COURSE OVERVIEW ME0434
Pressure/Safety Relief Valves

Course Title
Pressure/Safety Relief Valves

Course Date/Venue
August 04-08, 2025/Meeting Plus 9, City Centre Rotana, Doha, Qatar

Course Reference
ME0434

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.

1) Industrial Facility Visit: Course participants will be taken to an industrial facility where they will practice valve dismantling, assembling, inspection and testing. In case that this course is organized inside client premises (In-House), then client shall provide access to its valve workshop for practical sessions.

(2) Valve Demo Kit: Various safety relief valves will be distributed in the class to the participants by the course instructor for hands-on demonstration. These demo kits will be returned to the instructor at the end of the training day.

(3) Valve Simulator: Participants will use in the class our state-of-the-art "Valve Sizing Simulator", "Valve Simulator 3.0", "Valvestar 7.2 Simulator" and "PRV2SIZE Simulator" to practice some of the skills learnt.

This course is designed to provide participants with a detailed and up-to-date overview of Pressure/Safety Relief Valves. It covers the purpose and role in process safety of pressure relief devices and the types of pressure relief devices, operating principles and valve terminology and the industry standards and codes; the applications across industries, components and construction, sizing fundamentals and design conditions and the selection criteria for PRVs; the set pressure and overpressure, operate pressure margin recommendations, backpressure and superimposed pressure, multiple valve installations and relief scenarios and contingency cases.

During this interactive course, participants will learn the installation guidelines and best practices, operational behavior and performance, troubleshooting common issues, inspection and preventive maintenance and in-situ and bench testing; the blowdown and reseating adjustment, relief valves for different media, high pressure and high temperature applications and cryogenic and toxic media applications; the pilot-operated relief valves (PORVs), pressure vacuum relief valves (tank breathers), combination devices (rupture disk + PRV) and relief system design per API 521 the documentation and certification, PRV in HAZOP and LOPA studies, flare and vent system interface and PRV management programs

Course Objectives

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

- Apply and gain an in-depth knowledge on pressure/safety relief valves
- Discuss the purpose and role in process safety of pressure relief devices and identify the types of pressure relief devices, operating principles and valve terminology and the industry standards and codes
- Explain applications across industries, components and construction, sizing fundamentals and design conditions and the selection criteria for PRVs
- Determine set pressure and overpressure, operate pressure margin recommendations as well as discuss backpressure and superimposed pressure, multiple valve installations and relief scenarios and contingency cases
- Recognize installation guidelines and best practices, operational behavior and performance, troubleshooting common issues, inspection and preventive maintenance and in-situ and bench testing
- Determine blowdown and reseating adjustment, relief valves for different media, high pressure and high temperature applications and cryogenic and toxic media applications
- Discuss pilot-operated relief valves (PORVs), pressure vacuum relief valves (tank breathers), combination devices (rupture disk + PRV) and relief system design per API 521
- Carryout documentation and certification, PRV in HAZOP and LOPA studies, flare and vent system interface and PRV management programs

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 pressure and safety relief valves for those who are involved in the sizing, selection, operation, inspection, maintenance and troubleshooting of valves. This includes process engineers, piping engineers, pipelines and pressure vessels engineers and supervisors. Further, it is suitable for inspection and QA & QC engineers, boilers and process plant equipment owners, maintenance staff who inspect and install pressure and safety relief devices and engineers who are involved in plant turnaround and upgrade projects.

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 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:

