



COURSE OVERVIEW PE0263

Fired Heaters, Air Coolers, Heat Exchangers, Pumps, Compressors, Pressure Vessels & Valves

Course Title

Fired Heaters, Air Coolers, Heat Exchangers, Pumps, Compressors, Pressure Vessels & Valves

Course Date/Venue

December 08-12, 2024/Boardroom, Warwick Hotel Doha, Doha, Qatar

Course Reference

PE0263

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.

This course is designed to provide delegates with a detailed and up-to-date overview of fired heaters, air coolers, heat exchangers, pumps, compressors, crude desalter, pressure vessels & valves operations. It covers the objective and equipment layout of process equipment; developing of static and dynamic head in the operating volume of pumps for efficiency and control operation; the affinity laws as tools for efficient operation, pump auxiliaries, wear components, canned motor and magnetic drive pumps, flow pumps, servicing and condition monitoring; the main features of various types of compressors; the compressors classification based on design and application; the types, styles and configurations of centrifugal and axial compressors; and the main elements of centrifugal compressor construction and efficiency.



During this interactive course, participants will learn the compressor operation; the fin fan cooler including its types, operational efficiency and capacity control; the operation and troubleshooting of cooler; the heaters and their types, construction and operating parameters and inspection/testing requirements; the types and basic parts of furnaces; the fuel gas system of burners, gas burners, oil burners, flame impingement, draft and observations during normal operation; the heat exchangers, process vessels and valves; and the troubleshooting of different equipment and processes.



Course Objectives

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

- Apply and gain an in-depth knowledge on fired heaters, air coolers, heat exchangers, pumps, compressors, crude desalter, pressure vessels & valves operations
- Discuss process equipment including its objective and equipment layout
- Develop static and dynamic head in the operating volume of pumps for efficiency and control operation
- Discuss the affinity laws as tools for efficient operation, pump auxiliaries, wear components, canned motor and magnetic drive pumps, flow pumps, servicing and condition monitoring
- Explain the main features of various types of compressors, classify compressors based on design and application including world standards and codes related to compressor
- Identify the types, styles and configurations of centrifugal compressors and axial compressors
- Explain the main elements of centrifugal compressor construction and analyze centrifugal compressor efficiency
- Employ guidelines for trouble-free centrifugal compressor operation including troubleshooting, inspection and maintenance
- Operate compressor by analysing curves for surge, stall and choke as well as define appropriate equipment for safe operation
- Recognize fin fan cooler including its types, operational efficiency and capacity control
- Operate and troubleshoot cooler through key operational considerations and proper troubleshooting
- Discuss heaters and their types, construction and operating parameters, inspection/testing requirements
- Identify the types and basic parts of furnaces including their efficient operation and air control
- Analyze the fuel gas system of burners, gas burners, oil burners, flame impingement, draft and observations during normal operation
- Differentiate heat exchangers, process vessels and valves
- Troubleshoot different equipment and processes in a professional manner

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 an overview of all significant aspects and considerations of operation of process equipment for engineers, design engineers, maintenance staff and other technical staff.

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: -

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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.

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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. Mike Poulos, MSc, BSc, is a Senior Process Engineer with over 35 years of industrial experience within the Utilities, Refinery, Petrochemical and Oil & Gas industries. His expertise lies extensively in the areas of Process Equipment Design & Troubleshooting, Petroleum Processing, Process Design Specifications, Process Calculation Methods, Equipment Sizing & Selection, Piping, Pumps, Compressors, Heat Exchangers, Air Coolers, Direct-Fired Heaters, Process Vessels, Fractionator Columns, Reactors, Ancillary Equipment, Mechanical & Safety Aspects, Cost Estimation, Commissioning & Start-Up, Production & Cost Reduction, Reactor Building Ventilation System, PVC Initiators Storage Bunkers, PVC Modernization & Expansion, PVC Reactor, PVC Plant Reactors Pre-Heating, PVC Plant Start-Up & Commissioning, PVC Plant Shutdown, PVC Driers Automation, VCM Recovery, VCM Sphere Flooding System, VCM Storage Tanks, Steam Tripping Facilities, Solvents Plant Automation Commissioning & Start-Up and Inferential Properties System. Further, he is also well-versed in Advanced Process Control Technology, Designing Process Plant Fail-Safe Systems, Quantitative Risk Assessment, On-Line Statistical Process Control, Principles and Techniques of Contemporary Management, Rosemount RS3, Polymer Additives, Polymer Reaction Engineering, Polymer Rheology and Processing, GRID Management and Batch Process Engineering.

