

COURSE OVERVIEW PE0172
API 521: Pressure Relieving & De-Pressuring Systems

Course Title

API 521: Pressure Relieving & De-Pressuring Systems

Course Reference

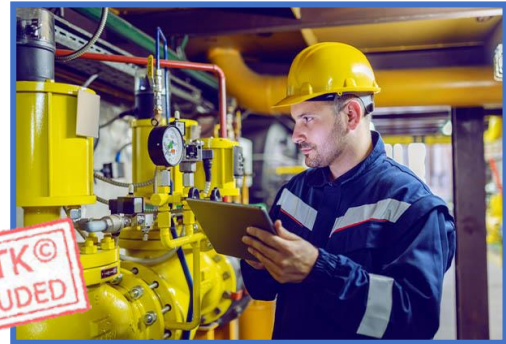
PE0172

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs

Course Date/Venue

Session(s)	Dates	Venue
1	January 21-25, 2024	Al Aziziya Hall, The Proud Hotel Al Khobar, Al Khobar, KSA
2	April 28-May 02, 2024	Boardroom, Warwick Hotel Doha, Doha, Qatar
3	July 14-18, 2024	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
4	October 21-25, 2024	Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE



Course Description



This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt in the class will be applied using the following practical methods:

(1) 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.



(2) Valve Simulator: Participants will use in the class our state-of-the-art valve simulators to practice some of the skills learnt.



This course is designed to provide participants with a detailed and up-to-date overview Pressure Relieving & De-Pressuring Systems in accordance with API 521 Standards. It covers the historical context, development, scope, purpose and interpretation of API 521; the design and safety considerations; the basic components of a pressure relief system; the safety valves and relief valves; the types, design and operation; the potential issues, challenges and troubleshooting common RV adequacy issues; the inlet pressure drop and its implications; and the solutions for inlet pressure drop 3% deviation.

During this interactive course, participants will learn the risks and solutions for dealing with oversized RVs; the risks of undersized knock out (KO) vessels and the solutions for dealing with undersized KO vessels; the importance of PRVs revalidation; the step-by-step guide on PRVs revalidation; the adequacy of KO vessels; the techniques to improve adequacy of KO vessels; the depressuring systems and fire case considerations under API 521; dealing with environmental, legal and economic constraints; and the best practices in managing pressure relieving and depressuring systems.

Course Objectives

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

- Apply and gain an in-depth knowledge on pressure relieving and de-pressuring systems in accordance with API 521
- Discuss the historical context and development as well as the scope, purpose and interpretation of API 521
- Explain the design and safety considerations as well as the basic components of a pressure relief system
- Identify safety valves and relief valves including their types, design and operation
- Analyze potential issues and challenges and troubleshoot common RV adequacy issues
- Explain inlet pressure drop and its implications as well as the solutions for inlet pressure drop 3% deviation
- Discuss the risks and solutions for dealing with oversized RVs
- Recognize the risks of undersized knock out (KO) vessels and the solutions for dealing with undersized KO vessels
- Discuss the importance of PRVs revalidation and apply the step-by-step guide on PRVs revalidation
- Identify adequacy of KO vessels as well as the techniques to improve adequacy of KO vessels
- Recognize depressuring systems and fire case considerations under API 521
- Deal with environmental, legal and economic constraints and apply best practices in managing pressure relieving and depressuring systems

Exclusive Smart Training Kit - H-STK®



Participants of this course will receive the exclusive “Howard 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 relieving and de-pressuring systems in accordance with API 521 for process engineers involved in relief and flare selection and sizing; operation engineers who have oversight responsibility for flare design and operation; and technical personnel and supervisors involved in supporting relief flare operation.

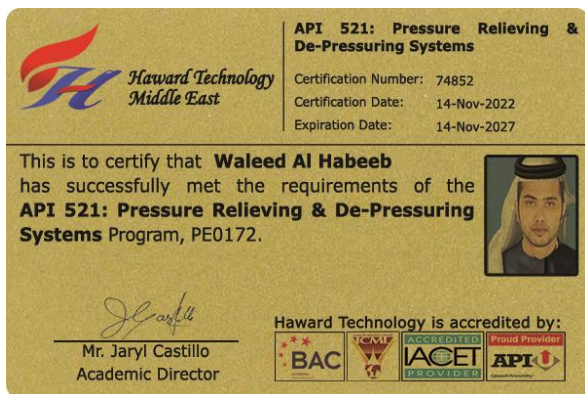
Course Certificate(s)

- (1) Internationally recognized Wall Competency Certificates and Plastic Wallet Card Certificates will be issued to participants who completed a minimum of 80% of the total tuition hours and successfully passed the exam at the end of the course. Certificates are valid for 5 years.

