



COURSE OVERVIEW ME1155 Valve Maintenance & Repair

Course Title

Valve Maintenance & Repair

Course Date/Venue

Please refer to page 3

Course Reference

ME1155

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs



Course Description



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 Valve Maintenance and Repair. It covers the valve types and functions, valve components and materials and valve flow characteristics; the valve sizing and selection, actuators, positioners and valve standards; the best practices covering pre-installation inspections and checks, alignment and orientation considerations, gasket selection, flange connections, torque specifications and bolt tightening sequences; the hydrostatic and pneumatic testing procedures, leak testing and seat tightness verification, functional testing of actuators and positioners; and the documentation of commissioning results.



Further, the course will also discuss the maintenance activities, lubrication practices, inspection intervals, checklists, record-keeping and maintenance logs; the predictive maintenance techniques, vibration analysis and acoustic emission monitoring; the thermography for detecting anomalies and data analysis for maintenance decision-making; diagnosing leakage, sticking and noise problems, the causes of valve failure; and the corrective actions and repair strategies.



During this interactive course, participants will learn the safety considerations in valve maintenance; the lockout/tagout procedures, personal protective equipment (PPE) requirements, handling hazardous materials and environments and emergency response planning; the disassembly and inspection procedures; the valve seat and seal maintenance; the actuator and positioner maintenance, control valve maintenance and safety relief valve maintenance; the high-pressure and high-temperature valves, non-return and check valves, control valve dynamics and the valve automation and smart technologies; the recurring valve failures, root cause analysis methodologies; the collaborative problem-solving approaches and documentation and communication of findings; the regulatory requirements for valve maintenance; the preparation for audits and inspections, record-keeping, traceability and continuous improvement and compliance strategies; the valve maintenance schedules, resource planning and budgeting and overall maintenance strategies; and the presentation and critique of maintenance plans.

Course Objectives

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

- Apply and gain an in-depth knowledge on valve maintenance and repair
- Identify valve types and functions, valve components and materials and valve flow characteristics
- Recognize valve sizing and selection, actuators, positioners and valve standards
- Carryout best practices covering pre-installation inspections and checks, alignment and orientation considerations, gasket selection and flange connections and torque specifications and bolt tightening sequences
- Apply hydrostatic and pneumatic testing procedures, leak testing and seat tightness verification, functional testing of actuators and positioners and documentation of commissioning results
- Schedule maintenance activities based on valve criticality and apply lubrication practices for moving parts, inspection intervals and checklists and record-keeping and maintenance logs
- Employ predictive maintenance techniques covering vibration analysis and acoustic emission monitoring, thermography for detecting anomalies and data analysis for maintenance decision-making
- Diagnose leakage, sticking and noise problems, identify causes of valve failure and apply corrective actions and repair strategies
- Carryout safety considerations in valve maintenance covering lockout/tagout procedures, personal protective equipment (PPE) requirements, handling hazardous materials and environments and emergency response planning
- Apply disassembly and inspection procedures, valve seat and seal maintenance, actuator and positioner maintenance, control valve maintenance and safety relief valve maintenance
- Determine high-pressure and high-temperature valves, non-return and check valves, control valve dynamics and valve automation and smart technologies

- Analyze recurring valve failures and apply root cause analysis methodologies, collaborative problem-solving approaches and documentation and communication of findings
- Implement regulatory requirements for valve maintenance, prepare for audits and inspections, record-keeping and traceability and continuous improvement and compliance strategies
- Create valve maintenance schedules and apply resource planning and budgeting, integrate with overall maintenance strategies and presentation and critique of maintenance plans

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 valve maintenance and repair for mechanical technicians and maintenance personnel, plant engineers and maintenance engineers, instrumentation and control technicians, operations and process supervisors, pipeline and utility operators and other technical staff.

Course Date/Venue

Session(s)	Date	Venue
1	June 15-19, 2025	Crowne Meeting Room, Crowne Plaza Al Khobar, KSA
2	August 17-21, 2025	Safir Meeting Room, Divan Istanbul, Turkey
3	October 05-09, 2025	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
4	December 22-26, 2025	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

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.

Accommodation


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

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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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 centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.
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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.

Course Fee

Al Khobar	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.
Istanbul	US\$ 6,000 per Delegate + VAT . This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Dubai,	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.
Abu Dhabi	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.



