

COURSE OVERVIEW ME0240
Advanced Valve Technology

Design, Selection, Installation, Applications, Sizing, Inspection, Maintenance & Troubleshooting

Course Title

Advanced Valve Technology: *Design, Selection, Installation, Applications, Sizing, Inspection, Maintenance & Troubleshooting*

Course Date/Venue

May 11-15, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Course Reference

ME0240

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.



The Valve industry has become increasingly digital during the last ten years. Even a casual examination of available smart or intelligent positioners reveals significant differences in design philosophies, on-board intelligence, and application options being employed by manufacturers. This course will focus on the new process plant applications for smart valve technology found since 1998. Further, this course offers complete coverage of the operation, application, and pros and cons of today's newest smart valves with digital positioners and actuators. Also includes updates on HART and FieldBus valve technology.



The course will cover the latest spectrum of available valves from gate, plug, butterfly, check, pressure-relief, globe valves to control valves equipped with microprocessors, which provide single-loop control of the process. Further, the course will cover valve materials: steel, iron, plastic, brass, bronze, and a number of special alloys.

Today the global valve industry involves hundreds of global manufacturers who produce thousands of designs of manual, check, pressure-relief and control valves. In addition to the traditional manufacturers in North America and Europe, the course will discuss the emerging Asian market, Japan, Korea, Taiwan, and China.

This course is offering everything the professional and the novice need to know about designing, selecting, installation, application, sizing, maintaining, and troubleshooting of nowadays valves. In addition to serving as an invaluable update for the experienced engineer, this course provides the beginner with a solid understanding of modern valve technology.

Course Objectives

This AVT (Advanced Valve Technology) course encourages attendees to advance from basic installation and maintenance to selection, upgrading and troubleshooting of valve failures. It includes modern technology of new materials that have been made available recently. Upon the successful completion of this AVT course, each participant will be able to:-

- Apply advanced techniques in design, selection, installation, sizing, inspection, maintenance and troubleshooting of valves
- Apply knowledge on control valve theory including cavitation, flashing, choked flow and sizing and identify the various types, features and functions of control valves
- Determine the characteristics of valves and recognize the concept of trims including low noise trim, diffusers & trim selection
- Classify manual valves and identify its components and functions
- Recognize the process considerations for valve technology including pressure classes, materials selection, leakage rates and international standards
- Implement the process of actuator selection by considering the various types and accessories used in valve technology and apply the principle of field communication as applied in valve technology
- Develop knowledge on Smart valves and positioners as well as the Smart partial valve stroke test devices used in valves
- Manage asset of field mounted devices and recognize its importance in advanced valve technology
- Develop in-depth knowledge on check valves, pressure relief valves and fire safe valves by identify their types, features and application in the industry
- List the common valve problems that are encountered including water hammer effects, high noise levels & fugitive emissions and determine how to prevent valve failures
- Apply proven methodology of assessing the valve failures in the oil & gas sector and explain how it affects the maintenance and troubleshooting processes of valves
- Acquire an overview of plant valve management and regulators that are used in valve technology and an overview of extended valve components, hardide & coatings and composite valves including their design, installation, application and sizing
- Apply the proper procedure for corrosion, galling and water testing and carryout proper methodology of valve sizing & selection using the various programs and applications

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 for those who are involved in the design, selection, installation, applications, sizing, inspection, maintenance and troubleshooting of such equipment. This includes maintenance, application, inspection, electrical, mechanical, control, instrumentation, production, wellhead and drilling engineers, designers and other technical staff. Likewise, it is beneficial for users, distributors, purchasers or buyers of this equipment for them to understand the design and manufacturing principles that dictates faster delivery of safer quality product.

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 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:-