Recertification is FOC for a Lifetime.

Sample of Certificates

The following are samples of certificates that will be awarded to course participants:-


API 521: Pressure Relieving & De-Pressuring Systems

Certification Number: 74852
 Certification Date: 14-Nov-2022
 Expiration Date: 14-Nov-2027

This is to certify that **Waleed Al Habeeb** has successfully met the requirements of the **API 521: Pressure Relieving & De-Pressuring Systems** Program, PE0172.

Mr. Jaryl Castillo
Academic Director

Haward Technology is accredited by:




API 521: Pressure Relieving & De-Pressuring Systems

Certification Program

This program is designed to assist companies in identifying professionals who have satisfied the minimum competencies specified in PE0172.

Haward Technology does not warrant or guarantee the performance of any professional certified under this program.

Haward Technology is accredited by:



74852



- (2) Official Transcript of Records will be provided to the successful delegates with the equivalent number of ANSI/IACET accredited Continuing Education Units (CEUs) earned during the course.

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Haward Technology Middle East
Continuing Professional Development (HTME-CPD)

CEUs

CEU Official Transcript of Records

TOR Issuance Date: 14-Nov-22
HTME No. 74852
Participant Name: Waleed Al Habeeb

Program Ref.	Program Title	Program Date	No. of Contact Hours	CEU's
PE0172	API 521: Pressure Relieving & De-Pressuring Systems	November 10-14, 2022	30	3.0

Total No. of CEU's Earned as of TOR Issuance Date **3.0**

TRUE COPY

Jaryl Castillo
 Academic Director

Haward Technology has been approved as an Authorized Provider by the International Association for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this approval, Haward Technology has demonstrated that it complies with the ANSI/IACET 1-2013 Standard which is widely recognized as the standard of good practice internationally. As a result of their Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for programs that qualify under the ANSI/IACET 1-2013 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 Association 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 is accredited by




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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.

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 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, PEng, MSc, BSc, is a Senior Process Engineer with over 25 years of industrial experience within the Oil & Gas, Refinery, Petrochemical and Refinery industries. His expertise widely includes in the areas of Pressure Relief Valves, Pressure Vessels Maintenance & Operation, Piping Support, Ironworks, Rotating & Static Equipment (Pumps, Valves, Boilers, Pressure Vessels, nks, Heat Exchangers, Bearings, Compressors, Pipelines, Motors, Turbines, Gears, Seals), Crude Distillation Process, Saturation Gas Process Technology, Crude Dehydration & Desalting, Crude Stabilization Operations, Process Plant Performance & Efficiency, Heat Exchangers & Fired Heaters Operation & Troubleshooting, Process Plant Optimization, Revamping & Debottlenecking, Process Plant Troubleshooting & Engineering Problem Solving, Mass & Material Balance, Oil & Gas Processing, Oil Field Operation, Process Plant Operation & Troubleshooting, Hydrogen Sulphide Stripping, Crude Oil De Salting Process, Gas Conditioning, NGL Recovery & NGL Fractionation, Flare Systems, Pre-Fabrication of Steel Structure, Alloy Piping Pre-Fabrication, Heat Exchangers, Vertical Columns/Pressure Vessels, Distillation Column, Steel Structures, Construction Management, Building Structures and Electrical-Mechanical Equipments. Further, he is also a well-versed in Materials Management, Inventory Control and Workplace Housekeeping. 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, Construction Manager, Project Engineer, Production Engineer, Construction Engineer, Consultant Engineer, Technical Consultant, Safety Engineer, Mechanical Engineer, External Collaborator, Deputy Officer** for various companies including the Alpha Astika, Anamorfosis Technical Firm, EKME, ASTE, Etof Consulting and Hypergroup.

