COURSE OVERVIEW ME0077
Control Valves, Actuators & Positioners

Course Title
Control Valves, Actuators & Positioners

Course Date/Venue
April 06-10, 2025/TBA Meeting Room, DoubleTree by Hilton Doha - Al Sadd, Doha, Qatar

3.0 CEUs (30 PDHs) AWARD

Course Reference
ME0077

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Objectives

This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.

This course is designed to provide participants with a detailed and up-to-date overview of Control Valves, Actuators & Positioners. It covers the functions of control valve and its importance in process control; the various types, components and materials of control valves and actuators as well as flow characteristics, sizing and selection; the standards of valves covering ISA, API and ASME standards; the pneumatic actuators and electric and hydraulic actuators; the routine checks and maintenance schedules; and ensuring safe operation of actuators in hazardous environments.

Further, the course will also discuss the purpose and function of positioners in control systems; the various types of positioners covering pneumatic, electro-pneumatic and digital (smart) positioners; the step-by-step installation guide and calibration procedures for accuracy; the positioner tuning, optimization and advanced positioner functions; the troubleshooting positioner issues and integrating control valve in process control systems; the advanced control strategies, smart valve technologies, remote monitoring and control capabilities; and the failure modes and effects analysis (FMEA) and the potential failure modes of control valves and actuators.

During this interactive course, participants will learn the corrective actions to mitigate risks; the control valve performance testing and maintenance strategies for control valves and actuators; the common issues in control valves and actuators; the root cause analysis and corrective actions; troubleshooting control valve issues; and the best practices in valve management including documentation and record-keeping.

Course Objectives

Upon the successful completion of this course, each participant will be able to:-

- Apply and gain a comprehensive knowledge on control valves, actuators and positioners
- Discuss the functions of control valve and its importance in process control
- Identify the various types, components and materials of control valves and actuators as well as flow characteristics, sizing and selection
- Review standards of valves covering ISA, API and ASME standards
- Recognize pneumatic actuators and electric and hydraulic actuators
- Apply routine checks and maintenance schedules and ensure safe operation of actuators in hazardous environments
- Discuss the purpose and function of positioners in control systems
- Identify the various types of positioners covering pneumatic, electro-pneumatic and digital (smart) positioners
- Carryout step-by-step installation guide and calibration procedures for accuracy
- Apply positioner tuning and optimization and discuss advanced positioner functions
- Troubleshoot positioner issues, integrate control valve in process control systems and apply advanced control strategies
- Discuss smart valve technologies, remote monitoring and control capabilities
- Employ failure modes and effects analysis (FMEA), analyze potential failure modes of control valves and actuators and implement corrective actions to mitigate risks
- Apply control valve performance testing and maintenance strategies for control valves and actuators
- Identify the common issues in control valves and actuators and apply root cause analysis and corrective actions
- Troubleshoot control valve issues and apply best practices in valve management including documentation and record-keeping

Exclusive Smart Training Kit - H-STK®

*Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK®**). The **H-STK®** consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of control valves, actuators and positioners for instrumentation technicians.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Certificates are accredited by the following international accreditation organizations: -

- The International Accreditors for Continuing Education and Training (IACET - USA)

  Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

  Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

  Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international center, Haward Technology meets all of the international higher education criteria and standards set by BAC.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:

Mr. Andrew Ladwig is a **Senior Process & Mechanical Engineer** with over **25 years** of extensive experience within the **Oil & Gas**, **Refinery**, **Petrochemical & Power** industries. His expertise widely covers in the areas of **Ammonia Manufacturing & Process Troubleshooting**, **Distillation Towers**, **Crude Oil Distillation**, **Fundamentals of Distillation** for Engineers, **Distillation** Operation and Troubleshooting, **Advanced Distillation** Troubleshooting, **Distillation** Technology, Vacuum **Distillation**, **Ammonia Storage & Loading** Systems, **Ammonia Plant** Operation, Troubleshooting & Optimization, **Ammonia Recovery**, **Ammonia Plant Safety**, Hazard of **Ammonia Handling**, Storage & Shipping, **Operational Excellence** in **Ammonia Plants**, **Fertilizer Storage** Management (Ammonia & Urea), **Fertilizer Manufacturing** Process Technology, **Sulphur Recovery**, Phenol Recovery & Extraction, **Wax Sweating & Blending**, **Petrochemical & Fertilizer** Plants, **Nitrogen Fertilizer** Production, **Petroleum Industry Process** Engineering, **Refining Process & Petroleum Products**, **Refinery Planning & Economics**, Safe **Refinery Operations**, **Hydrotreating & Hydro-processing**, **Separators** in **Oil & Gas** Industry, **Gas Testing & Energy** Isolations, Gas Liquor Separation, **Industrial Liquid Mixing**, **Wax Bleachers**, **Extractors**, **Fractionation**, Operation & Control of **Distillation**, Process of **Crude ATM & Vacuum Distillation** Unit, **Water Purification**, **Water Transport** & Distribution, **Steam & Electricity**, **Flame Arrestors**, **Coal Processing**, **Environmental Emission Control**, R&D of **Wax Blending**, **Wax** Molding/Slabbing, **Industrial Drying**, Principles, Selection & Design, Certified **Process Plant** Operations, Control & Troubleshooting, **Operator** Responsibilities, **Storage Tanks Operations** & Measurements, **Tank Design**, Construction, Inspection & Maintenance, **Atmospheric Tanks**, **Process Plant** Troubleshooting & Engineering Problem Solving, **Process Plant Performance**, Efficiency & Optimization, Continuous Improvement & Benchmarking, **Process Troubleshooting** Techniques, Oil & Gas Operation/Introduction to **Surface Facilities**, **Pressure Vessel** Operation, **Process Equipment** Performance & Troubleshooting, **Plant Startup & Shutdown**, **Startup & Shutdown** the Plant While Handling Abnormal Conditions, **Flare & Relief** System, **Process Gas Plant** Start-up, Commissioning & Problem Solving, **Process Liquid** and **Process Handling & Measuring** Equipment. Further, he is also well-versed in **Compressors & Turbines** Operation, Maintenance & Troubleshooting, **Heat Exchanger** Overhaul & Testing Techniques, Balancing of **Rotating Machinery** (**BRM**), **Pipe Stress** Analysis, **Valves & Actuators** Technology, Inspect & Maintain **Safeguarding Vent & Relief System**, Certified Inspectors for **Vehicle & Equipment**, Optimizing **Equipment Maintenance** & Replacement Decisions, Certified Maintenance Planner (**CMP**), Certified Planning and Scheduling Professional (**AACE-PSP**), **Material Cataloguing**, Specifications, Handling & Storage, **Steam Trap** Design, Operation, Maintenance & Troubleshooting, **Steam Trapping & Control**, **Column**, **Pump** Technology, **Pump** Selection & Installation, **Centrifugal Pumps** Troubleshooting, **Pumps** Design, Selection & Operation, **Pump & Exchangers**, Troubleshooting & Design, **Rotating Equipment** Operation & Troubleshooting, **Control & ESD** System, **Detailed Engineering Drawings**, Codes & Standards, **Budget** Preparation, Allocation & Cost Control, Root Cause Analysis (**RCA**), **Production Optimization**, Permit to Work (**PTW**), Project Engineering, **Data** Analysis, **Process Hazard** Analysis (**PHA**), **HAZOP** Study, Sampling & Analysis, **Training** Analysis, **Job Analysis** Techniques, Storage & Handling of **Toxic Chemicals & Hazardous Materials**, **Hazardous Material** Classification & Storage/Disposal, **Dangerous Goods**, Environmental Management System (**EMS**), Supply Chain, Purchasing, Procurement, **Logistics** Management & **Transport** & **Warehousing** & **Inventory**, **Risk** Monitoring Authorized Gas Tester (**AGT**), Confined Space Entry (**CSE**), Personal Protective Equipment (**PPE**), Fire & Gas, First Aid and Occupational Health & Safety.

