COURSE OVERVIEW ME0397
Practical Pump & Valve Technology
Selection, Operation, Control, Maintenance & Troubleshooting

Course Title
Practical Pump & Valve Technology: *Selection, Operation, Control, Maintenance & Troubleshooting*

Course Date/Venue
please refer to page 3

Course Reference
ME0397

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

Course Description

This practical and highly-interactive course includes various practical sessions and exercises. Practical sessions will be organized during the course using our state-of-the-art simulators and our cutting-edge Virtual Reality (VR) and Augmented Reality (AR) technologies to provide participants with a highly immersive and interactive learning experience.

The aim of this course is to provide delegates with a detailed and up-to-date overview of the operating performance of valves and pumps commonly employed in process plant and the manner in which they are chosen to provide the optimum configuration.

This course will concentrate on the fundamental aspects and operating principles and practice of pumps and control valves and will address the operating problems which are often experienced by plant personnel. This course will deliver this important engineering discipline whilst reducing to the absolute minimum the level of mathematics required.

On completion of this course, participants will be able to acquire the practical engineering knowledge to enable them not only to choose the correct device or combination of devices for a particular application but also to be in a position to resolve common operating problems associated with this topic. In addition, this course addresses the importance of safety in the selection and operation of these devices.

Course Objectives

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

- Select, operate, control, maintain and troubleshoot pumps and valves used in process industry
- Solve operating problems of pumps and valves which are often experienced by plant personnel
- Apply practical engineering knowledge that is essential not only to choose the correct device or combination of devices for a particular application but also to troubleshoot such devices correctly
- Recognize design issues and installation guidance for optimum performance of pumps and valves
- Employ proper techniques in operation and maintenance of pump and valves
- Implement proven control strategies for optimum pump and valve performance including analogue and digital controls signals

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 pump and valve for project engineers, process engineers and plant engineers in the oil, chemical and other process industries, who require a wider and deeper appreciation of the operating characteristics and the procedure required for the selection of pumps and valves. No prior knowledge of the topic is required.

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
10% Practical Workshops & Work Presentations
10% Hands-on Practical Exercises & Case Studies
20% Simulators (Hardware & Software) & Videos
30% VR/AR Hands-on Practical Application

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

Course Date/Venue

Session(s)	Date	Venue
1	April 19-23, 2026	Meeting Room 4, Four Seasons Hotel Cairo at Nile Plaza, Corniche El Nil, Garden City, Cairo, Egypt
2	June 22-26, 2026	Salon Expo, NH Hotel Plaza de Armas, Seville, Spain
3	August 10-14, 2026	Ruben Boardroom, The Rubens at The Palace, Buckingham Palace Road, London, United Kingdom
4	September 13-17, 2026	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
5	October 04-08, 2026	Pierre Lotti Meeting Room, Movenpick Hotel Istanbul Golden Horn, Istanbul, Turkey
6	November 08-12, 2026	Meeting Plus 9, City Centre Rotana, Doha, Qatar
7	January 10-14, 2027	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
8	February 07-11, 2027	Meeting Plus 9, City Centre Rotana, Doha, Qatar
9	March 15-19, 2027	Ruben Boardroom, The Rubens at The Palace, Buckingham Palace Road, London, United Kingdom

Course Fee

Doha	**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.
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.
London	**US$ 8,800** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Seville	**US$ 8,800** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Cairo	**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

Haward's 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**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). 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.

- 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

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:

Dr. Tony Dimitry, PhD, MSc, BSc, is a **Senior Mechanical Engineer** with over **30 years** of industrial experience. His expertise covers **Pumps, Compressors, Turbines & Troubleshooting**, **Centrifugal Pumps**, Maintenance of **Gas Compressors**, **Compressor & Steam Turbine**, **Pressure Safety Relief Valve** Repair & Recalibration, **PSV/PRV** Troubleshooting, **PRV** Testing & Repair, **Valve** Testing & Inspection, **Valve** Sealing, **Valve** Calibration, **Process Equipment**, **Vibration Analysis**, **Heat Exchanger**, **Siemens Steam Turbine Maintenance**, **Electromechanical Maintenance**, **Machinery Alignment**, **Lubrication Technology**, **Compressors**, **HVAC & Refrigeration Systems**, **Piping System**, **Blower & Fan**, **Shaft Repair**, **Control Valve & Actuator**, **Safety Relief Valves**, **Pipelines**, **Piping Vibration Analysis**, **Pressure Vessels**, **Dry Gas Seal**, **Process Equipment**, **Diesel Engine & Crane Maintenance**, **Maintenance Management** (**Preventive**, **Predictive**, **Breakdown**), **Reliability Management**, **Condition-Based Monitoring**, **Rotating Equipment**, **Tanks & Tank Farms**, **Pneumatic System**, **Static Equipment**, **Failure Analysis**, **FMEA**, **Corrosion**, **Metallurgy**, Planning, Scheduling, Cost Control, Preventive and Predictive Maintenance. Currently, he is the Maintenance Manager of the PPC Incorporation wherein he is responsible for the maintenance and upgrade of all plant components, monitoring the thermal stresses and the remaining life of steam pipes, turbine casing, mills, fans and pumps. He is in-charge of the metallurgical failure analysis and the usage of fracture mechanics for determining crack propagation in impellers of turbines, assessing all alterations and developments for upgrading the plant.

