JUPITER PRIME

Consulting • Training • Advisory

جوبيتر برايم للاستشارات والتدريب

COURSE BROCHURE

Pipeline Pump and Compressor Station Design Training Course

20 – 24 June 2027
Doha

Pipeline Pump and Compressor Station Design Training Course

Ref: 2886_110302 **Date:** 20 – 24 June 2027 **Location:** Doha **Fees:** 6500 GBP

Pipeline Pump and Compressor Station Design is a 1-week training course for pipeline facilities and rotating equipment engineers who size and lay out booster stations on liquid and gas lines, producing a station design basis. Throughput changes, energy prices and emissions targets now force owners to revisit how many stations a line needs and how each is driven. Jupiter Prime Training runs this course for engineers who define those stations.

Why Pipeline Pump and Compressor Station Design Matters Now

Three pressures shape station design today. Shippers ask for flexible throughput, so stations must run efficiently far from their original design point. Fuel gas and electricity costs, together with emissions targets, reopen the choice between gas turbines, gas engines and electric motors. Ageing units also need re-wheeling or replacement while the line keeps flowing. A station designed well holds pressure with few trips and modest fuel use; one designed badly surges, recycles constantly or limits the whole line. The course rests on recognised rotating equipment specification practice and pipeline hydraulic modelling methods.

Who Gains Most from Pipeline Pump and Compressor Station Design

- Facilities engineers who set station spacing, suction and discharge pressures
- Rotating equipment engineers who select pumps, compressors and their drivers
- Piping and layout engineers who arrange headers, unit bays and recycle loops
- Control and protection engineers who define surge control, trips and station shutdown
- Operations engineers who judge maintainability and spare unit philosophy

Owner teams planning a capacity expansion on crude, product or gas transmission lines gain most when facilities and machinery engineers attend together.

Pipeline Pump and Compressor Station Design Capabilities

Participants translate a hydraulic profile and a throughput forecast into station numbers, units and layout.

- Calculate station head and compression ratio requirements along a hydraulic gradient — line capacity planners
- Weigh centrifugal, reciprocating and screw machines against duty and turndown — rotating equipment authorities
- Specify drivers by comparing gas turbines, engines and variable speed motors — energy and emissions leads
- Design station piping, recycle loops and header arrangements for stable operation — layout and stress engineers
- Build a control and protection philosophy covering surge, overpressure and emergency shutdown — safety reviewers
-

Test station layout options for spacing, access and future expansion — operations and maintenance teams

Key Pipeline Pump and Compressor Station Design Terms

- Hydraulic gradient — the line of falling pressure along a pipeline that fixes where pressure must be restored.
- Compression ratio — discharge pressure divided by suction pressure across a compressor stage or station.
- Net positive suction head — the pressure margin above vapour pressure at a pump inlet that prevents cavitation.
- Surge line — the flow limit below which a centrifugal compressor becomes unstable and flow reverses.
- Recycle valve — a control valve returning cooled discharge gas or liquid to suction to keep a unit in its stable range.
- Station design basis — the agreed record of flows, pressures, units, drivers and philosophies from which station engineering proceeds.

Pipeline Pump and Compressor Station Design Day by Day

Day 1: Line Hydraulics and Station Need

- Hydraulic Profile Modelling — Elevation, Friction And Delivery Pressure Limits
- Station Spacing Studies — Number Of Stations Versus Pipe Diameter
- Throughput Forecast Cases — Minimum, Design And Future Expansion Flows
- Fluid Property Effects — Viscosity, Density And Gas Compressibility
- Station Duty Envelope — Head, Ratio And Turndown Requirements

Day 2: Pump and Compressor Selection

- Centrifugal Pump Curves — Series, Parallel And Variable Speed Operation
- Suction Head Margins — Cavitation Risk At Low Line Pressure
- Centrifugal Compressor Maps — Surge, Stonewall And Operating Point
- Reciprocating Machines — Capacity Control And Pulsation Effects
- Unit Count And Sparing — Installed Spare Versus Rental Philosophy

Day 3: Drivers, Energy and Emissions

- Gas Turbine Drivers — Site Rating, Fuel Use And Exhaust Heat
- Gas Engine Drivers — Efficiency At Part Load And Maintenance
- Electric Motors With Variable Speed Drives — Grid Supply And Harmonics
- Station Energy Comparison — Lifecycle Fuel And Power Cost
- Emissions And Noise Estimates — Driver Choice And Permit Limits

Day 4: Station Piping, Control and Protection

- Header And Unit Bay Arrangement — Flow Distribution And Isolation
- Recycle Loop And Cooler Sizing — Stable Start-Up And Low Flow
- Surge Control Philosophy — Controller Margins And Valve Speed
- Overpressure Protection — Relief, Trips And Station Bypass
- Emergency Shutdown And Blowdown — Station Isolation Sequence

Day 5: Practising the Station Design Basis

- Station Layout Options — Plot Plan, Access And Expansion Space
- Duty And Unit Selection Summary — Applying Hydraulic And Machine Results
- Driver Recommendation — Applying Energy And Emissions Comparison
- Control And Protection Summary — Applying Surge And Shutdown Philosophy
- Station Design Basis — Peer Challenge And Final Recommendation

Applying Pipeline Pump and Compressor Station Design After the Course

- Rebuild the hydraulic profile of one existing line and check each station against current throughput cases.
- Compare driver options for a planned compressor or pump unit using the lifecycle energy method.

Pipeline Pump and Compressor Station Design Questions FAQ

What is pipeline pump and compressor station design and why does it matter now?

It is the engineering that fixes where booster stations sit on a line and which units, drivers and protection they use. It matters now because flexible throughput, energy costs and emissions targets are reshaping those choices.

Which roles gain most from pipeline pump and compressor station design?

Facilities, rotating equipment, piping, control and operations engineers gain most. You benefit most if you size stations or select machines and drivers for transmission lines.

How does pipeline pump and compressor station design differ from a rotating equipment operations course?

It concentrates on station engineering decisions rather than running or maintaining machines. An operations course covers start-up, rounds and troubleshooting; this one covers sizing, selection and layout.

What do you bring back from pipeline pump and compressor station design?

You bring back a design basis drafted for a real or realistic station. It records duty cases, units, drivers, piping arrangement and protection philosophy.

Pipeline Pump and Compressor Station Design: The Way Forward

The station design basis first informs whether a line expansion needs a new station or upgraded units at existing ones. Facilities leads, machinery specialists and project sponsors use it to brief vendors and estimate cost. After the first year of operation, revisit the turndown cases against actual throughput and driver fuel use.