During his career life, Mr. Poulos held significant positions as the **Chemical Plants Technology Engineer, PVC Plant Production Engineer, PVC Plant Shutdown Coordinator, PVC Plant/CC Solvents Plants Acting Section Head and Chemical Distribution Section Head** from Hellenic Petroleum, wherein he was responsible for the development of integrated system.

Mr. Poulos has **Master's and Bachelor's degrees in Chemical Engineering** from the **University of Massachusetts and Thessaloniki Polytechnic** respectively. Further, he is a **Certified Instructor/Trainer, a** and a **member of the Greek Society of Chemical Engineers and Greek Society of 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\$ 6,000 per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

In addition to the Course Manual, participants will receive an e-book “Operator’s Guide to Rotating Equipment: An Introduction to Rotating Equipment Construction, Operating Principles, Troubleshooting and Best Practices”, published by AuthorHouse.

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: Sunday, 08th of December 2024

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|-------------|--|
| 0730 – 0800 | Registration & Coffee |
| 0800 – 0815 | Welcome & Introduction |
| 0815 – 0830 | PRE-TEST |
| 0830 – 0930 | Introduction to Process Equipment Process Equipment Objective • Types of Process Plants • Process Equipment Layout • Rotating Equipment • Stationery Equipment |
| 0930 – 0945 | Break |
| 0945 – 1100 | Pumps Development of Static and Dynamic Head in the Operating Volume of Pumps for Efficiency and Control Operation • The Affinity Laws as Tools for Efficient Operation • Pump Auxiliaries |
| 1100 – 1230 | Pumps (cont’d) Wear Components • Canned Motor and Magnetic Drive Pumps • High Speed/Low Flow Pumps • Servicing and Condition Monitoring |
| 1230 – 1245 | Break |
| 1245 – 1420 | Compressor Overview Overview of the Main Features of Various Types of Compressors • Classification of Compressors Based on Design and Application • World Standards and Codes Related to Compressor Design |
| 1420 – 1430 | Recap |
| 1430 | Lunch & End of Day One |





Day 2: Monday, 09th of December 2024

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|-------------|--|
| 0730 – 0930 | Types of Compressors Types, Styles and Configurations of Centrifugal and Axial Compressors • Construction Features • Mode of Operation • Compressor Auxiliaries and Support Systems |
| 0930 – 0945 | Break |
| 0945 – 1100 | Centrifugal Compressor Main Elements of Centrifugal Compressor Construction • Analysis of Centrifugal Compressor Efficiency • Guidelines for Trouble-free Centrifugal Compressor Operation |
| 1100 – 1230 | Centrifugal Compressor (cont'd) Troubleshooting Inspection and Maintenance • Centrifugal Compressors Anti Surge System and Surge Protection • Case Studies About Centrifugal Compressors |
| 1230 – 1245 | Break |
| 1245 – 1420 | Compressor Operation Analyse Operating Curves for Surge, Stall and Choke • Define Appropriate Equipment for Safe Operation |
| 1420 – 1430 | Recap |
| 1430 | Lunch & End of Day Two |

Day 3: Tuesday, 10th of December 2024

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|-------------|--|
| 0730 – 0930 | Fin Fan Cooler Types • Operational Efficiency • Capacity Control |
| 0930 – 0945 | Break |
| 0945 – 1100 | Cooler Operating & Troubleshooting Key Operational Considerations • Air vs Water Cooling • Troubleshooting |
| 1100 – 1230 | Heater Heaters and their Types • Construction & Operating Parameters • Inspection/Testing Requirements |
| 1230 – 1245 | Break |
| 1245 – 1420 | Furnaces Types of Furnaces • Furnace Basic Parts • Efficient Operation, Air Control etc |
| 1420 – 1430 | Recap |
| 1430 | Lunch & End of Day Three |