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 Maintenance 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, Ammonia Storage & Loading Systems, Operational Excellence in Ammonia Plants, Fertilizer Storage Management (Ammonia & Urea), Fertilizer Manufacturing Process Technology, Sulphur Recovery, Phenol Recovery & Extraction, Refining Process & Petroleum Products, Refinery Planning & Economics, Hydrotreating & Hydro-processing, Separators in Oil & Gas Industry, Gas Testing & Energy Isolations, Industrial Liquid Mixing, Extractors, Fractionation, Water Purification, Water Transport & Distribution, Environmental Emission Control, Process Plant Troubleshooting & Engineering Problem Solving, Process Plant Performance, Plant Startup & Shutdown, Process Troubleshooting Techniques and Oil & Gas Operation/Surface Facilities.** Further, he is also well-versed in **Rotating Machinery (BRM), Rotating Equipment Operation & Troubleshooting, Root Cause Analysis (RCA), Process Plant Shutdown, Turnaround & Troubleshooting, Planning & Scheduling Shutdowns & Turnarounds, Optimizing Equipment Maintenance & Replacement Decisions, Maintenance Planning & Scheduling, Material Cataloguing, Maintenance, Reliability & Asset Management Best Practices, Storage Tanks Operations & Measurements, Tank Inspection & Maintenance, Pressure Vessel Operation, Flare & Relief System, Flaring System Operation, PSV Inspection & Maintenance, Centrifugal & Reciprocating Compressor, Screw Compressor Troubleshooting, Heat Exchanger Overhaul & Testing, Pipe Stress Analysis, Control Valves & Actuators, Vent & Relief System, Centrifugal & Reciprocating Pump Installation & Repair, Heat Exchanger Troubleshooting & Maintenance, Steam Trapping & Control, Control & ESD System and Detailed Engineering Drawings, Codes & Standards.**

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.

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

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	PRE-TEST
0830 – 0930	Introduction to Valve Types & Functions Overview of Valve Roles in Refinery Systems • Classification: Gate, Globe, Ball, Butterfly, Check, Safety & Control Valves • Selection Criteria Based on Process Requirements • Common Applications within Refinery Units
0930 – 0945	Break
0945 – 1030	Valve Components & Materials Key Parts: Body, Bonnet, Stem, Seat, Disc, Actuator • Material Selection for Different Process Fluids & Temperatures • Corrosion Resistance & Material Compatibility • Standards & Codes Governing Valve Materials
1030 – 1130	Valve Flow Characteristics Understanding Flow Patterns: Linear, Equal Percentage, Quick Opening • Impact on Process Control & Efficiency • Cv & Kv Values: Definitions & Calculations • Pressure Drop Considerations Across Valves
1130 – 1215	Valve Sizing & Selection Factors Influencing Valve Sizing: Flow Rate, Pressure, Temperature • Sizing Calculations for Different Valve Types • Software Tools for Valve Sizing • Case Studies on Valve Selection in Refinery Scenarios
1215 – 1230	Break
1230 – 1330	Actuators & Positioners Types of Actuators: Manual, Electric, Pneumatic, Hydraulic • Role of Positioners in Valve Control • Calibration & Maintenance of Actuators • Troubleshooting Common Actuator Issues
1330 – 1420	Valve Standards & Certifications Overview of ASME, API, ISO Standards Relevant to Valves • Certification Requirements for Safety & Control Valves • Compliance with Refinery Regulatory Frameworks • Documentation & Traceability of Valve Certifications
1420 – 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day One

Day 2

0730 – 0830	Valve Installation Best Practices Pre-Installation Inspections & Checks • Alignment & Orientation Considerations • Gasket Selection & Flange Connections • Torque Specifications & Bolt Tightening Sequences
0830 – 0930	Commissioning & Operational Testing Hydrostatic & Pneumatic Testing Procedures • Leak Testing & Seat Tightness Verification • Functional Testing of Actuators & Positioners • Documentation of Commissioning Results
0930 – 0945	Break

