JUPITER PRIME
Consulting • Training • Advisory
جوبيتر برايم للاستشارات والتدريب

COURSE BROCHURE

Fluid Machinery Performance and Field Troubleshooting Training Course

19 – 23 July 2027
Milan

Fluid Machinery Performance and Field Troubleshooting Training Course

Ref: 1508_55772 **Date:** 19 – 23 July 2027 **Location:** Milan **Fees:** 7200 GBP

Fluid Machinery Performance and Field Troubleshooting is a 1-week training course for rotating equipment engineers, mechanical technicians and operations staff who keep centrifugal pumps, compressors and steam or gas turbines delivering their rated head and flow, and who leave with a fluid machinery troubleshooting casebook for their own units. Energy prices and tighter process margins make every point of lost efficiency visible on the operating budget. Jupiter Prime Training delivers this subject with a field engineer's focus on curves, symptoms and root causes.

Why Fluid Machinery Performance Matters Now

Three pressures meet at the pump skid and the compressor deck. Process units now run closer to their design limits, so a machine operating far from its best efficiency point quickly shows recirculation, cavitation or surge. Power consumption by pumping and compression is a large share of site energy use. Older machines are being re-rated for changed duties, often without updated curves. Sites that read curves well cut seal and bearing failures; sites that do not chase the same symptom for years. The course uses the maintenance terminology of EN 13306 to describe failure and degradation.

Who Gains Most from Fluid Machinery Performance

- Engineers who select, re-rate and approve operating envelopes for pumps and compressors
- Technicians who fit mechanical seals, bearings and couplings and perform shaft alignment
- Operators who start, load and protect machines against surge, dry running and overspeed
- Specialists who investigate repeat failures and propose design or duty changes
- Planners who scope overhauls and order spares for rotating plant

An operations and maintenance pairing from one process unit gains most.

Fluid Machinery Performance Capabilities

Participants turn field readings into corrective actions.

- Plot the operating point on pump and system curves — throttling, impeller trim or speed change
- Calculate net positive suction head margin — preventing cavitation damage on suction-limited pumps
- Assess compressor operation against the surge line — anti-surge settings and recycle decisions
- Diagnose seal, bearing and coupling distress from field evidence — repair or redesign choices

- Apply laser shaft alignment and soft-foot correction — technicians and machine reliability
- Specify an overhaul scope from performance loss and wear findings — planners and shutdown leaders

Key Fluid Machinery Performance Terms

- Best efficiency point — the flow at which a pump or compressor converts input power to fluid energy with the least loss.
- System curve — the head a piping system demands at each flow, set by static lift and friction losses.
- Net positive suction head — the margin of suction pressure above vapour pressure that keeps liquid from flashing at the impeller eye.
- Cavitation — vapour bubbles forming and collapsing inside a pump, causing noise, pitting and head loss.
- Surge — flow reversal in a dynamic compressor when it cannot meet discharge pressure at low flow.
- Soft foot — a machine foot that does not sit flat, distorting the casing and spoiling alignment.

Fluid Machinery Performance Day by Day

Day 1: Hydraulic Behaviour of Pumps

- Head, Flow and Power Curves — Reading Manufacturer Data Against Duty
- System Curve Construction — Finding the True Operating Point
- Affinity Laws and Variable Speed Drives — Throttling Versus Speed Control
- Parallel and Series Pump Operation — Sharing Load Without Instability
- Minimum Continuous Flow and Recirculation — Protecting Pumps at Low Demand

Day 2: Suction Conditions and Compressor Stability

- NPSH Available Versus Required — Diagnosing Suction-Limited Installations
- Cavitation Damage Patterns on Impellers — Separating Suction From Recirculation Causes
- Centrifugal Compressor Maps and Surge Line — Setting Safe Operating Margins
- Anti-Surge Control and Recycle Valves — Response to Process Upsets
- Reciprocating Compressor Valves and Pulsation — Capacity Loss and Cylinder Damage

Day 3: Seals, Bearings and Alignment

- Mechanical Seal Arrangements and Flush Plans — Matching Seal to Fluid
- Seal Face Failure Evidence — Dry Running, Contamination and Thermal Distress
- Rolling and Plain Bearing Lubrication — Oil Level, Ring Oilers and Mist
- Laser Shaft Alignment and Soft-Foot Checks — Precision Installation Practice
- Pipe Strain and Baseplate Grouting — Hidden Causes of Repeat Failures

Day 4: Symptoms, Turbines and Overhaul Scope

- Symptom-to-Cause Charts for Pumps — Structured Field Troubleshooting
- Vibration and Temperature Readings at the Machine — Confirming a Diagnosis
- Steam and Gas Turbine Governors and Trips — Overspeed Protection Checks
- Performance Testing in the Field — Quantifying Efficiency Loss Before Overhaul
- Overhaul Scope and Clearance Records — Deciding Repair, Upgrade or Replacement

Day 5: Practising Fluid Machinery Troubleshooting

- Cooling Water Pump Case — Applying Curves and NPSH From Days 1 and 2
- Process Gas Compressor Case — Applying Surge Assessment From Day 2
- Repeat Seal Failure Case From a Desalination Plant — Applying Day 3
- Refinery Feed Pump Efficiency Case — Applying Field Testing From Day 4
- Fluid Machinery Troubleshooting Casebook — Completing Entries for Own Units

Applying Fluid Machinery Performance After the Course

- Plot the actual operating point of five critical pumps on their curves and flag outliers.
- Run a soft-foot and alignment audit on one repeat-failure machine.

Fluid Machinery Performance Questions FAQ

What is fluid machinery performance and field troubleshooting and why does it matter now?

It is the skill of reading how pumps, compressors and turbines actually run and tracing faults to their cause. It matters now because units run closer to limits and energy for pumping and compression is under scrutiny.

Which roles gain most from fluid machinery performance and field troubleshooting?

Rotating equipment engineers, mechanical technicians and operators gain most. You share operating points, installation quality and diagnosis.

How does fluid machinery performance and field troubleshooting differ from a monitoring strategy course?

It works at the machine, on curves, suction conditions, seals and alignment. A monitoring strategy course decides which machines to watch and how often, while this one diagnoses and corrects what is happening on the skid.

What do you bring back from fluid machinery performance and field troubleshooting training?

You bring back a casebook of diagnosed faults for your own machines. Each entry records symptom, confirming evidence and corrective action.

Fluid Machinery Performance: The Way Forward

The fluid machinery troubleshooting casebook first informs which pumps and compressors need a duty correction rather than another repair. Engineers maintain it, technicians add installation findings and operators use it during upsets. After the first overhaul season, its entries are worth revisiting to see which corrections held and which symptoms returned.