

COURSE OVERVIEW FE0028
API 598: Valve Inspection & Testing

Course Title

API 598: Valve Inspection & Testing

Course Reference

FE0028

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs

Course Date/Venue

Session(s)	Date	Venue
1	April 20-24, 2025	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
2	July 06-10, 2025	TBA Meeting Room, Taksim Square Hotel, Istanbul, Turkey
3	October 05-09, 2025	Al Khobar Meeting Room, Hilton Garden Inn, Al Khobar, KSA



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 Inspection and Testing in accordance with API 598 standards. It covers the isolation valve types according to actuator covering rotary valve and linear valve; the types of actuators, actuator forces, actuator considerations, positioners and fail safe systems; the selection guidelines, application comparisons and computer sizing programmes; the installation issues and type of valve end connections; the face to face criteria and materials selection for process; and the valve material selection and standards covering materials of construction, composite valves, valve component coating and standards and testing of FSV.



During this interactive course, participants will learn the valve sealing solutions and non- asbestos valve sealing system; the physical failures, velocity problems, erosion by cavitation and characteristics and trims; the erosion by abrasion, valve noise and valve vibration; selecting and examining the right valves; the proper storage and handling, inspection, commissioning, operation and routine maintenance; the gate valves, ball valves, butterfly valves, globe valves, relief valves and check valves; and the systematic inspection and testing including overhauling, pressure testing and value certification and retesting.

Course Objectives

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

- Apply and gain an in-depth knowledge on valve inspection and testing in accordance with API 598 standards
- Identify isolation valve types according to actuator covering rotary valve and linear valve
- Recognize the types of actuators, actuator forces, actuator considerations, positioners and fail safe systems
- Explain the selection guidelines, application comparisons and computer sizing programmes
- Discuss installation issues and type of valve end connections, face to face criteria and materials selection for process
- Identify valve material selection and standards covering materials of construction, composite valves, valve component coating and standards and testing of FSV
- Carryout valve sealing solutions and identify non- asbestos valve sealing system
- Recognize physical failures, velocity problems, erosion by cavitation and characteristics and trims
- Describe erosion by abrasion, valve noise and valve vibration
- Select and examine the right valves and apply storage and handling, inspection, commissioning, operation and routine maintenance
- Recognize gate valves, ball valves, butterfly valves, globe valves, relief valves and check valves
- Employ proper inspection and testing including overhauling, pressure testing and value certification and retesting

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 a wide understanding and deeper appreciation for an overview of all significant aspects and considerations of valve inspection and testing in accordance with the international standard API 598 for process, piping, 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 relief devices and engineers 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

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. Manuel Dalas MSc, BSc, is a **Senior Mechanical & Maintenance Engineer** with over **25 years** of industrial experience in **Oil, Gas, Refinery, Petrochemical, Power** and **Nuclear** industries. His wide expertise includes **Gas Turbines & Compressors** Troubleshooting, **Gas Turbines** Performance, Maintenance & Testing, **Gas Turbine Performance** and Optimization, **Gas Turbine Control Systems**, **Advanced Gas Turbine, Gas Turbine Design and Analysis**, **Air Compressor & Gas Turbines** Selection and Design, **Material Cataloguing, Maintenance Planning & Scheduling**, Reliability

Centered Maintenance (RCM), **Reliability Maintenance, Condition Based Maintenance & Condition Monitoring, Asset & Risk Management, Vibration Condition Monitoring & Diagnostics** of Machines, **Vibration & Predictive Maintenance**, Reliability Improvement & Vibration Analysis for Rotating Machinery, Effective Maintenance **Shutdown & Turnaround** Management, **Engineering Codes & Standards, Rotating Equipment** Maintenance, **Mechanical** Troubleshooting, **Static Mechanical Equipment** Maintenance, **Machinery** Failure Analysis, **Machinery Diagnostics & Root Cause Failure Analysis, Plant Reliability & Maintenance** Strategies, **Boiler** Operation & Water Treatment, **Pumps** Maintenance & Troubleshooting, **Fans, Blowers & Compressors, Process Control Valves**, Piping Systems & Process Equipment, Advanced **Valve** Technology, **Pressure Vessel** Design & Analysis, **Steam & Gas Turbine, High Pressure Boiler** Operation, **FRP Pipe** Maintenance & Repair, **Centrifugal & Positive Displacement Pump** Technology Troubleshooting & Maintenance, **Rotating Machinery** Best Practices, **PD Compressor & Gas Engine** Operation & Troubleshooting, **Hydraulic Tools & Fitting, Mass & Material Balance, Water Distribution & Pump Station, Tank Farm & Tank Terminal** Safety & Integrity Management, **Process Piping** Design, Construction & **Mechanical Integrity, Stack & Noise** Monitoring, **HVAC & Refrigeration** Systems, BPV Code, Section VIII, Division 2, **Facility Planning & Energy** Management, Hoist - Remote & Basic **Rigging & Slings, Mobile Equipment** Operation & Inspection, **Heat Exchanger, Safety Relief Valve, PRV & POPRV/PORV, Bearing & Lubrication, Voith Coupling** Overhaul, **Pump & Valve** Technology, **Lubrication** Inspection, **Process Plant** Optimization, Rehabilitation, Revamping & Debottlenecking, Engineering Problem Solving and **Process Plant** Performance & Efficiency. Currently, he is the **Technical Consultant** of the **Association of Local Authorities of Greater Thessaloniki** where he is in charge of the mechanical engineering services for piping, pressure vessels fabrications and ironwork.