During his career life, Mr. Ladwig has gained his practical experience through his various significant positions and dedication as the **Mechanical Engineer**, **Project Engineer**, **Reliability & Maintenance Engineer**, **Maintenance Support Engineer**, **Process Engineer**, **HSE Supervisor**, **Warehouse Manager**, **Quality Manager**, **Business Analyst**, **Senior Process Controller**, **Process Controller**, **Safety Officer**, **Mechanical Technician**, **Senior Lecturer** and **Senior Consultant/Trainer** for various companies such as the Sasol Ltd., Sasol Wax, Sasol Synfuels, just to name a few.

Mr. Ladwig has a **Bachelor's** degree in **Chemical Engineering** and a **Diploma** in **Mechanical Engineering**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**) and has delivered various trainings, workshops, seminars, courses and conferences internationally.

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

30% Lectures
20% Practical Workshops & Work Presentations
30% Hands-on Practical Exercises & Case Studies
20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Course Fee

US$ 6,000 per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the workshop for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: ***Sunday, 06th of April 2025***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Introduction to Control Valve*** *Overview of Control Valve Functions • Importance in Process Control*
0930 – 0945	*Break*
0945 – 1030	***Types of Control Valves*** *Globe, Ball, Butterfly & Diaphragm Valves • Selection Criteria for Different Applications*
1030 – 1130	***Valve Components & Materials*** *Body, Trim, Bonnet & Packing • Material Selection Based on Process Conditions*
1130 – 1215	***Flow Characteristics*** *Linear, Equal Percentage & Quick Opening • Impact on Process Control*
1215 – 1230	*Break*
1230 – 1330	***Sizing & Selection of Control Valves*** *Flow Coefficient (CV) Calculations • Selecting the Right Valve for Specific Applications*
1330 – 1420	***Valve Standards & Certifications*** *ISA, API, ASME Standards • Certification Requirements in the Petroleum Industry*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2: Monday, 07th of April 2025

0730 – 0830	***Types of Actuators*** *Pneumatic, Hydraulic, Electric Actuators • Advantages & Disadvantages of Each Type*
0830 – 0930	***Actuator Components & Operation*** *Key Components: Springs, Diaphragms, Pistons, Motors • Operational Principles*
0930 – 0945	*Break*
0945 – 1100	***Actuator Sizing & Selection*** *Calculating Torque & Force Requirements • Factors Affecting Actuator Selection*
1100 – 1215	***Pneumatic Actuators*** *Functionality & Applications in the Petroleum Industry • Troubleshooting Common Issues*
1215 – 1230	*Break*
1230 – 1330	***Electric & Hydraulic Actuators*** *Comparative Analysis with Pneumatic Actuators •Case Studies of Application in Complex Systems*
1330 – 1420	***Maintenance & Safety Practices*** *Routine Checks & Maintenance Schedules • Ensuring Safe Operation of Actuators in Hazardous Environments*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3: Tuesday, 08th of April 2025

0730 – 0830	***Control Valves Positioners*** *Purpose & Function in Control Systems • Positioners as a Feedback Control Mechanism*
0830 – 0930	***Types of Positioners*** *Pneumatic, Electro-Pneumatic, Digital (SMART) Positioners • Application Differences & Benefits*
0930 – 0945	*Break*
0945 – 1100	***Installation & Calibration of Positioners*** *Step-By-Step Installation Guide • Calibration Procedures for Accuracy*
1100 – 1215	***Positioner Tuning & Optimization*** *PID Tuning for Positioners • Impact of Tuning on Control Valve Performance*
1215 – 1230	*Break*
1230 – 1330	***Advanced Positioner Functions*** *Diagnostics & Data Logging • Communication Protocols (HART, Fieldbus, Profibus)*
1330 – 1420	***Troubleshooting Positioner Issues*** *Identifying & Resolving Common Problems • Ensuring Optimal Performance & Reliability*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4: Wednesday, 09th of April 2025

