



MU047:

Practical Valve Technology:

Selection, Installation, Upgrading, Inspection and Troubleshooting

Training Description:

This five-day intensive course covers the parts and components of different types of valves; the methods of operation and maintenance; the troubleshooting and maintenance used in valves. This course will explain the main types of manual and control valves and their actuators. This course is designed to give participant a solid, practical understanding of common process control equipment and of the actual concepts and factors involved in setting up, maintaining, tuning, and troubleshooting a variety of valves and their control systems.

This course is best suited to participant who are familiar with basic information on valves; mechanical principles and basic electricity, and have a basic knowledge of instrumentation systems.

The course will finish by going back to the start by mentioning and giving examples of process integration, where control valves are employed to utilize fluid flow. The course is a well-structured. The participant will get the most updated knowledge and they will learn the modern techniques in profile solving and in computing appellation.

Training Objectives:

By the end of the training, participants will be able to:

- ✓ Gain an in-depth knowledge of the different types of valves including the ones on control valves used in oil & gas industry technologies to determine whether you are employing best practices in your system and protecting critical assets
- ✓ Understand the importance of well-designed and operated pre-treatment systems upstream of valves to increase overall plant reliability and lower operating costs
- ✓ Learn to interpret industry-wide guidelines and monitor key performance indicators of all valves as well as the control valves and actuators
- ✓ Determine the basic principles of all valves including control valves and their construction and operation
- ✓ Strengthen your skills to troubleshoot valves; and actuators
- ✓ Obtain invaluable insights on how to design for success in oil & gas industry
- ✓ Analyze the fundamental operation parameters and the control systems in all types of valves including the control valves
- ✓ Gain an in-depth knowledge in valves operation and construction; inspection and maintenance

Training Designed for:

This course is intended for all new graduated Engineers, Maintenance Personnel, Static Equipment Operators, Control Engineers and Instrumentation Personnel and other technical staff who are assigned in valve installation.

Training Requirement:

“Hand’s on practical sessions, equipment and software will be applied during the course if required and as per the client’s request.”

Contents can be adapted to your specific wishes. It is therefore possible to focus on specific modules of the training course as per client’s learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

Training Program:

DAY ONE:

- ❖ PRE-TEST
- ❖ **Types of Control Valves and Their Characteristic & Operations Mechanism Types**
 - Terms and definitions
 - Parts and components
- ❖ **Diaphragm** – gives some control and will handle corrosive slurries
 - Effects of control actuators
 - Control valves (types, characteristics, Cv sizing)
 - Valve actuators (types, fail modes, dead band)
 - Variable speed motor controls (DC and AC)
 - On / Off control action
 - Common problems in process control systems
 - Troubleshooting process control systems
- ❖ **Gearboxes:** Used to ensure easier operation of larger valves.
- ❖ **Diaphragm Valve:** A bi-directional valve which is operated by applying an external force to a flexible element, or diaphragm (typically an elastomer).

DAY TWO:

- ❖ **Operation of All Valves**
 - Application of all valves including the control valves
 - Operation: procedure of all valves manual and automatic
- ❖ **Pressure Reducing Valve:** is always open with the amount depending upon the required downstream and actual upstream pressures.
- ❖ **Uses of Control Valves:**
- ❖ **Relief Valve** – as a safety valve to prevent excess pressure
 - Pressure safety valves
 - The difference between PSV' PRV and the operation principles
- ❖ **Damaging Reducing Valve** – to control the downstream pressure at a required value
 - Location of critical valves
 - Actuators
 - Codes and fabrication
 - Pressure rating valves

DAY THREE:

- ❖ **Actuators:** Device used to open or close or control valves
- ❖ **Air Valves:** Valve that is used to control the flow rate of air
- ❖ **Back-pressure:** The pressure exerted on the downstream side of a valve
 - Location of critical valves
 - Actuators
 - Codes and fabrication
 - Pressure rating valves

- ❖ **Actuators** - Device used to open or close or control valves.
- ❖ **Air Valves** - Valve that is used to control the flow rate of air.
- ❖ **Back-Pressure** - The pressure exerted on the downstream side of a valve
- ❖ **Details** the operations and components of all valves including but not restricted to the following list:

- Ball valves
- Bellows
- Butterfly
- Bypass valves
- Check valves
- Diverter valve
- Double block and bleed
- Electric actuators
- Extended bonnets
- Float valves
- Full bore
- Gate valves
- Globe valves
- Hydraulic actuators
- Jacketed valves
- Line blinds
- Multi-ported
- Multi-turn
- Needle valves
- Penstock valves

❖ **Selection Criteria; Calculations; Sizing**

The materials; the metallurgy; the given duties; the selection rules and guidelines for valves to do a given task or a designed process in oil and gas industry and other industry as well. This will cover all of the following types of valves or any other types in the industry.

