

Course No. 1162

Control Valve Engineering Training Course

INSTRUMENTATION & CONTROL
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS

DURATION

5 Days

DELIVERY

Classroom



Course Overview

The Control Valve Engineering Training Course is a comprehensive professional development program designed to equip engineers, technicians, and industrial professionals with the technical knowledge and practical skills required to select, size, operate, maintain, troubleshoot, and optimize control valves used in modern industrial process control systems. As one of the most critical final control elements in automated process industries, control valves play a vital role in regulating flow, pressure, temperature, and level to ensure safe, efficient, and reliable plant operations.

This course provides participants with an in-depth understanding of control valve engineering principles, valve construction, operating characteristics, actuator technologies, valve sizing methodologies, performance analysis, diagnostics, maintenance strategies, and lifecycle management. Participants will gain practical insights into selecting the most appropriate control valve for different industrial applications while learning how valve performance directly influences process stability, product quality, energy efficiency, and operational reliability.

Industries such as oil and gas, petrochemicals, power generation, chemical processing, water and wastewater treatment, pharmaceuticals, mining, food processing, and manufacturing depend on properly engineered control valves to maintain process integrity, optimize production, reduce operational risks, and improve asset performance. This Control Valve Engineering Training Course enables participants to develop practical engineering capabilities that support operational excellence, equipment reliability, predictive maintenance, and sustainable industrial performance.

Through engineering concepts, industrial case studies, practical exercises, and real-world operational scenarios, this course prepares participants to evaluate, install, commission, maintain, troubleshoot, and improve control valve systems in accordance with internationally recognized engineering practices. By the end of the program, participants will possess the technical competence to contribute effectively to process optimization, maintenance improvement, automation projects, and long-term asset management initiatives.

Objectives

- Analyze the operating principles and engineering fundamentals of industrial control valves throughout the course.
- Develop the ability to select appropriate control valves based on process requirements and

operating conditions.

- Evaluate valve sizing calculations and performance characteristics for various industrial applications.
- Apply engineering principles to optimize valve selection, installation, and commissioning.
- Design effective control valve solutions that improve process efficiency and operational stability.
- Improve troubleshooting techniques for diagnosing valve performance problems and operational failures.
- Strengthen maintenance planning and reliability strategies for control valve systems.
- Implement diagnostic methods that evaluate valve condition and operational performance.
- Assess control valve performance using process data, inspection results, and maintenance records.
- Align control valve engineering practices with industrial safety, quality, reliability, and operational excellence objectives.

Who Should Attend

This Control Valve Engineering Training Course is designed for instrumentation engineers, control engineers, process engineers, mechanical engineers, maintenance engineers, automation engineers, reliability engineers, commissioning engineers, project engineers, inspection engineers, and technical professionals responsible for specifying, selecting, installing, operating, maintaining, or troubleshooting industrial control valves. It is equally valuable for instrumentation technicians, valve technicians, maintenance technicians, field service personnel, and plant operations specialists seeking to enhance their expertise in control valve engineering.

The course is also suitable for engineering managers, maintenance managers, operations managers, production managers, plant managers, reliability managers, technical supervisors, asset management specialists, quality professionals, project managers, industrial consultants, and decision makers responsible for improving equipment performance, operational reliability, maintenance effectiveness, and process optimization.

Professionals working within government entities, ministries, public sector organizations, oil and gas companies, petrochemical plants, power generation facilities, manufacturing industries, water treatment plants, mining operations, pharmaceutical manufacturers, food processing companies, engineering contractors, and large industrial enterprises will gain practical knowledge that supports efficient process control, reduced downtime, improved safety, and long-term asset performance.

Learning Outcomes

- By the end of this Control Valve Engineering Training Course, participants will be able to:
- Explain the operating principles, construction, and functions of industrial control valves.
- Select appropriate control valves based on process conditions and engineering requirements.
- Perform valve sizing calculations using recognized engineering methodologies.
- Evaluate valve characteristics and actuator performance for different applications.
- Diagnose valve failures, performance degradation, and process control problems.
- Apply preventive and predictive maintenance techniques for control valve systems.
- Verify valve performance during installation, commissioning, and operational testing.
- Analyze operational data to improve valve reliability and process efficiency.
- Apply industry best practices for valve lifecycle management and asset reliability.
- Develop practical engineering recommendations that optimize control valve performance and support continuous operational improvement.

Course Outline

DAY 01

Fundamentals of Control Valve Engineering

- Introduction to control valves and their role in industrial process control
- Control valve construction, components, and operating principles
- Valve classifications, flow characteristics, and applications
- Actuators, positioners, accessories, and control mechanisms

PRACTICAL APPLICATION

Identifying control valve components and evaluating operating principles

DAY 02

Control Valve Selection and Sizing

- Process requirements for control valve selection
- Valve sizing methodologies and engineering calculations

DAY 02 — CONTINUED

- Flow coefficients, pressure drop, cavitation, flashing, and noise considerations
- Material selection and service condition evaluation

PRACTICAL APPLICATION

Performing valve sizing calculations and selecting suitable control valves

DAY 03

Installation, Commissioning, and Performance Evaluation

- Control valve installation best practices
- Commissioning procedures and operational testing
- Valve performance monitoring and operational diagnostics
- Controller interaction and process stability considerations

PRACTICAL APPLICATION

Commissioning and evaluating control valve performance under simulated operating conditions

DAY 04

Maintenance, Diagnostics, and Troubleshooting

- Preventive and predictive maintenance strategies
- Valve inspection, testing, and condition assessment
- Diagnosing mechanical, pneumatic, electrical, and operational failures
- Corrective maintenance and performance restoration techniques

PRACTICAL APPLICATION

Troubleshooting industrial control valve problems and implementing corrective actions

DAY 05

Reliability Improvement and Operational Excellence

- Lifecycle management of control valves
- Reliability-centered maintenance and asset performance optimization
- Best practices for documentation, inspection planning, and maintenance management
- Continuous improvement strategies for valve performance and process control

FINAL WORKSHOP

Develop, evaluate, troubleshoot, and optimize a comprehensive control valve engineering solution that includes valve selection, sizing, commissioning, maintenance planning, performance evaluation, reliability improvement, and an implementation strategy to enhance operational efficiency and long-term asset performance.

Register or Request More Information

Course page: <https://quest-training.com/courses/control-valve-engineering-training-course>

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