Control Valve Sizing and Selection Training Course

Professional Development Training Course Outline

Category	General Training	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Control valves are at the heart of every modern process industry, directly influencing flow control accuracy, process stability, energy efficiency, and plant safety. In oil & gas, petrochemicals, power generation, water treatment, and chemical processing, improper valve sizing or incorrect selection can lead to severe operational inefficiencies such as cavitation, flashing, noise, vibration, and premature equipment failure. Control Valve Sizing and Selection Training Course is designed to equip engineers, technicians, and maintenance professionals with deep technical competence in fluid dynamics, valve performance characteristics, and industrial control system integration, ensuring optimal valve performance under varying process conditions.

With increasing industry focus on Industry 4.0, smart instrumentation, predictive maintenance, and energy optimization, understanding control valve behavior has become critical for plant reliability and digital transformation initiatives. This program blends theoretical fundamentals with real-world industrial applications, enabling participants to confidently perform valve sizing calculations, select appropriate valve types, and troubleshoot operational issues. The training also emphasizes compliance with global standards such as IEC, ISA, and API, ensuring participants meet international engineering best practices for modern process industries.

Programme Curriculum

Control Valve Sizing and Selection Training Course

Introduction

Control valves are at the heart of every modern process industry, directly influencing flow control accuracy, process stability, energy efficiency, and plant safety. In oil & gas, petrochemicals, power generation, water treatment, and chemical processing, improper valve sizing or incorrect selection can lead to severe operational inefficiencies such as cavitation, flashing, noise, vibration, and premature equipment failure. Control Valve

Sizing and Selection Training Course is designed to equip engineers, technicians, and maintenance professionals with deep technical competence in fluid dynamics, valve performance characteristics, and industrial control system integration, ensuring optimal valve performance under varying process conditions.

With increasing industry focus on Industry 4.0, smart instrumentation, predictive maintenance, and energy optimization, understanding control valve behavior has become critical for plant reliability and digital transformation initiatives. This program blends theoretical fundamentals with real-world industrial applications, enabling participants to confidently perform valve sizing calculations, select appropriate valve types, and troubleshoot operational issues. The training also emphasizes compliance with global standards such as IEC, ISA, and API, ensuring participants meet international engineering best practices for modern process industries.

Course Duration

5 days

Course Objectives

1. Master fundamentals of process control systems and flow dynamics
2. Understand control valve construction, design, and working principles
3. Apply ISA/IEC sizing equations for accurate valve selection
4. Evaluate flow coefficients and pressure drop calculations
5. Identify and prevent cavitation, flashing, and choked flow conditions
6. Select appropriate valve types
7. Analyze control valve characteristics
8. Integrate valves into automated control loops and DCS systems
9. Perform real-time troubleshooting of valve performance issues
10. Improve energy efficiency and process optimization in pipelines
11. Understand actuators, positioners, and smart valve technologies (IIoT)
12. Ensure compliance with API, ANSI, and IEC industrial standards
13. Build capability in predictive maintenance and asset reliability engineering

Target Audience

1. Process Engineers
2. Instrumentation Engineers
3. Mechanical Engineers
4. Maintenance Technicians
5. Plant Operators
6. Project Engineers
7. Design Engineers
8. Industrial Automation Specialists

Course Modules

Module 1: Fundamentals of Flow Control Systems

- Basics of fluid mechanics in process industries
- Role of control valves in automation loops
- Pressure, flow, and temperature relationships
- Open-loop vs closed-loop control systems
- Case Study: Flow instability in refinery pipeline system

Module 2: Control Valve Construction & Types

- Globe, ball, butterfly, plug valve designs
- Internal components and materials selection
- Valve body and trim configurations
- Fail-safe design principles
- Case Study: Valve failure in steam distribution network

Module 3: Valve Sizing Principles

- Definition and significance of flow coefficient
- ISA sizing equations and calculations
- Liquid vs gas sizing differences
- Pressure drop considerations
- Case Study: Oversized valve causing poor control in chemical plant

Module 4: Flow Characteristics & Performance Curves

- Linear, equal percentage, and quick opening curves
- Installed vs inherent characteristics
- Rangeability and turndown ratio
- Control stability analysis
- Case Study: Instability in water treatment dosing system

Module 5: Cavitation, Flashing & Noise Control

- Identification of cavitation and flashing
- Prevention techniques and design solutions
- Noise reduction in high-pressure systems
- Multistage trim solutions
- Case Study: Cavitation damage in offshore pipeline system

Module 6: Actuators, Positioners & Smart Valves

- Pneumatic, hydraulic, and electric actuators
- Smart positioners and digital communication
- IIoT-enabled valve monitoring
- Calibration and tuning techniques
- Case Study: Smart valve retrofit in power plant

Module 7: Valve Selection for Industrial Applications

- Industry-specific valve selection criteria
- Material compatibility and corrosion resistance
- High temperature and high pressure applications
- Safety and shutdown valve selection
- Case Study: Valve selection failure in LNG plant

Module 8: Troubleshooting & Predictive Maintenance

- Common valve failures and diagnostics
- Vibration and leakage analysis

- Maintenance strategies
- Digital monitoring and condition-based maintenance
- Case Study: Predictive maintenance reducing downtime in refinery

Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

Ready to enroll or request a customized program? Book online or contact us:

Register Online Now

Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com