Mr. Dalas is a **Registered Professional Engineer** and has a **Master's** degree in **Energy System** from the **International Hellenic University** and a **Bachelor's** degree in **Mechanical Engineering** from the **Mechanical Engineering Technical University, 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.

Accommodation

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

Course Fee

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.
Doha	US\$ 6,500 per Delegate. 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.
Abu Dhabi	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.

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 – 0930	Overview of API 521: Historical Context & Development
0930 – 0945	<i>Break</i>
0945 – 1100	API 521: Scope, Purpose & Interpretation
1100 – 1215	Overview of Pressure Relief Systems: Design & Safety Considerations
1215 – 1230	<i>Break</i>
1230 – 1330	Basic Components of a Pressure Relief System
1330 – 1420	Introduction to Pressure Relief Devices: Safety Valves & Relief Valves
1420 – 1430	Recap
1430	<i>Lunch & End of Day One</i>

Day 2

0730 – 0830	Detailed Study on Relief Valves (RVs): Types, Design & Operation
0830 – 0930	Analysis of Potential Issues & Challenges with RVs
0930 – 0945	<i>Break</i>
0945 – 1100	Case Studies: How to Assess Adequacy of RVs
1100 – 1215	Practical Session: Troubleshooting Common RV Adequacy Issues
1215 – 1230	<i>Break</i>
1230 – 1330	Introduction to Inlet Pressure Drop & Its Implications
1300 – 1420	Solutions for Inlet Pressure Drop 3% Deviations
1420 – 1430	Recap
1430	<i>Lunch & End of Day Two</i>



Day 3

0730 – 0830	Understanding the Risks of Oversized RVs
0830 – 0930	Solutions for Dealing with Oversized RVs
0930 – 0945	Break
0945 – 1100	Case Studies: Real-World Applications & Lessons Learned
1100 – 1215	Understanding the Risks of Undersized Knock Out (KO) Vessels
1215 – 1230	Break
1230 – 1330	Solutions for Dealing with Undersized KO Vessels
1300 – 1420	Case Studies: Real-World Applications and Lessons Learned
1420 – 1430	Recap
1430	Lunch & End of Day Three

Day 4

0730 – 0830	Importance of PRVs Revalidation: When & Why?
0830 – 0930	Process for PRVs Revalidation: Step-by-step Guide
0930 – 0945	Break
0945 – 1100	Practical Session: Hands-on PRVs Revalidation
1100 – 1215	Understanding & Identifying Adequacy of KO Vessels
1215 – 1230	Break
1230 – 1330	Techniques to Improve Adequacy of KO Vessels
1300 – 1420	Case Studies: Real-World Scenarios & Solutions
1420 – 1430	Recap
1430	Lunch & End of Day Four

Day 5

0730 – 0830	In-depth Look at Depressuring Systems
0830 – 0930	Fire Case Considerations under API 521
0930 – 0945	Break
0945 – 1100	Understanding & Dealing with Environmental, Legal & Economic Constraints
1100 – 1230	Best Practices in Managing Pressure Relieving & Depressuring Systems
1230 – 1245	Break
1245 – 1330	Review of Key Learnings from the Course
1330 – 1345	Q&A, Course Evaluation & Closing
1345 – 1400	Course Conclusion
1400 – 1415	POST TEST
1415 – 1430	Presentation of Course Certificates
1430	Lunch & End of Course



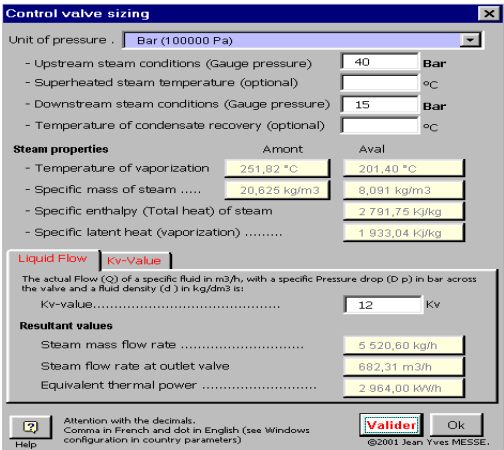
Valve Demo Kit

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”.