0730 – 0830	***Control Valve Integration in Process Control Systems*** *Role in Distributed Control Systems (DCS) • Integration with SCADA & PLC Systems*
0830 – 0930	***Advanced Control Strategies*** *Cascade, Ratio & Split-Range Control • Role of Control Valves in Complex Control Loops*

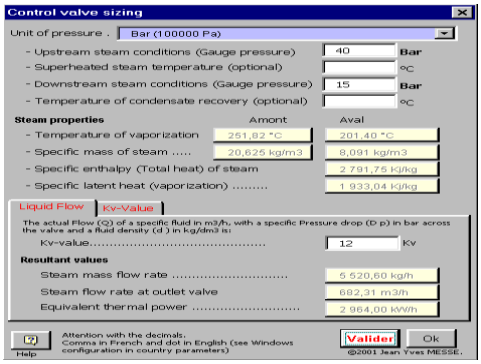
0930 – 0945	Break
0945 – 1100	***Automation & Smart Valves*** *Introduction to Smart Valve Technologies • Remote Monitoring & Control Capabilities*
1100 – 1215	***Failure Modes & Effects Analysis (FMEA)*** *Analyzing Potential Failure Modes of Control Valves & Actuators • Implementing Corrective Actions to Mitigate Risks*
1215 – 1230	Break
1230 – 1330	***Case Studies in Petroleum Industry*** *Real-World Applications of Advanced Control Valves • Lessons Learned from Operational Challenges*
1330 – 1420	***Control Valve Performance Testing*** *On-Site Testing Procedures • Ensuring Compliance with Industry Standards*
1420 – 1430	***Recap***
1430	Lunch & End of Day Four

Day 5: Thursday, 10th of April 2025

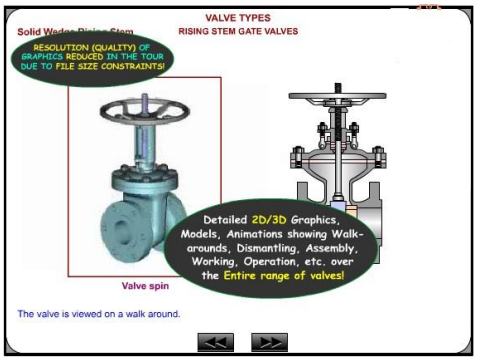
0730 – 0830	***Maintenance Strategies for Control Valves & Actuators*** *Preventive versus Predictive Maintenance • Developing a Maintenance Plan for Critical Valves*
0830 – 0930	***Common Issues in Control Valves & Actuators*** *Identifying Symptoms of Failure • Root Cause Analysis & Corrective Actions*
0930 – 0945	Break
0945 – 1100	***Troubleshooting Control Valve Problems*** *Systematic Approach to Diagnosing Issues • Hands-On Troubleshooting Exercises*
1100 – 1230	***Best Practices in Valve Management*** *Documentation & Record-Keeping • Training & Knowledge Transfer for Maintenance Teams*
1230 – 1245	Break
1245 – 1345	***Future Trends in Control Valve Technology*** *Innovations in Materials, Design & Smart Technologies • Impact on Efficiency & Process Safety*
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	Presentation of Course Certificates
1430	Lunch & End of Course

Simulators (Hands-on Practical Sessions)

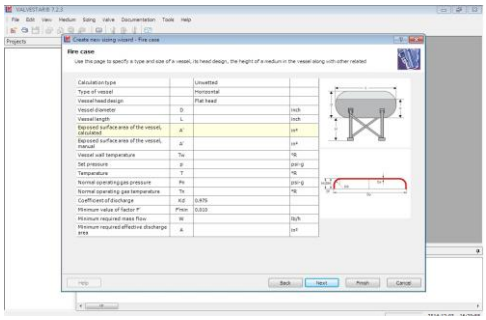
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art simulators "Valve Sizing Software", "Valve Software 3.0", "Valvestar 7.2 Software" and "PRV2SIZE Software".



Valve Sizing Software



Valve Software 3.0



Valvestar 7.2 Software

PRV²SIZE Software

Course Coordinator

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