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COURSE BROCHURE

Fluid Flow Control in the Process Industry Training Course

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Registered in the United Kingdom and Saudi Arabia

Fluid Flow Control in the Process Industry Training Course

Fluid Flow Control in the Process Industry is a 1-week training course for process, instrument and mechanical engineers, technicians and operators, ending with a flow control loop assessment for one valve and pump circuit on their own plant. Ageing valves, tighter energy targets and leaner maintenance crews mean that poorly sized or badly tuned flow loops now cost throughput, energy and reliability. Jupiter Prime Training runs this course for plant flow control teams.

Why Fluid Flow Control Matters Now

Two pressures shape flow control on process plants today. Energy and emissions targets push operators to cut pumping losses, and an oversized valve throttling against a large pump wastes power. At the same time, maintenance and instrument crews are smaller, so cavitation damage and sticking positioners go unnoticed until they limit production. Plants that size valves against real pressure drop data, choose suitable trim characteristics and read loop behaviour early run steadier and spend less on repairs; others live with hunting loops and repeated trim replacement.

Who Gains Most from Fluid Flow Control

- Process engineers who set flow targets, pressure profiles and control valve duties
- Instrument engineers and technicians who size, calibrate and maintain valves and positioners
- Mechanical engineers who select pumps and judge valve and piping damage
- Control room operators who run flow loops and report unstable behaviour
- Planners who schedule valve overhauls and spare trims

A unit team gains most when its process, instrument and mechanical staff attend together and examine the same pump and valve circuit.

Fluid Flow Control Capabilities

Participants leave able to connect fluid behaviour, valve hardware and loop response and trace flow problems to their cause.

- Calculate pressure drop across pipes, fittings and valves — valve duty specification
- Specify control valve type, size and trim characteristic for a stated duty — purchase and replacement decisions
- Assess the risk of cavitation, flashing and noise — trim selection and material choice
- Test actuator and positioner response — maintenance priorities
- Weigh pump curve, system curve and valve authority together — energy and throttling trade-offs
- Build a fault diagnosis for an unstable flow loop — operations and instrument action

Key Fluid Flow Control Terms

- Pressure drop — the loss of pressure as fluid moves through pipe, fittings or a valve.
- Flow coefficient Cv — a number expressing how much liquid a valve passes at a given opening for a set pressure drop.
- Inherent characteristic — the relation between valve travel and flow at constant pressure drop, typically linear, equal percentage or quick opening.
- Cavitation — formation and collapse of vapour bubbles in a liquid when local pressure falls below vapour pressure and then recovers, damaging trim.
- Flashing — vapour formation that persists downstream because outlet pressure stays below the liquid's vapour pressure.
- Valve authority — the share of total system pressure drop taken by the control valve.

Fluid Flow Control Day by Day

Day 1: Fluid Behaviour and Pressure Drop

- Density, Viscosity and Vapour Pressure — Fluid Data for Valve Sizing
- Laminar and Turbulent Flow Regimes — Reynolds Number in Practice
- Pipe Friction and Fitting Losses — Line Pressure Profile
- Compressible Flow and Choked Conditions — Gas and Steam Duties
- Pump Curves and System Curves — Operating Point Location

Day 2: Control Valve Types and Characteristics

- Globe, Ball and Butterfly Valve Bodies — Body Style Selection
- Trim Designs and Inherent Characteristics — Linear Versus Equal Percentage
- Installed Characteristic and Valve Authority — Controllability Across Range
- Rangeability and Turndown — Minimum and Maximum Flow Duties
- Shut-off Classes and Seat Leakage — Isolation Expectations

Day 3: Valve Sizing, Cavitation and Flashing

- Flow Coefficient Sizing for Liquids — Valve Size Calculation
- Gas and Steam Sizing Methods — Expansion and Choked Flow Effects
- Cavitation Indices and Anti-Cavitation Trim — Damage Prevention
- Flashing Service Materials and Body Choices — Erosion Resistance
- Aerodynamic and Hydrodynamic Noise — Noise Reduction Options

Day 4: Actuators, Positioners and Flow Measurement

- Pneumatic, Electric and Hydraulic Actuators — Thrust and Fail Position
- Digital Positioners and Valve Signatures — Condition Diagnostics
- Differential Pressure and Magnetic Flowmeters — Meter Choice by Fluid
- Ultrasonic, Coriolis and Vortex Meters — Accuracy and Installation Needs
- Flow Loop Tuning and Valve Stiction — Stable Loop Response

Day 5: Practising the Flow Control Loop Assessment

- Duty Data and Pressure Profile for a Chosen Circuit — Baseline Conditions
- Valve Size and Characteristic Check — Fit for Present Duty
- Cavitation and Flashing Screening — Trim and Material Findings
- Pump and Valve Interaction Review — Energy Saving Options
- Flow Control Loop Assessment — Findings, Causes and Recommended Actions

Applying Fluid Flow Control After the Course

- Recalculate the flow coefficient for one control valve that runs mostly near closed or fully open, and recommend a trim change, resize or pump speed change.
- Run a step test and positioner signature on one unstable flow loop with the instrument technician, then separate tuning, stiction and sizing faults.

Fluid Flow Control Questions FAQ

What is fluid flow control in the process industry, and why does it matter now?

Fluid flow control in the process industry is the use of control valves, pumps, meters and loops to hold flow at target. It matters now because energy targets and smaller maintenance crews expose oversized valves, cavitation damage and unstable loops.

Which roles gain most from fluid flow control training?

Process, instrument and mechanical engineers, technicians and operators gain most. They size valves, maintain positioners, select pumps and run the flow loops that set plant throughput.

How does fluid flow control training differ from a process control tuning course?

It starts with the fluid and the hardware. Participants work through pressure drop, valve sizing, cavitation, actuators and meters before tuning, so loop faults are traced to their physical cause.

What do you bring back from fluid flow control training?

You bring back an assessment of one valve and pump circuit on your plant. It checks valve size, characteristic, cavitation risk and pump interaction and lists recommended actions.

Fluid Flow Control: The Way Forward

The flow control loop assessment first informs whether a troublesome valve needs a new trim, a resize or simply retuning. Process, instrument and mechanical staff use it to agree one maintenance action. After the change, revisit the pump and valve operating point, because a new trim or speed setting moves the duty and can expose the next weak loop on the unit.