During his career life, Mr. Dalas has gained his practical and field experience through his various significant positions and dedication as the **Technical Manager, Project Engineer, Safety Engineer, Deputy Officer, Instructor, Construction Manager, Construction Engineer, Consultant Engineer** and **Mechanical Engineer** for numerous multi-billion companies including the **Biological Recycling Unit** and the **Department of Supplies of Greece, Alpha Bank Group, EMKE S.A, ASTE LLC** and **Polytechnic College of Evosmos**.

Mr. Dalas has a **Master's** degree in **Energy System** from the **International Hellenic University, School of Science & Technology** and a **Bachelor's** degree in **Mechanical Engineering** from the **Mechanical Engineering Technical University of Greece** along with a **Diploma in Management & Production Engineering** from the **Technical University of Crete**. Further, he is a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership and Management (ILM)**, a **Certified Project Manager Professional (PMI-PMP)**, a **Certified Instructor/Trainer**, a **Certified Energy Auditor for Buildings, Heating & Climate Systems**, a **Member** of the **Hellenic Valuation Institute** and the **Association of Greek Valuers** and a **Licensed Expert Valuer Consultant** of the **Ministry of Development and Competitiveness**. He has further delivered numerous trainings, courses, seminars, conferences and workshops 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.

Course Fee

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.
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.
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.

Accommodation

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

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	<i>Registration & Coffee</i>
0800 – 0815	<i>Welcome & Introduction</i>
0815 – 0830	PRE-TEST
0830 - 0945	Valve & Its Types <i>Definition of an Isolation Valve • Isolation Valve Types According to Actuator • Rotary Valve • Linear Valve</i>
0945 - 1000	<i>Break</i>
1000 - 1115	Valve Components Actuators & Regulators <i>Types of Actuators • Actuator Forces • Actuator Considerations • Positioners • Fail Safe Systems</i>
1115 - 1200	Decision for Valve Selection <i>Economic Based Upon Valve Selection • Selection Guidelines • Application Comparisons • Computer Sizing Programmes</i>
1200 - 1215	<i>Break</i>



1215 – 1420	Valve Acceptance & Verifications <i>Installation Issues • Type of Valve End Connections • Face to Face Criteria • Materials Selection for Process • Valve In-House Acceptance</i>
1420 – 1430	Recap <i>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</i>
1430	<i>Lunch & End of Day One</i>

Day 2

0730 - 0845	Valve Material Selection & Standards <i>Materials of Construction • Composite Valves • Valve Component Coating • Standards & Testing of FSV</i>
0845 - 0900	<i>Break</i>
0900 – 1000	Valve Packing, Seals & Seats <i>Valve Sealing Solutions • Non- Asbestos Valve Sealing System • Electric Power Research Institute (EPRI) • Valve Leakage & Packing</i>
1000 - 1100	Valve Failures & Causes <i>Physical Failures • Velocity Problems • Erosion by Cavitation • Characteristics & Trims</i>
1200 - 1215	<i>Break</i>
1100 -1420	Valve Failures & Causes (Cont'd) <i>Erosion by Abrasion • Valve Noise • Valve Vibration • Practical Examples</i>
1420 - 1430	Recap <i>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</i>
1430	<i>Lunch & End of Day Two</i>

Day 3

0730 - 1030	Valves Integrity Assurance <i>Selecting the Right Valves • Examination & Acceptance • ANSI B16.104 • Storage & Handling • Inspecting & Commissioning • Flange Tightening Sequence • Proper Valves Operation • Routine Maintenance</i>
1030 – 1045	<i>Break</i>
1045 - 1245	Gate Valves <i>Gate Valve • Stem Design • Disk Design • Seat Design • Parallel Gate Valve • Wedge Gate Valve • Types of Valves • Expanding Type Gate Valve • Emergency Seat Seal • Pressure Relief</i>
1245 – 1345	Ball Valves <i>Floating Ball Design • Trunnion Ball Design • Trunnion Vs. Floating Ball Design • Seat Material & Seat Face Sealing Design • Automatic Body Cavity Relief • Anti-fire Safe Design • Typical Stem Sealing Arrangement • Double Block and Bleed (DBB)</i>
1345 – 1400	<i>Break</i>