- 
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 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. Dimitry Rovas, CEng, MSc, PMI-PMP, SMRP-CMRP is a **Senior Mechanical & Maintenance Engineer** with extensive industrial experience in **Oil, Gas, Power and Utilities** industries. His expertise includes **CAESAR, Pipe Stress Analysis, Pipeline System Design, Construction, Maintenance and Repair, Facilities & Pipeline Integrity Assessment, Pipeline Welding Practices, Internal Corrosion of Pipelines, Pipeline Integrity Management & Risk Assessment, Thermal Insulation, Insulation Standards & Regulations, Insulation Materials & Selection, Piping System Insulation, Insulation Installation Techniques, Insulation Inspection & Quality Control, Insulation Thickness Calculation, Insulation & Corrosion Protection, Heat Exchanger & Boiler Insulation, Tanks & Vessels Insulation, Pipeline & Piping Insulation, Insulation Testing & Quality Assurance, Insulation Maintenance & Repair, Insulation Retrofitting, Impulse Tube Installation & Inspection, Parker Compression Fittings, Pipes & Fittings, PSV Inspection, Boiler Operation, Maintenance & Inspection, Root Cause Failure Analysis, Tank Design & Engineering, Tank Shell, Tanks & Tank Farms, Vacuum Tanks, Gas Turbine Operating & Maintenance, Diesel Engine, Engine Cycles, Governors & Maintenance, Crankshafts & Maintenance, Lubrication System Troubleshooting & Maintenance, Engines/Drivers, Motor Failure Analysis & Testing, Motor Predictive Maintenance, Engine Construction & Maintenance, HP Fuel Pumps & Maintenance, Fired Equipment Maintenance, Combustion Techniques, Process Heaters, Glass Reinforced Epoxy (GRE), Glass Reinforced Pipes (GRP), Glass Reinforced Vent (GRV), Mechanical Pipe Fittings, Flange Joint Assembly, Adhesive Bond Lamination, Butt Jointing, Joint & Spool Production, Isometric Drawings, Flange Assembly Method, Fabrication & Jointing, Jointing & Spool Fabrication, Pipe Cuttings, Flange Bolt Tightening Sequence, Hydro Testing, Pump Technology, Fundamentals of Pumps, Pump Selection & Installation, Centrifugal Pumps & Troubleshooting, Reciprocating & Centrifugal Compressors, Screw Compressor, Compressor Control & Protection, Gas & Steam Turbines, Turbine Operations, Gas Turbine Technology, Valves, Process Control Valves, Bearings & Lubrication, Advanced Machinery Dynamics, Rubber Compounding, Elastomers, Thermoplastic, Industrial Rubber Products, Rubber Manufacturing Systems, Heat Transfer, Vulcanization Methods, Process Plant Shutdown & Turnaround, Professional Maintenance Planner, Advanced Maintenance Management, Maintenance Optimization & Best Practices, Maintenance Auditing & Benchmarking, Material Cataloguing, Reliability Management, Rotating Equipment, Energy Conservation, Energy Loss Management in Electricity Distribution Systems, Energy Saving, Thermal Power Plant Management, Thermal Power Plant Operation & Maintenance, Heat Transfer, Machine Design, Fluid Mechanics, Heating & Cooling Systems, Heat Insulation Systems, Heat Exchanger & Cooling Towers, Mechanical Erection, Heavy Rotating Equipment, Material Unloading & Storage, Commissioning & Start-Up. Further, he is also well-versed in MS project & AutoCAD, EPC Power Plant, Power Generation, Combined Cycle Powerplant, Leadership & Mentoring, Project Management, Strategic Planning/Analysis, Construction Management, Team Formation, Relationship Building, Communication, Reporting and Six Sigma. He is currently the **Project Manager** wherein he is managing, directing and controlling all activities and functions associated with the domestic heating/cooling facilities projects.**

During his life career, Mr. Rovas has gained his practical and field experience through his various significant positions and dedication as the **EPC Project Manager, Field Engineer, Thermal Insulation Engineer, Mechanical Engineer, Preventive Maintenance Engineer, Senior Thermal Insulation Technician, Researcher, Instructor/Trainer, Telecom Consultant** and **Consultant** from various companies such as the Podaras Engineering Studies, Metka and Diadikasia, S.A., **Hellenic Petroleum Oil Refinery** and COSMOTE.

Mr. Rovas has a **Master's** degree in **Energy Production & Management** and **Mechanical Engineering** from the **National Technical University of Athens (NTUA), Greece**. Further, he is a **Certified Instructor/Trainer**, a **Certified Maintenance and Reliability Professional (CMRP)** from the Society of Maintenance & Reliability Professionals (**SMRP**), **Certified Project Management Professional (PMI-PMP)**, **Certified Six Sigma Black Belt**, **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management (ILM)**, **Certified Construction Projects Contractor**, **Certified Energy Auditor** and a **Chartered Engineer**. Moreover, he is an active member of **American Society for Quality**, **Project Management Institute (PMI)**, **Body of Certified Energy Auditors** and **Technical Chamber of Greece**. He has further received various recognition and awards and delivered numerous trainings, seminars, courses, workshops 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 course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: Sunday, 11th of May 2025

