

Training Title

**CONTROL VALVES, ACTUATORS AND PUMPS**

**(SELECTION, CALCULATIONS, SIZING, APPLICATIONS, OPERATION, DIAGNOSTIC TESTING, TROUBLESHOOTING AND MAINTENANCE)**

Training Duration

5 days

Training Venue and Dates

REF ME060	Control Valves, Actuators & Pumps	5	14 – 18 March, 2021	\$4,500	Dubai, UAE
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In any of the 5 star hotels. The exact venue will be intimated once finalized.

Training Fees

4,500US\$ per participant for Public Training includes Materials/Handouts, tea/coffee breaks, refreshments & Buffet Lunch

Training Certificate

Define Management Consultancy & Training Certificate of course completion will be issued to all attendees.

**TRAINING DESCRIPTION**

Control valves, actuators, and pumps are a vital component of modern industrial operations around the world. Today's control valves incorporate a number of impressive design and materials enhancements which allow higher flow capacity and overall compactness with improved dynamic and sealing performance. In addition, recent improvements in actuators and petitioners have made control valve performance and economy an attractive benefit and incentive for their use. Care must be taken, however, to insure that a control valve- actuator system can handle the pressure, temperature, flow rate, and medium required without noise or cavitation, corrosion, erosion or leakage. Pumps are mainly the driving forces in the system; hence their operation, technology, and maintenance are vital parameters for the overall system to run smoothly. Properly selected and maintained control valves and pumps increase efficiency, safety, profitability, and ecology.

The course covers control valve types and designs, materials, specification selection, actuators and controllers, preventive maintenance procedures, operation and troubleshooting. Also, it discusses various types of pumps: operation, technology, and troubleshooting.

A number of different instructional methods are used throughout the course to allow for interactive learning and to give practical examples from manufacturing and service industry to enable the delegates to operate, select and troubleshoot control and safety valves upon course completion.

DMCT/OL/9/18(Rev3Dt:23/9/18)

## TRAINING OBJECTIVES

- Familiarize the Attendees with different types of control valves, actuators and pumps and their corresponding advantages.
- Understand the characteristics of various types of pumps, control valves and actuators.
- Understand the basic operation of control valves and the underlying fluid mechanics principles.
- Appreciate common problems encountered in control valves and Pumps including cavitation, water hammering, flashing, noise, vibration erosion and corrosion.
- Obtain hands-on training on valve and pump sizing based on head loss and flow rate calculations.
- Learn how to choose the right control and pumps, how to read the performance curves of pumps, and understand the limits on the pumps operation
- Recognize the different types of materials used for the valve body, trim, packing boxes and gaskets and understand the design considerations for selecting these materials.

## WHO SHOULD ATTEND

The course is designed for plant safety specialists, maintenance engineers and technicians, maintenance planners, system engineers and operators in the power generation, oil, chemical, paper and other processing industries involved in control valve selection, specification, procurement, inspection, troubleshooting or repair.

## TRAINING METHODOLOGY:

A highly interactive combination of lectures and discussion sessions will be managed to maximize the amount and quality of information and knowledge transfer. The sessions will start by raising the most relevant questions, and motivate everybody find the right answers. You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of multiple-choice type will be made available on daily basis to examine the effectiveness of delivering the course. Very useful Course Materials will be given.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Group Work& Practical Exercises
- 20% Videos& General Discussions

## COURSE OUTLINE

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- **Introduction to control valves:** Valve functions and service conditions, body ratings, materials and body styles, linear and rotary action valves, globe valves, gate valves, plug valves, ball valves, butterfly valves, cavitation, water hammer, noise, vibration.
- **Control valve dynamics:** Control of automatic valves, control functions and relevant terminology, safety, stability & accuracy, on/off and continuous control modes. Proportional, integral and derivative control actions, control loops and feedback systems.
- **Sizing of control valves:** Control valve flow characteristics, fast opening characteristics, linear characteristics, equal percentage characteristics, matching characteristics, capacity and flow coefficients, control valve sizing for water systems, control valve sizing for steam systems, control valve sizing for oil and gas systems.
- **Actuators and positioners:** Pneumatic actuators, operation and options of pneumatic actuators, piston actuators, diaphragm actuators, direct acting and reverse acting actuators, positioners, electric actuators, valve motor drives, modulating, hydraulic actuators, forces on actuator, sizing and selection of valve actuator.
- **Pumps:** Pumping methods; Centrifugal pumps, Reciprocating pumps, and Rotary pumps. Pump operation, control and performance curves. Pump Technology and design.
- **Auxiliary Pump Systems:** Bearings, seals, oil lobes...etc.
- **Quality standards and maintenance:** Standards organizations, ISA, ASME, NACE and ISO, installation, commissioning, routine maintenance, troubleshooting diagrams, modes of failure and fault finding.

**Note:**

**Pre & Post Tests will be conducted**

**Case Studies, Group Exercises, Group Discussions, Last Day Review & Assessments will be carried out.**

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