1400 - 1420	Ball Valves (Cont'd) Double Sealing (Double Piston) • Emergency Seat Sealant (Option) • Emergency Stem Sealant (Option) • Body Vent & Drain Feature (Option) • Safety Relief Device • Special Structure of Automatic Pressure Relief Towards Upper Stream • Body Vent & Drain Feature • Standards and Codes for Ball Valves • Control Valve Types
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 - 1030	Butterfly Valves Butterfly Valves Operation • Butterfly Valves Components • Valve Body, Disc, Seat • Butterfly Valves Types • Fire Safe Design • Butterfly Valves Standards • Butterfly Valves Storage • Installation Recommendations • Butterfly Valves Maintenance • Seat Ring Replacement
1030 - 1045	Break
1045 -1245	Globe Valves Globe Valve Body Designs • Valve Seatings • Valve Characteristics • Control Valve Characteristics & System Requirements • Cavitation Control • Applications • Direction of Flow Through Globe Valves
1245 - 1345	Relief Valves Relief Valves • How does a Safety Valve Work? • Pressure Relief Valves
1345 - 1400	Break
1400 - 1420	Relief Valves (Cont'd) Rupture Discs • P&ID • Relief Valve Testing & Calibration
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

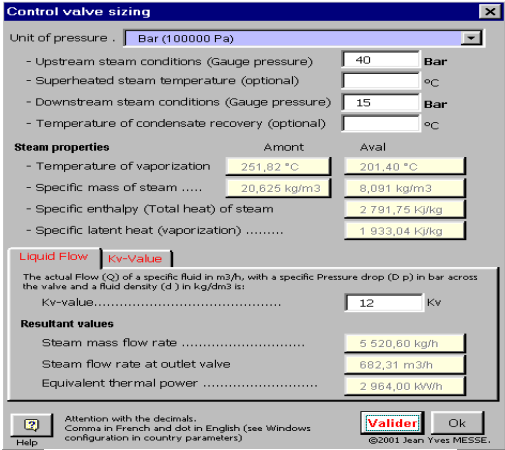
Day 5

0730 - 0930	Check Valves Check Valves Types • Lift Check Valves • Check Valves Split Disk Type • Split Disc Check Valves • Check Valves – Ball Type • Silent Check Valves • Water Hammer
0930 - 0945	Break
0945 - 1130	Inspection & Testing Reasons for Inspection • Shop Inspection/Overhaul • Safety
1130 - 1230	Valve Certification & Retesting API 598 Standard • Inspection • Pressure Tests
1230 - 1245	Break

1245 - 1345	Inspection & Testing (Cont'd) Pressure Test Procedures • Valve Certification & Retesting
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

Simulators/Equipments (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 Software”, “Valve Software 3.0”, “Valvestar 7.2 Software” and “PRV2SIZE 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	20.625 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

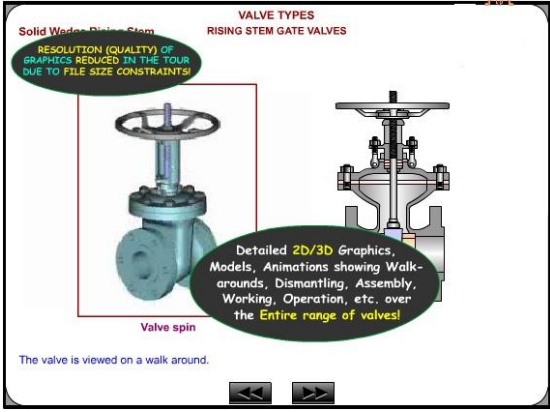
The actual Flow (Q) of a specific fluid in m³/h, with a specific Pressure drop (D p) in bar across the valve and a fluid density (d) in kg/dm³ is:

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) | iValider | OK | Help



VALVE TYPES
RISING STEM GATE VALVES

Solid Wedge Rising Stem

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

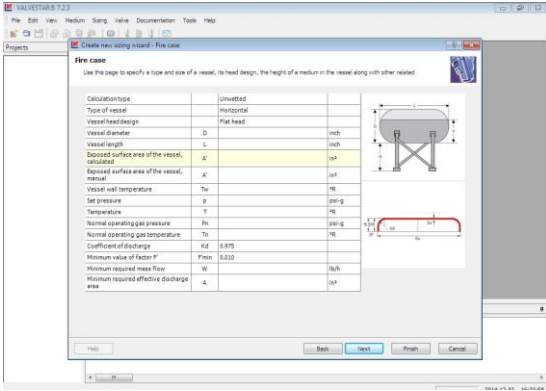
Detailed 2D/3D Graphics, Models, Animations showing Walk-arounds, Dismantling, Assembly, Working, Operation, etc. over the Entire range of valves!

Valve spin

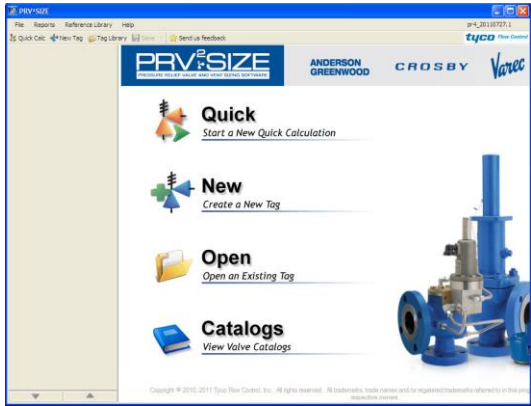
The valve is viewed on a walk around.

Valve Sizing Software

Valve Software 3.0



Valvestar 7.2 Software



PRV²SIZE Software

Course Coordinator

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