Dr. Tony Dimitry, PhD, MSc, BSc, is a **Senior Mechanical & Maintenance Engineer** with over **35 years** of industrial experience within the **Petroleum**, **Oil & Gas**, **Petrochemical**, **Nuclear & Power** industries. His expertise covers Revising **Engineering Drawings**, **Engineering Drawings & Diagrams**, **AutoCAD & GIS Support**, Retailed **Engineering Drawings**, Codes & Standards, **Mechanical Diagrams** Interpretation, Reading **Engineering Drawings**, **Process & Project Drawings**, **Engineering Drawings** Interpretation, **Piping Layouts & Isometrics**, **P&ID** Reading & Interpretation, 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**, **Failure Analysis Methodologies**, Machinery Root Cause Failure Analysis (**RCFA**), **Preventive Maintenance** & **Condition Monitoring**, Reliability Centred Maintenance (**RCM**), Risk Based Inspection (**RBI**), Root Cause Analysis (**RCA**), **Planning & Managing Plant Turnaround**, **Scheduling Maintenance**, **Data Archive Maintenance**, **Master Milestone Schedule** (**MMS**), Piping & Mechanical **Vibration Analysis**, Preventive & Predictive Maintenance (**PPM**) **Maintenance**, Condition Based Monitoring (**CBM**), Risk Based Assessment (**RBA**), Planning & Preventive Maintenance, **Maintenance** Management (**Preventive**, **Predictive**, **Breakdown**), **Reliability** Management, Rotating Equipment, Scheduling & Cost Control, **Maximo** Foundation, **Maximo** Managing Work, **Asset Management Best Practices**, **Resource Management**, **Inventory Set-up & Management**, **Work Management**, Automatic & Work Flows & Escalations, **Vibration Analysis**, **Heat Exchanger**, **Siemens**, **Gas & Steam Turbine Maintenance**, **Pumps & Compressors**, **Turbo-Expanders**, **Fractional Columns**, **Boilers**, **Cryogenic Pumps** for **LNG**, **Electromechanical Maintenance**, **Machinery Alignment**, **Lubrication Technology**, **Bearing & Rotary Machine**, **Blower & Fan**, **Shaft Repair**, **Safety Relief Valves**, **Pipelines**, **Piping**, **Pressure Vessels**, **Process Equipment**, **Diesel Engine & Crane Maintenance**, **Tanks & Tank Farms**, **Pneumatic System**, **Static Equipment**, **FMEA**, **Corrosion**, **Metallurgy**, **Thermal** and **Electrical Modelling** of **Battery Problems**. He is also well-versed in various simulators such as i-**Learn Vibration**, **AutoCAD**, **Word Access**, **Aspen One**, **Fortran**, **VB**, **C ANSYS**, **ABAQUS**, **DYNA3D**, **Ceasar**, **Caepipe**, **MS Project**, **Primavera**, **MS Excel**, **Maximo**, **Automation Studio** and **SAP**. Currently, he is the **Maintenance Manager** of the PPC Incorporation wherein he is responsible for the maintenance and upgrading of all **Power Station** components.

During his career life, Dr. Dimitry held a significant positions such as the **Operations Engineers**, **Technical Trainer**, **HSE Contracts Engineer**, **Boilers Section Engineer**, **Senior Engineer**, **Trainee Mechanical Engineer**, **Engineer**, **Turbines Section Head**, **Professor**, **Lecturer/Instructor** and **Teaching Assistant** from various multinational companies like **Chloride Silent Power Ltd.**, **Technical University of Crete**, **National Nuclear Corporation**, **UMIST Aliveri Power Station** and **HFO Fired Power Station**.

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.

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 Fee

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.

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, 04th of August 2025***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Introduction to Pressure Relief Devices*** *Purpose and Role in Process Safety • Pressure versus Safety versus Relief Valve Definitions • Overview of Overpressure Scenarios • Industry Relevance and Common Applications*
0930 – 0945	*Break*
0945 – 1030	***Types of Pressure Relief Devices*** *Safety Valves (Spring-Loaded, Pilot-Operated) • Relief Valves (Liquid Service) • Rupture Disks and Combination Devices • Pressure and Vacuum Relief Valves (PVRVs)*
1030 – 1130	***Operating Principles & Valve Terminology*** *Set Pressure, Blowdown, Reseating Pressure • Overpressure and Accumulation • Lift and Relieving Capacity • Modulating versus Pop-Action Behavior*
1130 – 1215	***Industry Standards & Codes*** *ASME Section VIII, API 520/521/526/527 • ISO 4126 and EN Standards • OSHA and PED Compliance • Differences Between Regional and International Standards*
1215 – 1230	*Break*
1230 – 1330	***Applications Across Industries*** *Boilers and Pressure Vessels • Piping Systems and Tank Protection • Compressors, Heat Exchangers and Reactors • Storage Tanks and Flare Systems*

1330 – 1420	***Components & Construction*** *Valve Body, Nozzle, Spring, Spindle, Disc • Materials of Construction (Carbon Steel, Stainless, Exotic Alloys) • Soft versus Metal Seating • Corrosion-Resistant and High-Temperature Designs*
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, 05th of August 2025***

