



## COURSE OVERVIEW IE0274 Motor Operated Valves Maintenance & Troubleshooting

### Course Title

Motor Operated Valves Maintenance & Troubleshooting

### Course Date/Venue

January 19-23, 2025/TBA Meeting Room,  
The H Hotel, Sheikh Zayed Road, Dubai,  
UAE

### Course Reference

IE0274

### 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 in the class will be applied using our state-of-the-art simulators.***



Motor Operated Valve (MOV) is an important item of plant & piping system. These valves are generally of large size and are used for different applications such as pump discharge etc. motor operated valves serve the purpose of fully opening or fully closing valves in pipelines. For example, cooling water lines, process pipelines where controlling of fluid is not required, motor operated valves can be used to fully allow or fully stop the fluid flow.



This course is designed to provide participants with a detailed and up-to-date overview of motor operated valves maintenance and troubleshooting. It covers the different types of actuators; the analysis of the main components of motor operated valves; setting procedures for limit switches and torque as prerequisite for proper operation; and troubleshooting techniques and advanced electrical signal analysis for remote diagnosis of problems.

## Course Objectives

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

- Apply proper techniques on motor operated valves maintenance and troubleshooting
- Discuss valves and different types of actuators
- Select and analyze the main components of motor operated valves
- Set and adjust procedures for limit switches and torque as prerequisite for proper operation
- Employ advanced troubleshooting techniques and advanced electrical signal analysis for remote diagnosis of problems

## 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, 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 motor operated valves maintenance and troubleshooting for electrical maintenance technicians and field engineers.

## 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: -

- 
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 centre, 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.

### **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, 19<sup>th</sup> of January 2024**

0730 – 0800	<i>Registration &amp; Coffee</i>
0800 – 0815	<i>Welcome &amp; Introduction</i>
0815 – 0830	<b>PRE-TEST</b>
0830 – 0930	<i>Valve Types &amp; Components</i>
0930 – 0945	<i>Break</i>
0945 – 1100	<i>Actuators for Valves</i>
1100 – 1230	<i>Motor Selection</i>
1230 – 1245	<i>Break</i>
1245 – 1420	<i>Sizing of Control Valves, Torque &amp; Thrust Requirements</i>
1420 - 1430	<b>Recap</b>
1430	<i>Lunch &amp; End of Day One</i>

#### **Day 2: Monday, 20<sup>th</sup> of January 2024**

0730 – 0900	<i>Thrust &amp; Torque Switches Setting</i>
0900 – 0915	<i>Break</i>
0915 – 1100	<i>Limit Switches Adjustment</i>
1100 – 1230	<i>Gearing Components of MOV's</i>
1230 – 1245	<i>Break</i>
1245 – 1420	<i>Control Amplifiers</i>
1420 - 1430	<b>Recap</b>
1430	<i>Lunch &amp; End of Day Two</i>

#### **Day 3: Tuesday, 21<sup>st</sup> of January 2024**

0730 – 0930	<i>Feedback Devices</i>
0930 – 0945	<i>Break</i>
0945 – 1100	<i>Control Valve Repair</i>
1100 – 1215	<i>Packing Maintenance &amp; Theory</i>
1215 – 1230	<i>Break</i>
1230 – 1420	<i>Power Supply Selection &amp; Maintenance</i>
1420 - 1430	<b>Recap</b>
1430	<i>Lunch &amp; End of Day Three</i>

#### **Day 4: Wednesday, 22<sup>nd</sup> of January 2024**

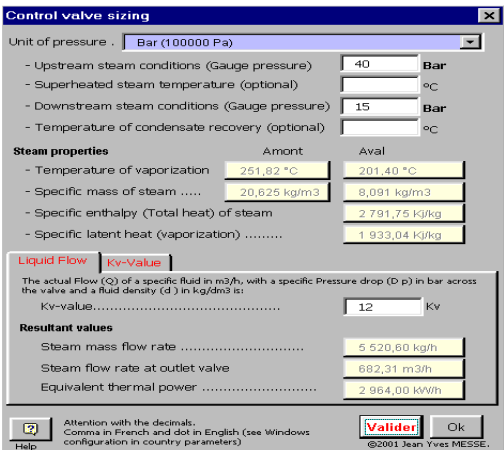
0730 – 0930	<i>Electrical Drawings &amp; Schematics</i>
0930 – 0945	<i>Break</i>
0945 – 1100	<i>Control Strategies for MOV's</i>
1100 – 1215	<i>Auma Controls</i>
1215 – 1230	<i>Break</i>
1230 – 1420	<i>Rotork and Flowserve Components &amp; Adjustments</i>
1420 - 1430	<b>Recap</b>
1430	<i>Lunch &amp; End of Day Four</i>

