

Control Valve Maintenance and Troubleshooting

Course Price

£3050

Course Description

This intensive 5-day Course forms part of the Instrument Technicians / Engineers development program and is designed to provide the required underpinning knowledge of Control Valves. It is a primarily classroom based unit covering the aspects of valves, valve actuators and valve accessories. It will also cover the operating principles, applications, terminology and failure modes associated with a variety of different process valves and actuators. Valve and actuator sizing will be covered. Maintenance and troubleshooting methods and techniques are included.

Course Objectives

At the end of this training course, participants will understand the use of control valve in closed loop control systems and the valve type characteristics and applications. In addition, participants will be able to explain cavitation and flashing cause /effects and methods to minimize, evaluate and select actuators for specific application, understand valve sizing and the use of the flow coefficient factor and evaluate and select actuators for specific valve applications. This course will also equip participants with understanding of the use of pneumatic, smart positioners and I/P converters; the ability to describe the use of valve accessories limit switches, volume booster and quick exhausts. Participants will also understand the applications for Shutdown / Blowdown and Process Shutdown Valves, be able to understand the principals of valve and actuator sizing to ISA standards and understand the methods and techniques of Maintenance and Troubleshooting.

Who Should Attend

Instrumentation and Control Engineers & Technicians, Mechanical Engineers & Technicians, Projects Engineers, Operation Engineers, Process and Utility Supervisors, and Technical Supervisory personnel involved in Sizing, Selecting, and Applying Process Control Valves

Course Content

- Closed Loop Control System

- Globe, Ball, Needle, Butterfly and Eccentric valve characteristics and applications.
- Cavitation cause / effect and methods used to minimize these.
- Control Valve Failure Mode applications
- Stem Packing types, selection and replacement methods.
- Diaphragm Actuators characteristics, application and sizing calculation
- Piston – Pneumatic and Hydraulic characteristics
- I/P Converter operation and application.
- Booster relay, quick exhaust, limit switch accessories operation and application
- Valve Positioner – Pneumatic and SMART type operation and application
- Motor Operated Valve (MOV) and Solenoid applications
- Process control/process shutdown/emergency shutdown/ blowdown valves
- Manual and Software Control Valve Sizing to ISA standard.
- Maintenance and Troubleshooting methods and techniques

Day 1

- Closed loop control system
- Globe valve characteristics and application
- Slide valve characteristics and application
- Needle valve characteristics and application
- Eccentric plug valve characteristics and application
- Ball valve characteristic and application
- Butterfly valve characteristic and application
- Gland packing types, selection and replacement methods
- Valve bonnets for high temperature applications
- Summary of two port valves

Video: Control Valves

Video: Gland packing replacement method

Oral Quiz to assess delegate's level of understanding

Day 2

- Three-port valves characteristics and application
- Piston valves
- Control valve trim types and applications
- Failure mode philosophy and applications
- Diaphragm actuators characteristics, applications and sizing
- Piston actuators
- Motor operated valve (MOV) operation and applications.

Video: Control Valve Actuators

Written Diaphragm sizing exercise to overcome a 275 lbf

Oral Quiz to assess delegate's level of understanding

Day 3

- Pneumatic positioner principal of operation, calibration techniques
- Analog i/p positioner principal of operation, calibration techniques
- Double acting positioner principal of operation
- Smart positioner principal of operation, Hart Protocol explained
- Limit switch application
- Volume booster application

Videos: Fisher D ring positioner

Video: Fisher Fieldvue positioner

Oral Quiz to assess delegate's level of understanding

Day 4

- Cavitation cause / effects and methods to minimize these
- Flashing explained
- Rangeability explained
- Turndown explained
- Controllability explained
- Flow coefficient factor explained and sample Valve Sizing exercise
- Valve testing specification, evaluation, methods and techniques

Video: Cavitation Cause / Effects

Video: Anti Cavitation valve

Written valve sizing exercise for 8inch class 300 system.

Oral Quiz to assess delegate's level of understanding

Day 5

- Blowdown valve applications
- Emergency shutdown valve applications
- Process shutdown valve applications
- Maintenance and Troubleshooting methods and techniques
- Review and question / answer
- Written multiple choice test
- Written course feedback

CPD Unit**Continuing Professional Development**