0945 – 1100	Preventive Maintenance Programs <i>Scheduling Maintenance Activities Based on Valve Criticality • Lubrication Practices for Moving Parts • Inspection Intervals & Checklists • Record-Keeping & Maintenance Logs</i>
1100 – 1215	Predictive Maintenance Techniques <i>Vibration Analysis & Acoustic Emission Monitoring • Thermography for Detecting Anomalies • Use of Smart Sensors & IoT in Valve Monitoring • Data Analysis for Maintenance Decision-Making</i>
1215 – 1230	Break
1230 – 1330	Troubleshooting Common Valve Issues <i>Diagnosing Leakage, Sticking & Noise Problems • Identifying Causes of Valve Failure • Corrective Actions & Repair Strategies • Case Studies on Troubleshooting in Refinery Settings</i>
1330 – 1420	Safety Considerations in Valve Maintenance <i>Lockout/Tagout Procedures • Personal Protective Equipment (PPE) Requirements • Handling Hazardous Materials & Environments • Emergency Response Planning</i>
1420 – 1430	Recap <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow</i>
1430	Lunch & End of Day Two

Day 3

0730 – 0830	Disassembly & Inspection Procedures <i>Step-by-Step Disassembly of Various Valve Types • Inspection of Internal Components for Wear & Damage • Measurement of Critical Dimensions & Tolerances • Documentation of Inspection Findings</i>
0830 – 0930	Valve Seat & Seal Maintenance <i>Techniques for Lapping & Polishing Valve Seats • Replacement of Seals, Gaskets & Packing • Selection of Appropriate Sealing Materials • Testing for Seat Leakage Post-Maintenance</i>
0930 – 0945	Break
0945 – 1100	Actuator & Positioner Maintenance <i>Calibration of Positioners for Accurate Control • Inspection & Servicing of Actuator Components • Troubleshooting Signal & Power Issues • Upgrading Actuators for Improved Performance</i>
1100 – 1215	Control Valve Maintenance <i>Specific Considerations for Control Valve Internals • Trim Inspection & Replacement • Addressing Issues like Cavitation & Erosion • Control Loop Tuning Post-Maintenance</i>
1215 – 1230	Break
1230 – 1330	Safety Relief Valve Maintenance <i>Understanding Set Pressure & Blowdown Adjustments • Testing Procedures for Safety Valves • Compliance with API & ASME Codes • Documentation & Tagging Post-Servicing</i>

1330 – 1420	Workshop Practices & Tool Usage <i>Selection & Use of Specialized Valve Maintenance Tools • Safety Protocols in Workshop Environments • Handling & Storage of Valve Components • Waste Management & Environmental Considerations</i>
1420 – 1430	Recap <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow</i>
1430	<i>Lunch & End of Day Three</i>

Day 4

0730 – 0830	High-Pressure & High-Temperature Valves <i>Design Considerations for Extreme Service Conditions • Material Selection & Thermal Expansion Issues • Maintenance Challenges & Solutions • Case Studies on High-Pressure Valve Applications</i>
0830 – 0930	Non-Return & Check Valves <i>Functionality & Importance in Process Safety • Common Failure Modes & Diagnostics • Maintenance & Testing Procedures • Selection Criteria for Different Process Needs</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Control Valve Dynamics <i>Understanding Control Valve Behavior in Process Loops • Interaction with Process Variables & Control Systems • Diagnosing Control Valve Performance Issues • Strategies for Optimizing Control Valve Operation</i>
1100 – 1215	Valve Automation & Smart Technologies <i>Integration of Valves with Control Systems (DCS/PLC) • Use of Smart Positioners & Diagnostics Tools • Remote Monitoring & Control Capabilities • Cybersecurity Considerations in Automated Systems</i>
1215 – 1230	<i>Break</i>
1230 – 1330	Troubleshooting Complex Valve Issues <i>Analyzing Recurring Valve Failures • Root Cause Analysis Methodologies • Collaborative Problem-Solving Approaches • Documentation & Communication of Findings</i>
1330 – 1420	Regulatory Compliance & Auditing <i>Understanding Regulatory Requirements for Valve Maintenance • Preparing for Audits & Inspections • Record-Keeping & Traceability • Continuous Improvement & Compliance Strategies</i>
1420 – 1430	Recap <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow</i>
1430	<i>Lunch & End of Day Four</i>

