cost and pumping power — project sponsor
- Weigh carbon steel, stainless, duplex and lined pipe for corrosive services — materials engineer
- Specify support spacing and flexibility measures for thermal movement — piping designer
- Assess erosion, vibration and water hammer risks before rate increases — reliability lead
- Build a net present value comparison of improvement options — plant manager

## Key Plant Piping Hydraulics and Lifecycle Cost Optimisation Terms

- Head loss — The pressure lost to friction and fittings as fluid flows along a pipe.
- Economic pipe diameter — The size that minimises the sum of installed cost and lifetime pumping energy cost.
- Erosional velocity — The flow speed above which liquid droplets or solids start wearing the pipe wall.
- Expansion loop — A bend added to a line so thermal growth is absorbed without overloading nozzles or supports.
- Corrosion allowance — Extra wall thickness added so a pipe stays safe after expected metal loss.
- Lifecycle cost — The total of purchase, installation, energy, maintenance and replacement cost over a line's service life.

## Plant Piping Hydraulics and Lifecycle Cost Optimisation Day by Day

### Day 1: Where Piping Cost Hides

- Plant Piping Cost Breakdown — Separating Capital, Energy and Maintenance Shares
- Line Lists and Isometrics — Locating Lines Worth Reviewing First
- Throughput Debottlenecking Drivers — Identifying Lines That Limit Production
- Failure and Leak History Review — Linking Repairs to Design Choices
- Lifecycle Cost Framework — Setting the Basis for Option Comparison

### Day 2: Hydraulics and Line Sizing

- Darcy-Weisbach Friction and Moody Chart — Calculating Straight Pipe Losses
- Fitting and Valve Loss Coefficients — Totalling System Resistance
- Two-Phase Flow Regimes — Avoiding Slugging in Gas and Liquid Lines
- Economic Diameter Analysis — Balancing Installed Cost Against Pumping Power
- System Curves and Pump Matching — Checking Headroom for Higher Rates

### Day 3: Materials and Mechanical Integrity

- Carbon, Stainless, Duplex and Non-Metallic Options — Matching Material to Service
- Corrosion Allowance and Lining Choices — Extending Line Life Economically
- Erosional Velocity Limits — Protecting Elbows and Tees Under Higher Flow
- Water Hammer and Surge Control — Preventing Pressure Spikes on Valve Closure
- Vibration Screening of Small-Bore Connections — Reducing Fatigue Failures

### Day 4: Layout, Supports and Flexibility

- Routing Principles for Access and Drainage — Cutting Maintenance Time
- Support Spacing and Guide Placement — Controlling Sag and Movement
- Thermal Expansion Loops and Bellows — Keeping Nozzle Loads Within Limits
- Insulation and Heat Tracing Economics — Weighing Energy Saved Against Cost
- Modular and Prefabricated Spool Strategies — Shortening Shutdown Windows

## Day 5: Practising the Piping Improvement Case

- Header Resizing Case for a Water Injection Line — Applying Day 2 Hydraulics
- Material Upgrade Comparison for a Sour Gas Line — Applying Day 3 Choices
- Support and Loop Review for a Steam Line — Applying Day 4 Layout Rules
- Net Present Value Ranking of Options — Applying Day 1 Lifecycle Framework
- Piping Improvement Case — Completing Recommendation, Cost and Risk Summary

## Applying Plant Piping Hydraulics and Lifecycle Cost Optimisation After the Course

- Recalculate head loss on the line most often blamed for throughput limits.
- Prepare a lifecycle cost comparison for the next spool replacement.

## Plant Piping Hydraulics and Lifecycle Cost Optimisation Questions FAQ

### What is plant piping hydraulics and lifecycle cost optimisation and why does it matter now?

It is the practice of sizing, routing and specifying plant lines on total cost over their life. It matters now because energy prices, debottlenecking and ageing networks make poor piping choices expensive.

### Which roles gain most from plant piping hydraulics and lifecycle cost optimisation training?

Piping, mechanical and process engineers gain most. Water and power plant engineers also benefit.

### How does plant piping hydraulics and lifecycle cost optimisation differ from a piping code course?

It focuses on hydraulic performance and cost over the life of a line rather than code compliance. You compare options on energy, maintenance and replacement cost instead of checking design rules.

### What do you bring back from plant piping hydraulics and lifecycle cost optimisation training?

You bring back an improvement case for one real line or header. It sets out hydraulic findings, material and layout options and a cost comparison.

## Plant Piping Hydraulics and Lifecycle Cost Optimisation: The Way Forward

The Piping Improvement Case first informs whether a constrained line is resized, upgraded or rerouted at the next shutdown. Plant engineers, maintenance planners and project sponsors use it to rank modifications. After the first change is in service, it is worth checking measured pressure drop and pump power against the predictions.