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	PRE-TEST
0830 – 0915	Control Valve Theory Introduction • Definition of a Control Valve • Types of Energy • What is Happening Inside a Control Valve • Cavitation • Flashing • Choked Flow • Control Valve Sizing • Turndown vs. Range ability
0915 – 0930	Video Presentation Cavitation
0930 – 0945	Break
0945 – 1030	Control Valve Types Rotary Valves • Linear Valves • Valve Selection • How to Choose the Right Valve • Selection Guidelines • Application Comparisons
1030 – 1100	Video Presentation Control Valve Body Assembly
1100 – 1215	Characteristics & Trims Valve Characteristics • Application Examples • Cavitation Control • Anti-Cavitation Trim • High Pressure Drop-Applications • Low Noise Trim • Diffusers • Trim Selection
1215 – 1230	Break
1230 – 1330	Manual Valves Classification of Manual Valves • Rotating Manual Valves • Stopper Valves • Sliding Valves • Flexible Valves
1330 – 1420	Process Considerations End Connections • Pressure Classes • Face to Face Criteria • Materials Selection • Modes of Failure • Leakage Rates • International Standards
1420 – 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day One

Day 2: Monday, 12th of May 2025

0730 – 0900	Actuator Selection Types of Actuators • Linear Actuators • Rotary Actuators • Actuator Forces • Positioners • Fail Safe Systems • Auxiliary Hand wheels • Valve Accessories
0900 – 0930	Video Presentation Actuator Assembly
0930 – 0945	Break
0945 – 1030	Field Communications Analogue Signals • Digital Communications • Fieldbus Technologies
1030 – 1100	Video Presentation HART Protocol



1100 – 1215	Smart Valves & Positioners Introduction • Development • Digital Valve Controllers • Future Development
1215 – 1230	Break
1230 – 1330	Smart Partial Valve Stroke Test Devices Overview
1330 – 1420	Asset Management of Field Mounted Devices Maximizing Asset Uptime
1420 – 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day Two

Day 3: Tuesday, 13th of May 2025

0730 – 0930	Check Valves Introduction to Check Valves • Lift Check Valves • Swing Check Valves • Tilting Disc Check Valves • Double Disc Check Valves
0930 – 0945	Break
0945 – 1100	Pressure Relief Valves Introduction • Principles of Operation • Standards (ASME, National Board, etc.) • Applications • Installation
1100 – 1215	Pressure Relief Valves (cont'd) Testing • Assembly • Repair • Troubleshooting • VR Accreditation
1215 – 1230	Break
1230 – 1420	Fire Safe Valves Overview
1420 – 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day Three

Day 4: Wednesday, 14th of May 2025

0730 – 0930	Common Valve Problems Water hammer Effects • High Noise Levels • Noise Attenuation • Fugitive Emissions • How to Prevent Valve Failures • Installation Issues • Practical Problems • Maintenance Considerations
0930 – 0945	Break
0945 – 1100	Assessment of Valve Failure in the Oil & Gas Sector Overview
1100 – 1215	Plant Valve Management Overview
1215 – 1230	Break
1230 – 1420	Regulators Overview
1420 – 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day Four





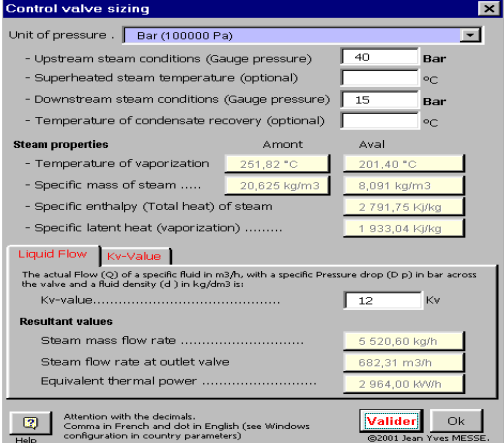
Day 5: Thursday, 15th of May 2025

0730 – 0930	Extended Valve Components, Hardide & Coatings Overview
0930 – 0945	Break
0945 – 1100	Composite Valves Overview
1100 – 1215	Corrosion, Galling & Water Testing Overview
1215 – 1230	Break
1230 – 1345	Valve Sizing & Selection Computer Program • Liquid & Gas Applications • Linear & Rotary Valves • Actuator Sizing
1345 – 1400	Course Conclusion Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course
1400 – 1415	POST-TEST
1415 – 1430	Presentation of Course Certificates
1430	Lunch & End of Course



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 our state-of-the-art simulators “Valve Sizing Simulator”, “Valve Simulator 3.0”, “Valvestar 7.2 Simulator” and “PRV2SIZE Simulator”.