Day 4: Wednesday, 11th of December 2024

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|-------------|---|
| 0730 – 0930 | Fuel Gas System Burners • Gas Burners • Oil Burners |
| 0930 – 0945 | Break |
| 0945 – 1100 | Fuel Gas System (cont'd) Flame Impingement • Draft • Observations During Normal Operation |
| 1100 – 1230 | Heat Exchangers Types • Shell-and-Tube |
| 1230 – 1245 | Break |
| 1245 – 1420 | Heat Exchangers (cont'd) Heat Transfer Relation |
| 1420 – 1430 | Recap |
| 1430 | Lunch & End of Day Four |

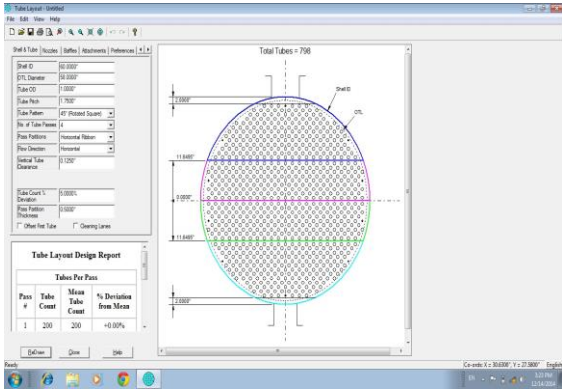


Day 5: Thursday, 12th of December 2024

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| 0730 – 0930 | Process Vessels Types and Functions • Safety Aspects |
| 0930 – 0945 | Break |
| 0945 – 1215 | Valves Valve Theory • Valve Types • Applications |
| 1215 – 1230 | Break |
| 1230 – 1245 | Valves (cont'd) Function • Operation • Troubleshooting |
| 1245 – 1345 | Troubleshooting of Different Equipment & Processes |
| 1345 – 1400 | Course Conclusion |
| 1400 – 1415 | POST-TEST |
| 1415 – 1430 | Presentation of Course Certificates |
| 1430 | Lunch & End of Course |

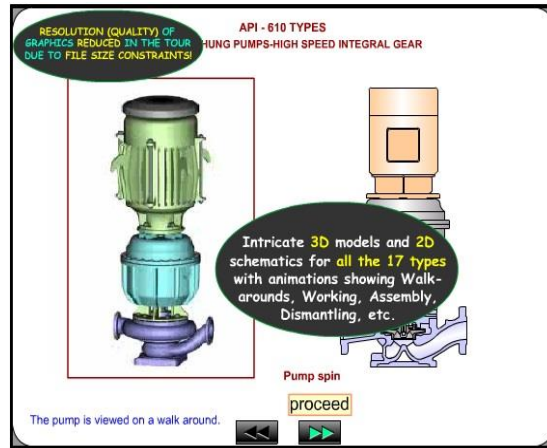
Simulator (Hands-on Practical Sessions)

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 our state-of-the-art simulators “Heat Exchanger Tube Layout”, “Centrifugal Pumps and Troubleshooting Guide 3.0”, “SIM 3300 Centrifugal Compressor”, “CBT on Compressors”, “Valve Sizing Simulator”, “Valve Simulator 3.0”, “Valvestar 7.2 Simulator”, “PRV²SIZE Simulator”, and “ASPEN HYSYS V12.1” simulator.

