

COURSE OVERVIEW ME0077 Control Valves, Actuators & Positioners

Course Title

Control Valves, Actuators & Positioners

Course Date/Venue

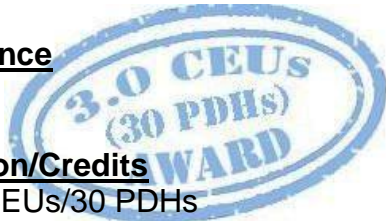
January 12-16, 2025/TBA Meeting Room, The H Dubai Hotel, Sheikh Zayed Road, Dubai, UAE

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 “Howard Smart Training Kit” (H-STK®). The H-STK® consists of a comprehensive set of technical content which includes **electronic version** of the course materials, sample video clips of the instructor’s actual lectures & practical sessions during the course 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: -

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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.

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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\$ 5,500 per Delegate. + **VAT** 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, 12th of January 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, 13th of January 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, 14th of January 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, 15th of January 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, 16th of January 2025

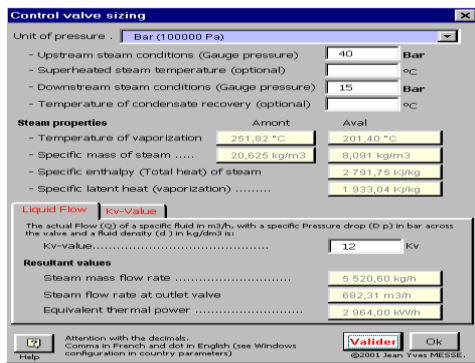
0730 - 0830	Maintenance Strategies for Control Valves & Actuators Preventive versus Predictive Maintenance • Developing a Maintenance Plan for Critical Valves
0830 - 0930	Common Issues in Control Valves & Actuators Identifying Symptoms of Failure • Root Cause Analysis & Corrective Actions
0930 - 0945	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



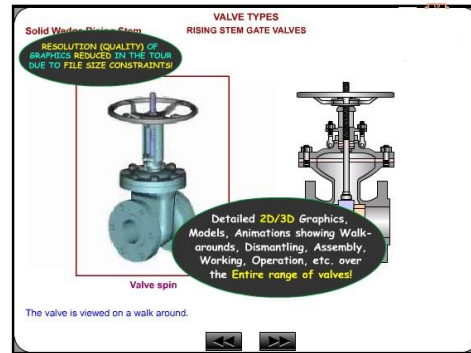


Simulators (Hands-on Practical Sessions)

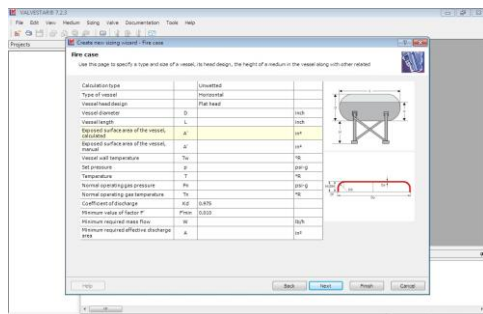
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art simulators “Valve Sizing Software”, “Valve Software 3.0”, “Valvestar 7.2 Software” and “PRV2SIZE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



Valve Sizing Software



Valve Software 3.0



Valvestar 7.2 Software



PRV²SIZE Software

Course Coordinator

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