MERCURY

# Valves, Actuators, Control, & Safety Systems in the Oil & Gas Industry

8 – 12 March 2027
London (UK)



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**Ref:** 15394_306452 **Date:** 8 – 12 March 2027 **Location:** London (UK) **Fees:** 5900 Euro

## Introduction:

This oil and gas valves, actuators, control, and safety systems training seminar is a highly interactive introduction to control valves and actuators' most important features and characteristics. Valve and actuator combinations are used in every process worldwide, and understanding and utilizing them is essential for efficient operation and control. It is designed to provide hands-on thinking about valve and actuator installations, enabling participants to consider, select, and install the best equipment for the application.

This oil and gas valves, actuators, control, and safety systems training course will highlight important aspects of valves and actuators, leading to a better understanding of the flow aspects associated with these devices. The differences between valves and actuators can be very large or very subtle. Participants will learn to note and distinguish the differences between the various devices and how they fit into the larger scheme of things. This experience will better equip them to make informed decisions and help them make decisions at a higher level.

This course on oil and gas valves, actuators, control, and safety systems provides a deep dive into the critical components of the oil and gas sector valve, actuator, control, and safety systems. It integrates key aspects of oil and gas safety and control, delving into the precise use of valves and actuators to optimize operational efficiency and ensure rigorous safety standards.

## Oil and Gas Safety and Controls in Valve and Actuator Systems:

This course on oil and gas valves, actuators, control, and safety systems will cover the safety elements of valve and actuator systems and delve into the principles of pressure safety valves and other critical components that comprise safety systems in the oil and gas industry. Participants will learn how to ensure comprehensive safety and compliance with industry standards while implementing oil and gas safety training within their organizations.

## Targeted Groups:

- Key instrumentation personnel involved in valve maintenance.
- Senior management and staff are responsible for valve and actuator selection.
- Mechanical and electrical staff that come into contact with valves.
- Process control engineers require a high plant availability, often affected by valves.
- Designers, industrial engineers, and staff responsible for plant safety.
- All personnel with a vested interest in applications that require/utilize valves.

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## Course Objectives:

At the end of this oil and gas valves, actuators, control, and safety systems course, the participants will be able to:

- Comprehend the inner operation of the most commonly utilized valve types.
- Decide on the best valve to use for specific applications.
- Determine the most cost-effective valve size.
- Determine the best device to drive and operate an assortment of valves.
- Get control valves to operate optimally in the field using various techniques.

## Targeted Competencies:

By the end of this oil and gas valves, actuators, control, and safety systems course, the participant's competencies will:

- Valve Principles, Purposes, Types, Control Signals and Flow Conditions.
- Valve in P&IDs, Leakage, Valve Characteristics, and Valve Size Calculations.
- Know the Valve Software, Actuators, Positioners, Cavitation and Noise Control and SIS., and Noise Control,
- 3-term Controllers and Loop-tuning for Processes Containing Control Valves.
- Using Valves in Cascade, Ratio, Dead-Time Dominant, Non-Linear and PLC-Controlled Processes.

## Course Content:

### Unit 1: Valve Principles, Purposes, Types, Control Signals and Flow Conditions:

- Valve Principles, Valve Purposes, and Control Signals Used with Valves.
- Flow Conditions in and around Valves.
- Reynolds Numbers.
- Cavitation and Flashing and How This Influences Valve Selection.
- Associated Equipment and Pertinent to Valves.
- Definitions and Principles of Operation of the Major Types of Valves.

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## Unit 2: Valve in P&IDs, Leakage, Valve Characteristics and Valve Size Calculations:

- Continuation of the Definitions and Principles of Operation of More Major Types of Valves.
- Additional associated Equipment and Pertinent Valves.
- P&ID Diagrams associated with Valves.
- Valve Leakage and Valve Leakage Rate Calculation.
- Valve Inherent Characteristics and Their Importance Once Installed.
- Performing Manual Calculations for Valve Sizing.

## Unit 3: Valve Software, Actuators, Positioners, Cavitation & Noise Control & SIS:

- Software Used to Size Control Valves.
- Assorted Actuators and their Properties and Characteristics.
- Valve Positioners.
- Cavitation and Noise Control - in and around valves.
- Valves and How They Fit into Pressure Relief and Safety Instrumented Systems SIS.
- Using Digital Controllers with valves.

## Unit 4: 3-term Controllers and Loop-tuning for Processes Containing Control Valves:

- Understand and Implement the Right Controller Action for fail-safe valves.
- Understand all of the Variables - associated with three-term control.
- Open Loop Tuning for controllers that act on control valve loops.
- Closed Loop Tuning for controllers that act on control valve loops.
- Trial and Error Tuning to optimize control valve performance.

## Unit 5: Using Valves in Cascade, Ratio, Dead-Time Dominant, Non-Linear and PLC-Controlled Processes:

- Setting up a Cascade Loop and using a single valve and multiple controllers.
- Setting up a Ratio Loop and using a Single Valve and Multiple Process Variables PVs.
- Dead Time Dominant Loops: How does this affect the valve performance, and how is this corrected?
- Using a Control Valve in a process that exhibits different responses in different zones.
- Combining PLCs for valve control.