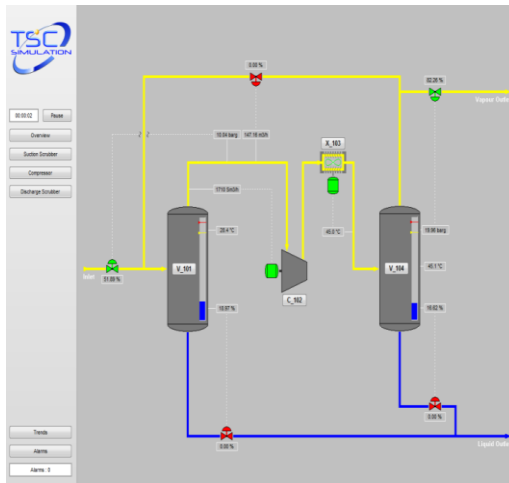


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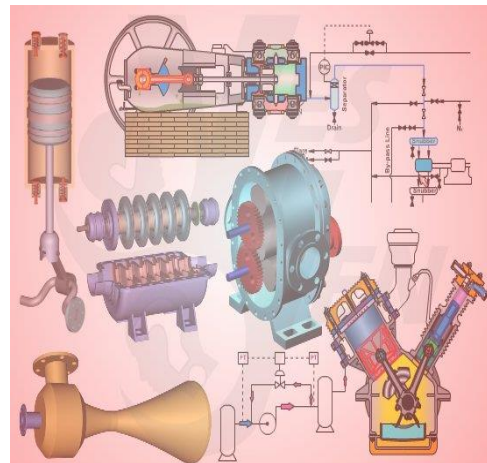
Heat Exchanger Tube Layout Simulator



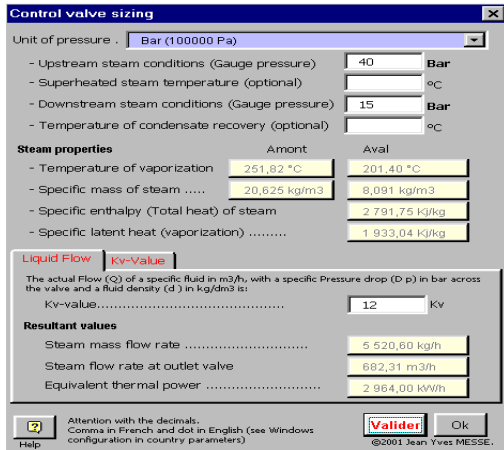
Centrifugal Pumps and Troubleshooting Guide



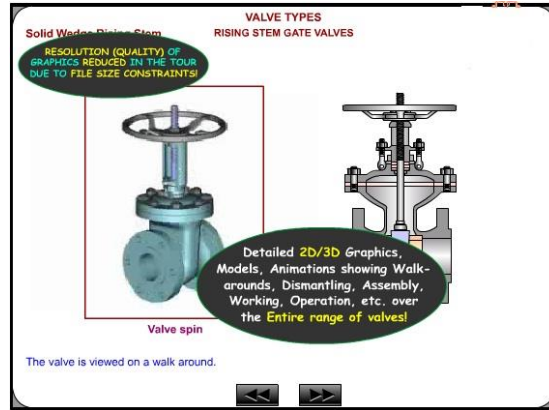
SIM 3300 Centrifugal Compressor Simulator