0730 – 0830	***Sizing Fundamentals & Design Conditions*** *Required Data: Flow, Fluid Properties, Pressure, Temperature • Critical versus Subcritical Flow • Steam, Gas and Liquid Sizing Equations (per API 520 Part I) • Sizing for Two-Phase and Flashing Fluids*
0830 – 0930	***Selection Criteria for PRVs*** *Operating Pressure versus Set Pressure versus MAWP • Type of Valve (Spring-Loaded, Pilot-Operated) • Body Material and Trim Selection • Service-Specific Considerations (Clean, Corrosive, Sticky)*
0930 – 0945	*Break*
0945 – 1100	***Set Pressure & Accumulation Concepts*** *Determining Set Pressure and Overpressure • Accumulation versus Relieving Pressure • Operating Pressure Margin Recommendations • Effects of Backpressure on Valve Performance*
1100 – 1215	***Backpressure & Superimposed Pressure*** *Types: Constant versus Variable • Impact on Valve Lift and Capacity • Use of Balanced Bellows and Pilot Valves • Blowdown Considerations*
1215 – 1230	*Break*
1230 – 1330	***Multiple Valve Installations*** *Capacity Sharing with Multiple Valves • Staggered versus Simultaneous Lift • Installation Sequencing and Spacing • Header and Collector Effects*
1330 – 1420	***Relief Scenarios & Contingency Cases*** *Fire Exposure and External Heating • Blocked Outlet, Thermal Expansion and Runaway Reactions • Power Failure and Cooling Loss • Pressure Surge and Water Hammer*
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, 06th of August 2025***

0730 – 0830	***Installation Guidelines & Best Practices*** *Orientation and Accessibility • Discharge Piping Design (API 521 Considerations) • Drainage and Freezing Protection • Isolation Valve Restrictions and Interlocks*
0830 – 0930	***Operational Behavior & Performance*** *Valve Lift and Chatter Causes • Flow Characteristics and Capacity Curves • Seat Leakage and Simmering • Dynamic Forces and Valve Stability*
0930 – 0945	*Break*

0945 – 1100	***Troubleshooting Common Issues*** *Chattering and Fluttering • Sticking and Fouling • Failure to Reseat Properly • Premature Opening or Delayed Opening*
1100 – 1215	***Inspection & Preventive Maintenance*** *Visual and Functional Checks • Signs of Corrosion, Galling, Erosion • Spring and Spindle Inspection • Inspection Intervals and Condition-Based Monitoring*
1215 – 1230	*Break*
1230 – 1330	***In-Situ & Bench Testing*** *Lift Assist Devices • Inline Testing Methods (Trevitest, Accutest) • Hydrotesting and Air/Gas Testing Procedures • Criteria for Test Acceptance (API 527)*
1330 – 1420	***Blowdown & Reseating Adjustment*** *Blowdown Ring Function • Factory Setting versus Field Adjustment • Fine-Tuning for Stable Reseat • Avoiding Seat Damage During Adjustment*
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, 07th of August 2025***

0730 – 0830	***Relief Valves for Different Media*** *Steam: Superheated versus Saturated • Gas and Vapor: Compressibility Effects • Liquid Service: Velocity and Cavitation • Two-Phase Flow and Relief Modeling*
0830 – 0930	***High Pressure & High Temperature Applications*** *Material Compatibility and Selection • Spring and Body Stress Limitations • Thermal Growth and Expansion Allowances • Design for Supercritical Service*
0930 – 0945	*Break*
0945 – 1100	***Cryogenic & Toxic Media Applications*** *Low-Temperature Seal and Material Performance • Extended Bonnet and Insulation • Fugitive Emission Control • Special Valve Tagging and Identification*
1100 – 1215	***Pilot-Operated Relief Valves (PORVs)*** *Operating Principle and Advantages • Pilot Sensing Line Design • Remote Sensing and Backpressure Management • PORV Failure Modes and Maintenance*
1215 – 1230	*Break*
1230 – 1330	***Pressure Vacuum Relief Valves (Tank Breathers)*** *Use in Atmospheric and Low-Pressure Tanks • Sizing for Inbreathing and Outbreathing • Flame Arrestors and Vent Stack Design • API 2000 Considerations*
1330 – 1420	***Combination Devices (Rupture Disk + PRV)*** *Use Cases and Sequencing • Rupture Disk Sizing and Burst Pressure • Impact on PRV Accuracy and Sealing • Installation Practices and Inspection*
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*