During his career life, Dr. Dimitry was a **Senior Engineer** in **Chloride Silent** (**UK**) wherein he was responsible for the mechanical, thermal and electrical modelling of battery problems for electric vehicles and satellites as well as an **Operations Engineer** of the **National Nuclear Corporation** (**UK**) wherein he was responsible for the optimization of the plant. Prior to this, he was a **Professor** at the **Technical University of Crete** and an Assistant **Professor** of the **University of Manchester** (**UK**).

Dr. Dimitry has **PhD**, **Master** and **Bachelor** degrees in **Mechanical Engineering** from the **Victory University of Manchester** and the **University of Newcastle**, **UK** respectively. Further, he is a **Certified Instructor/Trainer,** a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**) and an associate member of the American Society of Mechanical Engineers (**ASME**) and Institution of Mechanical Engineers (**IMechE**). He has further delivered various 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

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Introduction to Pumps & Valves*** *Highlighted Problem Areas*
0930 – 0945	*Break*
0945 – 1100	***General Description of Centrifugal Pumps & Turbines***
1100 – 1215	***Centrifugal Pumps*** *Torque, Head and Flow Calculations*
1215 – 1230	*Break*
1230 – 1330	***Axial Flow Pumps*** *Torque and Power Calculations*
1330 – 1400	***Video: Basic Pump Types & Technologies***
1400 – 1420	***Discussion***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0830	***Pump Performance Curves*** *Centrifugal Multistage Pump ● Mixed-Flow Machines ● Effect of Impeller Speed and Diameter on Performance*
0830 – 0930	***Pump Specific Speed & Specific Radius***
0930 – 0945	*Break*
0945 – 1100	***Centrifugal Pumps Basics*** *Types of Centrifugal Pumps ● Self-Priming Pumps ● Specific Speeds ●Suction Specific Speed ● Optimum Efficiency Point*
1100 – 1215	***Centrifugal Pump Design Issues*** *Balancing Disc ● Impeller NPSHR ● Impeller Centre-Rib ● Mechanical Seals ● Velocity Head ● Affinity Laws ● Suction Lift ● Re-Rate/Retrofit ● Head-Rise ● Radial/Horizontal Split Case*
1215 – 1230	*Break*
1230 – 1400	***Centrifugal Pump Installation Guidance for Optimum Performance*** *Foundation Problems ● Soft Foot ● Suction Pipe ● Suction Strainer*
1400 – 1420	***Video: Fundamentals of Pump Performance***
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

0730 – 0930	***Optimum Centrifugal Pump Operation*** *Start-up ● Minimum Flow ● Maximum Pump RPM ● Motor Current/Specific Gravity ● Entrained Gas ● Operation at Shut Off ●Temperature-Rise ● Thermal Shock*
0930 – 0945	*Break*
0945 – 1100	***Centrifugal Pump Maintenance*** *Case Gasket ● Checking For Wear Clearance ● Oil Change ● Pump Storage ● Bearing Failures ● Bearing Housing Oil Leakage ● Cavitation Noise and Damage ● Pump Vibration ● Cracked Volute Tongues*
1100 – 1215	***Centrifugal Pump Re-Rate/Retrofit*** *Impeller Cut ● NPSH ● De-Staging ● Electric Motor Sizing ● Effect of Viscosity Changes on Optimum Performance*
1215 – 1230	*Break*
1230 – 1300	***Video: Pump Hydraulic Loads, Critical Speed & Torque***
1300 – 1330	***Video: Bearings, Seals & Couplings***
1330 – 1420	***Discussion Forum***
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

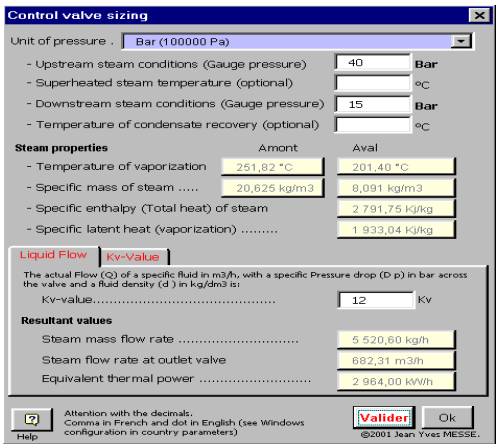
0730 – 0830	***Principles of Control Valve Technology [1]*** *Types of Control Valves, e.g. Globe, Butterfly, Ball and Cage Valves etc. ● Control Valve Flow Characteristics ● Noise and Cavitation in Control Valves*
0830 – 0930	***Principles of Control Valve Technology [2]*** *Actuators and Positioners ● Valve Testing ● Transmitters for Each of the Process Variables ● Smart Transmitters ● Control Loop Testing*
0930 – 0945	*Break*
0945 – 1100	***Valve Control Loops*** *The 3-15 psi and 4 - 20 MA Control Loops ● Digital Transmission and the Control Room*
1100 – 1215	***Control Strategies for Optimum Valve Performance*** *Manual Control ● Feedback Control ● Feed Forward Control ● Simple On-Off Control*
1215 – 1230	*Break*
1230 – 1330	***Other Control Strategies*** *Proportional, Integral and Derivative Control-Valve Systems*
1330 – 1420	***Analogue and Digital Control Signals*** *Direct Digital Control, Analogue/Digital Conversion, Digital/Analogue Conversion*
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