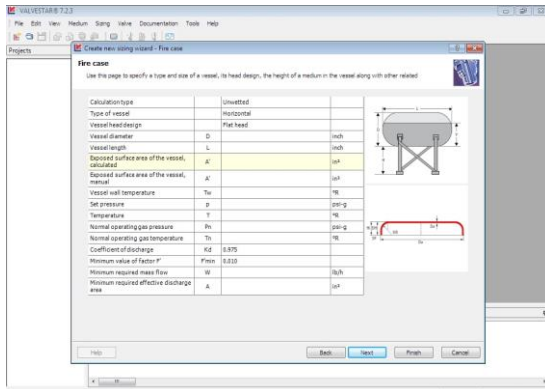
CBT on Compressors



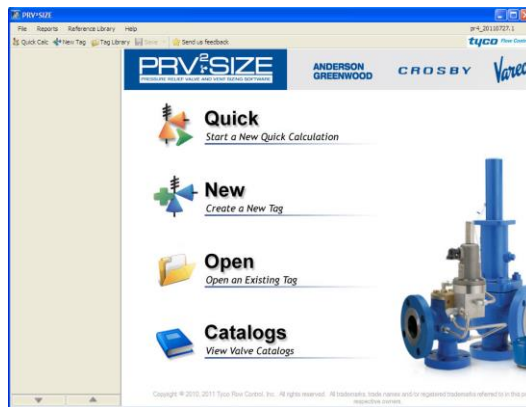
Valve Sizing Simulator



Valve Simulator 3.0

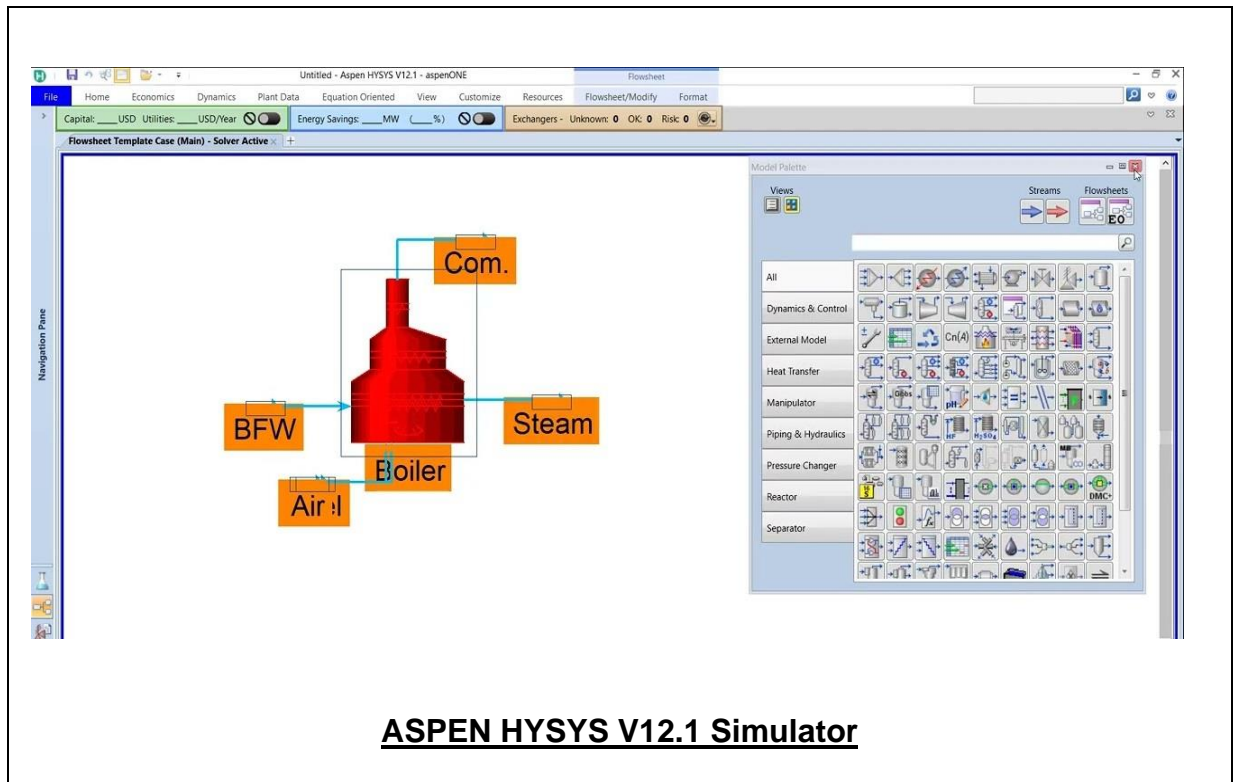


Valvestar 7.2 Simulator



PRV²SIZE Simulator





Book(s)

As part of the course kit, the following e-book will be given to all participants:

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|--|--|
| | <p>Title : Operator's Guide to Rotating Equipment: An Introduction to Rotating Equipment Construction, Operating Principles, Troubleshooting and Best Practices</p> <p>ISBN : 978-1-49690-868-1</p> <p>Authors : Julien LeBleu Robert Perez</p> <p>Publisher : AuthorHouse</p> |
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Course Coordinator

Jaryl Castillo, Tel: +974 4423 1327, Email: jaryl@haward.org