**Day 5: Thursday, 23<sup>rd</sup> of January 2024**

0730 – 0930	<b>Troubleshooting of MOVs</b>
0930 – 0945	<i>Break</i>
0945 – 1100	<b>Electrical Signal Analysis for Diagnostics</b>
1100 – 1215	<b>Failure Analysis of MOV's</b>
1215 – 1230	<i>Break</i>
1230 – 1345	<b>Wireless Control &amp; Setting</b>
1345 - 1400	<b>Course Conclusion</b>
1400 – 1415	<b>POST-TEST</b>
1415 – 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch &amp; End of Course</i>

**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” and “PRV<sup>2</sup>SIZE Software”.



**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**

Amount	Aval
Temperature of vaporization	251,82 °C / 201,40 °C
Specific mass of steam	20,825 kg/m <sup>3</sup> / 8,091 kg/m <sup>3</sup>
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 m<sup>3</sup>/h, with a specific Pressure drop (D p) in bar across the valve and a fluid density (d) in kg/dm<sup>3</sup> is:

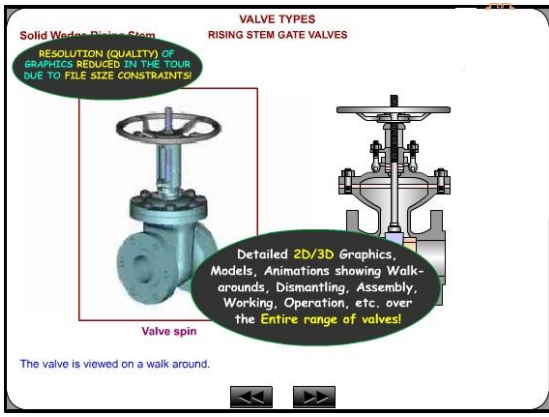
Kv-value: 12 Kv

**Resultant values**

Steam mass flow rate	5 520,60 kg/h
Steam flow rate at outlet valve	682,31 m <sup>3</sup> /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)

Validat | ©2001 Jean Yves MESSE



**VALVE TYPES**

RISING STEM GATE VALVES

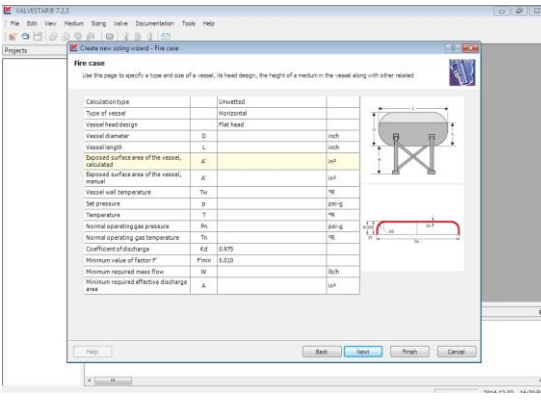
RESOLUTION (QUALITY) OF GRAPHICS REDUCED IN THE TOUR DUE TO FILE SIZE CONSTRAINTS!

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

Valve spin

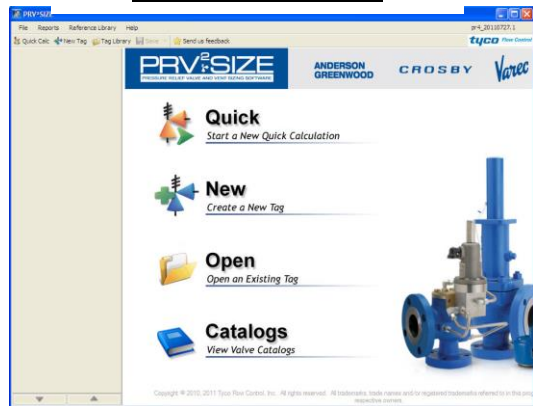
The valve is viewed on a walk around.

**Valve Sizing Software**



**Valvestar 7.2 Software**

**Valve Software 3.0**



**PRV<sup>2</sup>SIZE Software**

**Course Coordinator**

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