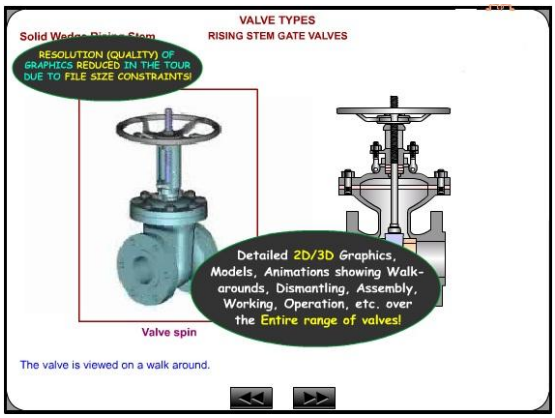
0730 – 0930	***Valve Safety Issues*** *Cleanliness, Fault-Finding Instrumentation, Preventive Maintenance*
0930 – 0945	*Break*
0945 – 1215	***Centrifugal Pump Troubleshooting*** *Bearing Failures ● Bearing Housing Oil Leakage ● Cavitation Noise and Damage ● Impeller Cavitation/Erosion ● Vibration ● Cracked Volute Tongues ● Net Positive Suction Head*
1215 – 1230	*Break*
1230 – 1300	***Video: Special Pump Topics***
1300 – 1345	***Discussion Forum***
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulators (Hands-on Practical Sessions)

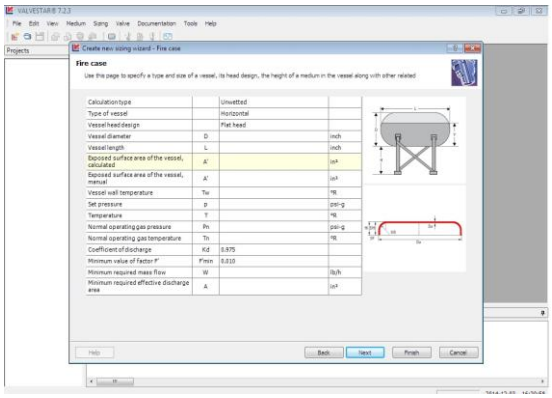
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art "Valve Sizing Software", "Valve Software 3.0", "Valvestar 7.2 Software", "PRV²SIZE Software" and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



Valve Sizing Software

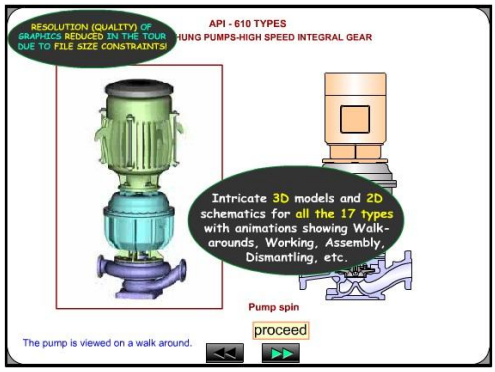


Valve Software 3.0



Valvestar 7.2 Software

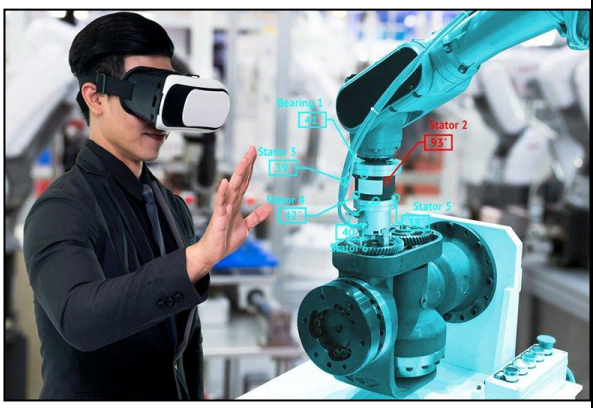
PRV²SIZE Software



Centrifugal Pumps and Troubleshooting Guide 3.0

Virtual Reality (VR) and Augmented Reality (AR) Practical Sessions

Practical sessions will be organized during the course using cutting-edge Virtual Reality (VR) and Augmented Reality (AR) technologies to provide participants with a highly immersive and interactive learning experience. Through VR headsets and AR-enabled devices, delegates will be able to simulate real-world scenarios in a safe and controlled virtual environment, allowing them to practice the theories and techniques learned in class. Participants will engage in realistic, hands-on exercises such as operating equipment, performing inspections, troubleshooting systems and responding to simulated incidents that closely replicate actual field conditions. This advanced training approach enhances understanding, improves decision-making skills and builds confidence by bridging the gap between theoretical knowledge and real-world application.



Course Coordinator

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org