Control valve sizing

Unit of pressure: Bar (100000 Pa)

Upstream steam conditions (Gauge pressure): 40 Bar

Superheated steam temperature (optional): °C

Downstream steam conditions (Gauge pressure): 15 Bar

Temperature of condensate recovery (optional): °C

Steam properties

Property	Amount	Aval
Temperature of vaporization	251,82 °C	201,40 °C
Specific mass of steam	20,825 kg/m ³	8,091 kg/m ³
Specific enthalpy (Total heat) of steam	2 791,75 kJ/kg	
Specific latent heat (vaporization)	1 933,04 kJ/kg	

Liquid Flow | Kv-Value

The actual Flow (Q) of a specific fluid in m³/h, with a specific Pressure drop (D p) in bar across the valve and a fluid density (d) in kg/dm³ is:

Kv-value: 12 Kv

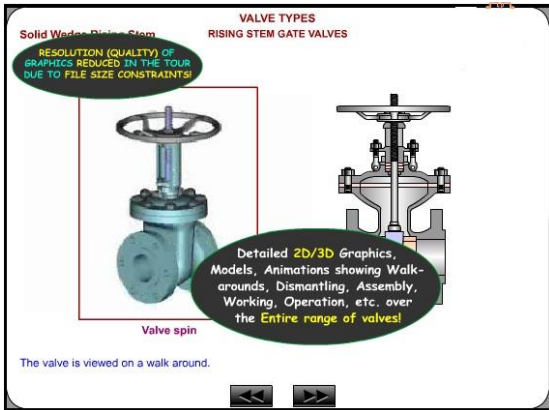
Resultant values

Steam mass flow rate	5 520,60 kg/h
Steam flow rate at outlet valve	682,31 m ³ /h
Equivalent thermal power	2 964,00 kW/h

Attention with the decimals. Comma in French and dot in English (see Windows configuration in country parameters)

Validater | Ok

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VALVE TYPES

Solid Welder Rising Stem

RESOLUTION (QUALITY) OF GRAPHICS REDUCED IN THE TOUR DUE TO FILE SIZE CONSTRAINTS!

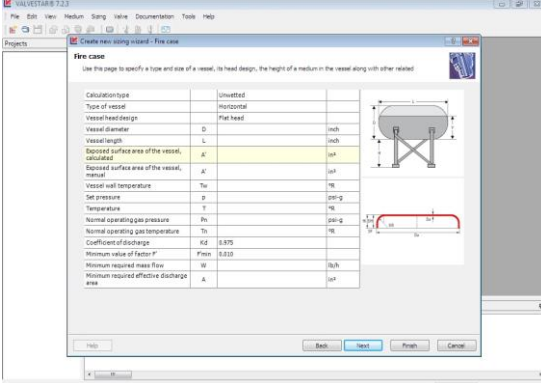
Detailed 2D/3D Graphics, Models, Animations showing Walk-arounds, Dismantling, Assembly, Working, Operation, etc. over the Entire range of valves!

Valve spin

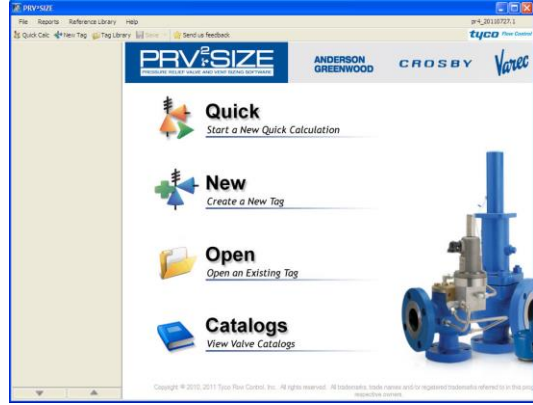
The valve is viewed on a walk around.

Valve Sizing Simulator

Valve Simulator 3.0



Valvestar 7.2 Simulator



PRV²SIZE Simulator

Course Coordinator

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