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

Amont	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 (ρ) in kg/dm³ is:

Kv-value: 12 Kv

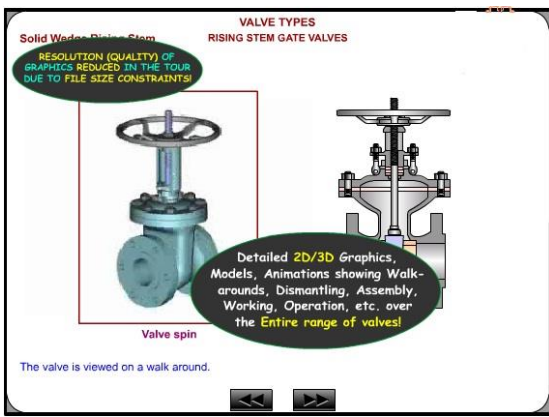
Resultant values

Steam mass flow rate	5 520,60 kg/h
Steam flow rate at outlet valve	682,31 m ³ /h
Equivalent thermal power	2 864,00 kW/h

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

Validier OK

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VALVE TYPES

RISING STEM GATE VALVES

Solid Welder-Rising Stem

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

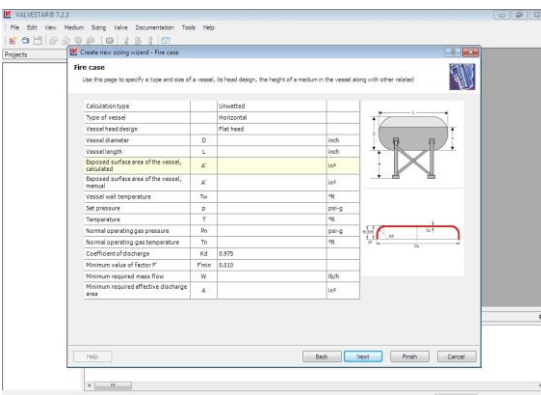
Detailed 2D/3D Graphics, Models, Animations showing Walk-arounds, Dismantling, Assembly, Working, Operation, etc. over the Entire range of valves!

Valve spin

The valve is viewed on a walk around.

Valve Sizing Software

Valve Software 3.0



VALVESTAR 7.2

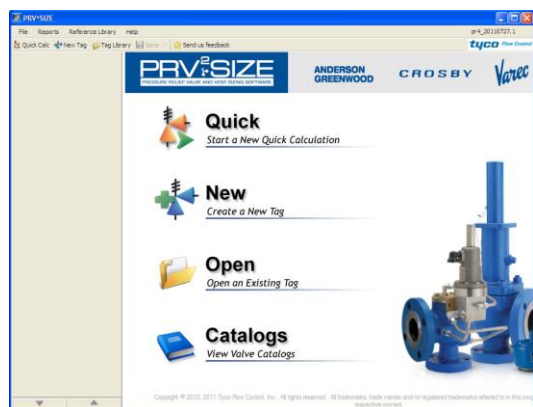
File Edit View Medium Sing Value Documentation Tools Help

Project: **Case** (Create new, modify, delete, File case)

Use this page to specify a type and size of a vessel, its head design, the height of a medium in the vessel along with other related

Calculation type	Unsettled
Type of vessel	Horizontal
Vessel head design	Flat head
Vessel diameter	D
Vessel length	L
Exposed surface area of the vessel, calculated	A
Exposed surface area of the vessel, manual	A
Vessel wall temperature	T _w
Set pressure	p
Temperature	T
Normal operating pressure	P _N
Normal operating temperature	T _N
Coefficient of discharge	K _d 0,875
Minimum value of Factor P	P _{min} 0,02
Minimum required mass flow	W
Minimum required effective discharge area	A

Back Next Finish Cancel



PRV2SIZE

File Reports Reference Library Help

Quick Calc. Main Tag Top Library

ANDERSON GREENWOOD CROSBY Valtec tyco Flow Control

Quick
Start a New Quick Calculation

New
Create a New Tag

Open
Open an Existing Tag

Catalogs
View Valve Catalogs

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Valvestar 7.2 Software

PRV²SIZE Software

Course Coordinator

Kamel Ghanem, Tel: +971 2 30 91 714, Email: kamel@haward.org