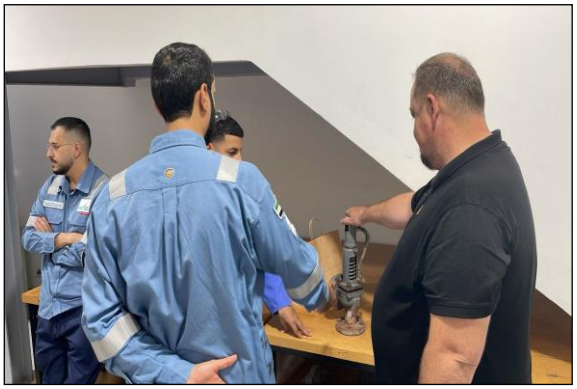
Day 5: Thursday, 08th of August 2025

0730 – 0830	***Relief System Design per API 521*** *System-Wide Pressure Relief Strategy • Discharge Piping and Header Sizing • Knockout Drums and Flare System Connections • Handling of Toxic or Flammable Releases*
0830 – 0930	***Documentation & Certification*** *Relief Valve Datasheets and Set Pressure Certificates • Pressure Relief Valve Tags and Traceability • Test Reports and Inspection Documentation • Compliance with ASME UV Stamping*
0930 – 0945	*Break*
0945 – 1100	***PRV in HAZOP & LOPA Studies*** *Role of PRVs in Risk Reduction • Independence and Effectiveness Evaluation • Scenarios Requiring Safeguarding • Integration with Alarm and Interlock Systems*
1100 – 1215	***Flare & Vent System Interface*** *Sizing Relief Lines to Flare Headers • KO Drum and Seal Drum Considerations • Environmental Limits and Smokeless Flares • Continuous versus Emergency Venting*
1215 – 1230	*Break*
1230 – 1345	***PRV Management Programs*** *Asset Hierarchy and Tagging • Maintenance Planning and CMMS Integration • Lifecycle Cost Optimization • Reliability-Centered Maintenance (RCM)*
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*

Practical Sessions/Industrial Facility Visit

Site visit will be organized during the course for delegates to practice the theory learnt:-



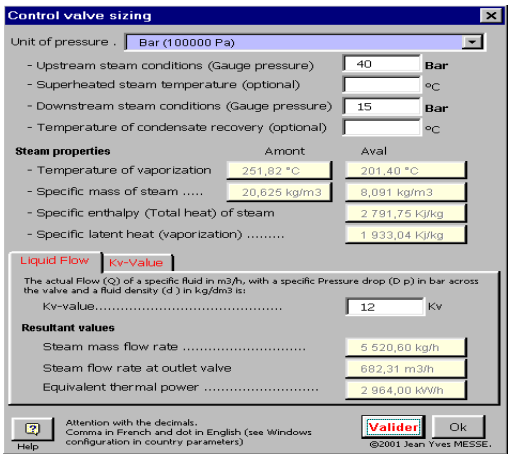



Valve Demo Kit

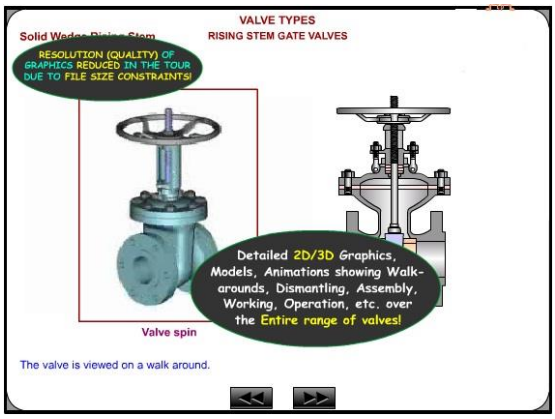
Hands-on demonstration will be held during the course. Proto-type safety relief valves will be temporary given to course participants for demonstration purposes as part of this course.

Simulator (Hands-on Practical Sessions)

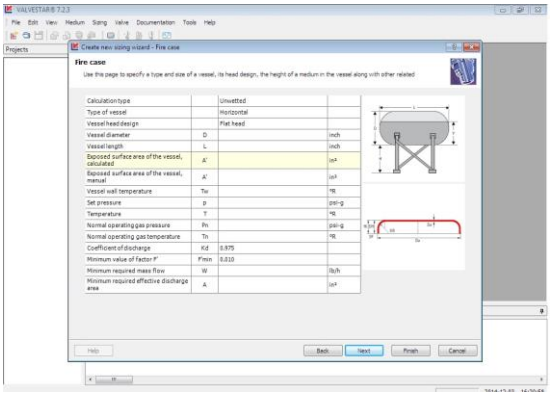
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the state-of-the-art "Valve Sizing Software", "Valve Software 3.0", "Valvestar 7.2 Software" and "PRV2SIZE Software".



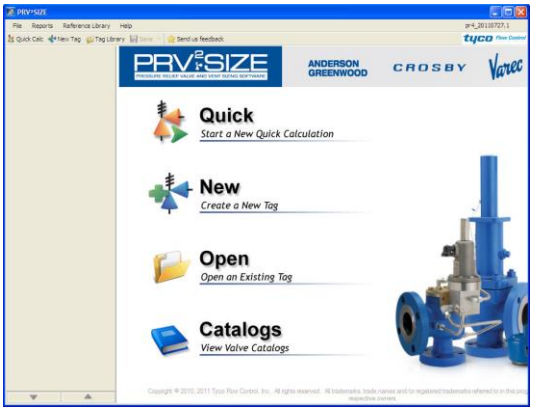
Valve Sizing Software



Valve Software 3.0



Valvestar 7.2 Software



PRV²SIZE Software

Course Coordinator

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