DAY FOUR:

- ❖ **Pilot Valves**
 - Small valve requiring little power which is used to operate a larger valve
- ❖ **Pinch Valves**
 - A valve in which a flexible hose is pinched between one or two moving external elements to stop the flow
- ❖ **Plug Valves**
 - This multi-turn valve derives its name from the rotating plug which forms the closing element. The plug may be cylindrical or truncated
- ❖ **Petitioners**
 - Devices that help control the opening and closing of valves remotely by controlling pneumatic or hydraulic elements
- ❖ **Pressure Reducing Valves**

- A self-operating valve used to reduce any excess pressure in a system, for example- steam. Also known as a PRV
- ❖ **Quarter-turn Valves**
 - Category of valves (such as ball and plug valves) which require just a 90 degree turn of the stem to move from the fully open to the fully closed positions
- ❖ **Reduced Bore**
 - Indicates that the internal diameter of the valve is lower than the piping to which the valve is fitted as opposed to full bore (see full bore)
- ❖ **Regulating Valves**
 - This valve type is used to regulate flows to provide a constant pressure output
- ❖ **Sampling Valves**
 - A valve which is fitted to a pipeline to allow samples of a fluid to be withdrawn for analysis
- ❖ **Solenoid Valves**
 - Solenoid valves are operated by an electrical solenoid
- ❖ **Subsea Valves**
 - A valve which is designed for use in sea water. For example, installed in a pipeline on the sea bed
- ❖ **Swing Checks Valves**
 - This non-return valve has a hinged disk as the closing element
- ❖ **Tank Valves**
 - A valve arranged for fitting at the bottom of a tank or process vessel
- ❖ **Well head valves**
 - Wellhead valves are used to isolate the flow of oil or gas at the takeoff from oil or gas well. The design is usually a plug or gate valve
- ❖ **Manual Valves & Control Valves Design**
- ❖ **Valves & Pipe-work**
- ❖ **Technical Information**
 - Manufactures standard as well as customized pipes, fittings, and spools according to customer's requirements. The standard product range has been designed to resolve most industrial valves problems
- ❖ **Selection of Control Valves Type**
 - (Service Temperature; Fluid to be carried; Service Pressure; flow rate, etc.
 - The Control valves work in oil industry
 - The main uses for CV in oil industry are in transport of materials;
 - Plant services
 - Process materials
 - The control valve & pipe work joints (Welding, brazing, cementing, flanges, socket and spigot, unions and couplings [screwing], flared and compression joints
- ❖ **Control Valves Work Fabrication**
 - To keep the cost low by using an expensive corrosion resistant lining to a cheap but strong valve made out of metal that would normally corrode rather than constructing the whole CV out of the expensive material

DAY FIVE:

❖ CV WORK LAGGING

Lagging minimizes heat loss and protects operators from hot surfaces

- Coating regulations & protection
- Isolation; Types of fittings
- Installation procedure

❖ Installation procedures

- Safety shear valves under dispensers
- Minimum pipe slope
- Testing the valves system
- Vent line requirements
- Hydrostatic & pneumatic testing
- Types of materials

❖ Maintenance & Inspection

- Diagnostic testing
- Troubleshooting
- Maintenance and repairs
- Inspection - the Control valves & actuators
- Maintenance Inspection, Inspecting Out-of-Service for CV & actuators
- Record Keeping; Scheduling and Preparing for Cleaning, Repairs and Alterations
- Control Valves Cleaning
- Maintaining and Repairing Closures, Channels; stem; seals; seats; discs; and Bonnets;
- Actuator; gear box Repairs and Alterations -
- Design of a simple control valve
- Overall control valves coefficient
- Single and multiphase flow in control valves
- Methods of calculation

❖ Course Conclusion

❖ POST-ASSESSMENT and EVALUATION

Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Gamification, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

CMCT Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

TBA as per the course location - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Training Timings:

Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:00	Recess (Prayer Break & Lunch)
13:00 - 14:00	Last Session

For training registrations or in-house enquiries, please contact:

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