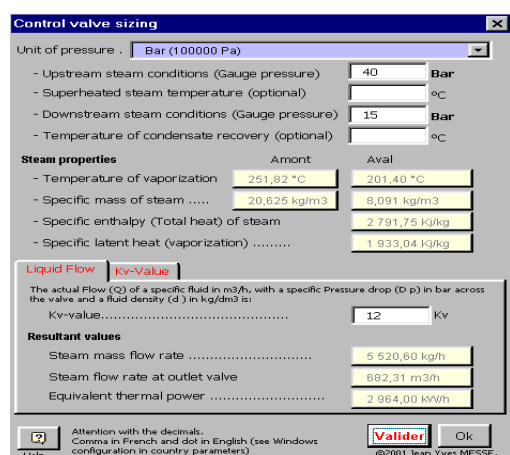
Day 5

0730 – 0930	Hands-on Valve Maintenance Workshop <i>Guided Practice on Disassembly & Reassembly • Real-World Scenarios for Troubleshooting • Use of Diagnostic Equipment & Tools • Safety Drills & Emergency Response Simulations</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Case Studies & Group Discussions <i>Analysis of Past Incidents & Maintenance Challenges • Sharing Experiences & Best Practices • Collaborative Problem-Solving Exercises • Lessons Learned & Knowledge Transfer</i>

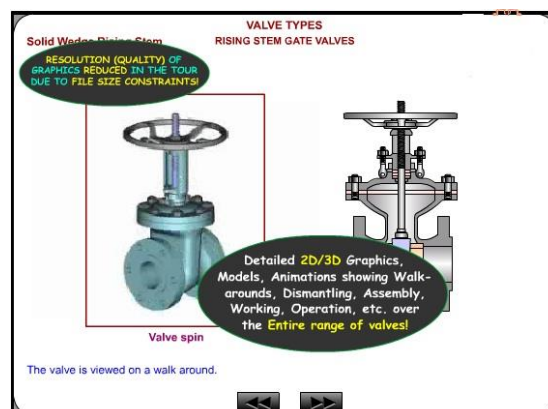
1100 - 1215	Development of Maintenance Plans <i>Creating Valve Maintenance Schedules • Resource Planning & Budgeting</i>
1215 - 1230	<i>Break</i>
1230 - 1345	Development of Maintenance Plans (cont'd) <i>Integration with Overall Maintenance Strategies • Presentation & Critique of Maintenance Plans</i>
1345 - 1400	Course Conclusion <i>Using this Course Overview, the Instructor(s) will Brief Participants about Topics that were Covered During the Course</i>
1400 - 1415	POST-TEST
1415 - 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch & End of Course</i>

Simulator (Hands-on Practical Sessions)

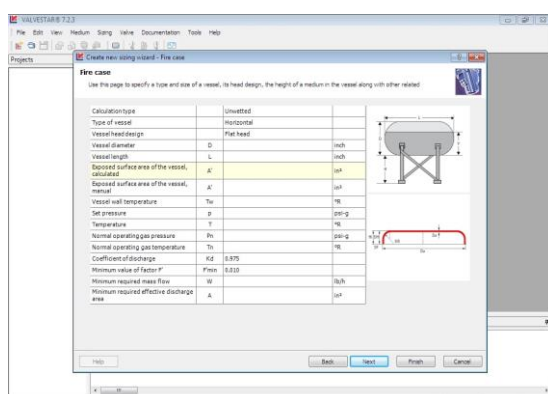
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the state-of-the-art “Valve Sizing Software”, “Valve Software 3.0”, “Valvestar 7.2 Software” and “PRV2SIZE Software”.



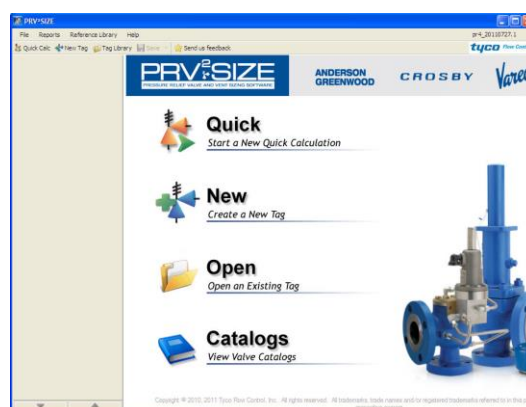
Valve Sizing Software



Valve Software 3.0



Valvestar 7.2 Software



PRV2SIZE Software

Course Coordinator

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