



Consulting and Training | Reach New Heights

Course Name

Control Valves & Final Control Elements

Sector Name

Instrumentation & Controls

Document Type

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Control Valves & Final Control Elements

Course Introduction

A control loop can have accurate measurement and well-tuned control logic yet still perform poorly when the final control element cannot translate the controller's command into the required process change. Incorrect valve selection, inappropriate sizing, actuator limitations, poor valve characteristics, excessive pressure drop, cavitation, flashing, stiction, or mechanical problems can produce unstable control, excessive wear, noise, and inefficient process operation.

Boost Consulting & Training offers this course to develop a practical engineering understanding of control valves and final control elements within industrial process-control systems. Participants examine valve types and characteristics, sizing principles, actuators, positioners, flow behavior, pressure conditions, cavitation, flashing, installed performance, and common control-valve problems. Practical cases focus on matching valve behavior with process requirements and distinguishing valve-related problems from wider control-loop issues.

The **main concept of this course** is to ensure that the final control element converts control-system decisions into stable and effective process action under actual operating conditions.

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Target Audience

- ✓ Instrumentation and control engineers
- ✓ Process and automation engineers
- ✓ Instrument and control valve specialists
- ✓ Engineers responsible for process-control performance

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Learning Objectives

- ✓ Explain the role of control valves and final control elements within process-control loops.
- ✓ Compare common control valve types and their industrial applications.
- ✓ Interpret inherent and installed valve flow characteristics.
- ✓ Apply fundamental control valve sizing and selection principles.
- ✓ Evaluate actuator and positioner requirements for different applications.
- ✓ Recognize cavitation, flashing, noise, and excessive velocity conditions.
- ✓ Diagnose common control valve performance and mechanical problems.
- ✓ Evaluate valve behavior as part of complete control-loop performance.

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Course Outline

✓ DAY 01

Understanding the Final Control Element

Connecting the Valve with the Control Loop

- ✓ Trace the controller output through the positioner, actuator, valve, and process response.
- ✓ Understand how valve movement changes flow and influences the controlled process variable.
- ✓ Recognize how final-element limitations can affect overall control-loop performance.

Comparing Control Valve Designs

- ✓ Examine globe, ball, butterfly, rotary, and other common control valve configurations.
- ✓ Match valve designs with flow, pressure, temperature, and process-service requirements.
- ✓ Complete a Control Valve Application Challenge across contrasting industrial services.

Control Valves & Final Control Elements

Course Outline

✓ DAY 02

Understanding Valve Flow Behavior

Reading Valve Characteristics

- ✓ Compare linear, equal-percentage, and quick-opening flow characteristics.
- ✓ Distinguish inherent valve characteristics from actual installed behavior.
- ✓ Evaluate how system pressure conditions change the effective valve response.

Matching Valve Behavior with the Process

- ✓ Connect valve characteristics with changing process gain and operating requirements.
- ✓ Recognize problems caused by inappropriate valve selection or operating range.
- ✓ Complete a Valve Characteristic Selection Exercise for different process-control applications.

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Course Outline

✓ DAY 03

Selecting and Sizing Control Valves

Understanding Valve Sizing

- ✓ Interpret flow coefficient and the major variables influencing required valve capacity.
- ✓ Evaluate liquid, gas, and steam service considerations.
- ✓ Recognize the consequences of oversized and undersized control valves.

Evaluating Difficult Flow Conditions

- ✓ Identify pressure conditions associated with cavitation and flashing.
- ✓ Examine excessive velocity, noise, vibration, and erosion concerns.
- ✓ Conduct a Control Valve Sizing Case involving changing process conditions and competing valve options.

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Course Outline

✓ DAY 04

Engineering Actuation and Positioning

Selecting Valve Actuators

- ✓ Compare pneumatic, electric, and hydraulic actuation approaches.
- ✓ Evaluate thrust, torque, speed, supply, and operating requirements.
- ✓ Understand fail-open, fail-closed, and fail-in-place considerations.

Understanding Positioner Performance

- ✓ Examine how valve positioners translate control signals into accurate valve movement.
- ✓ Recognize deadband, hysteresis, stiction, and response problems.
- ✓ Run a Valve Response Diagnosis using controller commands and actual valve behavior.

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Course Outline

✓ DAY 05

Troubleshooting Control Valve Performance

Diagnosing Valve Problems

- ✓ Investigate hunting, sticking, leakage, excessive noise, vibration, and unstable movement.
- ✓ Distinguish mechanical valve problems from actuator, positioner, signal, and process-related causes.
- ✓ Use valve position and process information to narrow down possible faults.

Restoring Effective Final Control

- ✓ Determine whether adjustment, calibration, repair, sizing correction, or valve modification is appropriate.
- ✓ Verify valve performance after corrective action within the complete control loop.
- ✓ Complete a Control Valve Troubleshooting Case from abnormal process behavior through diagnosis to the final engineering response.

Control Valves & Final Control Elements

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
Nov. 30, 2026	Dec. 4, 2026	5 days	4950.00 \$	Austria , Vienna
Jan. 31, 2027	Feb. 4, 2027	5 days	4250.00 \$	KSA , Riyadh
April 4, 2027	April 8, 2027	5 days	4250.00 \$	Bahrain , Manama
May 31, 2027	June 4, 2027	5 days	4250.00 \$	UAE , Dubai

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