COURSE OVERVIEW PE0221
Operation of Process Equipment
Fired Heaters, Air Coolers, Heat Exchangers, Pumps, Compressors, Crude Desalter, Pressure Vessels & Valves

Course Title
Operation of Process Equipment: *Fired Heaters, Air Coolers, Heat Exchangers, Pumps, Compressors, Crude Desalter, Pressure Vessels & Valves*

Course Date/Venue
Please refer to page 3

Course Reference
PE0221

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.

The course is designed to provide delegates with a detailed and up-to-date overview on the operation of the hydrocarbon process equipment that includes fired heaters, air coolers, heat exchangers, pumps, compressors, crude desalter, pressure vessels and valves.

It covers the characteristics of crude oil and function of chemicals used in the process such as composition of petroleum, hydrocarbon properties, salt concentration and emulsions.

At the completion of the course, participants will be able to apply oil treating; dehydration and desalting; process and equipment operations; and employ the sequence of desalter plant start-up.

The course will also cover the different types and function of direct fired heaters; safety aspects; air coolers; heat exchangers; pumps; compressors; process vessels; valves; and troubleshooting of different equipment and processes.

Course Objectives

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

- Apply proper techniques and procedures on the operation of the hydrocarbon process equipment such as fired heaters, air coolers, heat exchangers, pumps, compressors, crude desalter, pressure vessels and valves
- Enumerate the characteristics of crude oil and identify the function of chemicals used in the process such as composition of petroleum, hydrocarbon properties, salt concentration and emulsions
- Discuss oil treating, dehydration and desalting including the process and equipment operations
- Employ the sequence of desalter plant start-up and identify the different types and function of direct fired heaters including the safety aspects
- Differentiate the various types of air coolers, heat exchangers, pumps and compressors
- Describe the types and functions of process vessels and valves including the troubleshooting of different equipment and processes

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 operational aspects of the hydrocarbon process equipment for engineers and other technical staff who are involved in the operation and troubleshooting of various process equipment including fired heaters, air coolers, heat exchangers, pumps, compressors, crude desalter, pressure vessels and valves. The course is also beneficial for design engineers and maintenance staff.

Accommodation

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

Course Date/Venue

Session(s)	Date	Venue
1	May 31-June 04, 2026	Pierre Lotti Meeting Room, Movenpick Hotel Istanbul Golden Horn, Istanbul, Turkey
2	July 05-09, 2026	Ruben Boardroom, The Rubens at The Palace, Buckingham Palace Road, London, United Kingdom
3	August 08-12, 2026	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
4	September 20-24, 2026	Meeting Room 4, Four Seasons Hotel Cairo at Nile Plaza, Corniche El Nil, Garden City, Cairo, Egypt
5	October 18-22, 2026	Meeting Plus 9, City Centre Rotana, Doha, Qatar
6	December 13-17, 2026	Salon Expo, NH Hotel Plaza de Armas, Seville, Spain
7	January 10-14, 2027	Meeting Room 4, Four Seasons Hotel Cairo at Nile Plaza, Corniche El Nil, Garden City, Cairo, Egypt
8	February 08-12, 2027	Ruben Boardroom, The Rubens at The Palace, Buckingham Palace Road, London, United Kingdom
9	March 14-18, 2027	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE

Course Fee

Doha	**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.
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.
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.
London	**US$ 8,800** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Seville	**US$ 8,800** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Cairo	**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 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:

Mr. Henry Beer is a **Senior Process Engineer** with over **35 years** of indepth industrial experience within the **Petrochemical**, **Oil & Gas** industries specializing in **Hydrocarbon Process** Equipment, **DOX Unit** Operation & Troubleshooting, **Polyethylene & Polypropylene** Processing, **Oil Movement** Storage & Troubleshooting, **Power Plant Chemistry**, **Fuel Quality** Monitoring System Fundamentals, **Liquid Bulk Cargo Handling**, **Oil Refinery Cost Management**, **Flare & Blowdown** Operation, **Pressure Relief Systems** Maintenance & Troubleshooting, Refinery **SRU**, **Tail Gas** Treating, **Sour Water & Amine Recovery** Units, **Propylene** Compressor and Turbine, **Clean Fuel** Technology & Standards, Principles of **Operations Planning**, **Heat Exchangers & Fired Heaters** Operation & Troubleshooting, **Plastic Extrusion Technology** Operation & Troubleshooting, **Chemical Engineering** for Non-Chemical Engineers, **Process Plant** Troubleshooting, **Process Plant Optimization** Technology, **Engineering Problem Solving**, **Process Plant** Performance & Efficiency, **Process Plant** Start-up & Shutdown, **Process Plant** Commissioning, **Process Plant** Turn-around & Shutdown, **Pumps & Compressors** Troubleshooting, **Fired Heaters & Air Coolers** Maintenance, **Pressure Vessels & Valves** Repair, **Polymers**, **Plastics**, **Polyolefin** & **Catalysts**, **Polymerization**, **Thermal Analysis Techniques**, **Rheology**, **Thermoplastics**, **Thermosets**, **Coating Systems** and **Fibre Reinforced Polymer Matrix Composites**. Further, he is also well-versed in **Water Hydraulic Modelling**, **Efficient** Shutdowns, Turnaround & Outages, **Pump** Selection and Installation, Operation and Maintenance of **Pumps**, **Demand & Supply** Management, **Catalyst Manufacturing Techniques**, **Fuel Systems Management**, **Aviation Fuel**, **Diesel**, **Jet Fuel**, **Petrol** and **IP Octane**, **Cetane Control** and related Logistics, Road, Rail and Pipeline Distribution, **Process Design** and **Optimisation**, **Boiler Feed Water Preparation**, **Flocculation Sedimentation**, **Hot Lime Water Softening Processes**, **Desalination Processes**, **Reverse Osmosis**, **Molecular Sieves**, activated **Sludge Aerobic/Anaerobic**, **Sludge Removal** and **Incineration Process Control**, **Domestic Sewage Plants Optimisation**, **Process Cooling Water System**, **High Pressure** and **Low Pressure Tank Farm Management**, **Hydrocarbon** and **Chemical products** and **GTL** (**Gas to Liquids**).

During his career life, Mr. Beer holds significant key positions such as the **Director**, **Global Commissioning Manager**, **Process Engineering Manager**, **Senior Business Analyst**, **Process Engineer**, **Chemical Engineer**, **Senior Technician**, **Technical Sales Engineer**, **Entrepreneur**, **Financial Consultant**, **Business Analyst**, **Business Financial Planner** and **Independent Financial Planner** to various international companies such as the **Sasol**, **SASOLChem**, **TAG Solvents**, **Virgin Solvent Products**, **SARS** & **SAPIA** (**South African Petroleum Industry Association**) and **RFS Financial Servi**

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 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	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Characteristics of Crude Oil*** *Composition of Petroleum ● Hydrocarbon Gases Properties*
0930 – 0945	*Break*
0945 – 1100	***Characteristics of Crude Oil (cont'd)*** *Salts Concentration ● Emulsions ● Function of Chemicals Used in the Process*
1100 – 1230	***Oil Treating, Dehydration & Desalting*** *Emulsion Formation & Breaking ● Vertical & Horizontal Theater Operation ● Electrostatic Theatre Design/Operation ● The Desalting Process/Equipment ● Emulsion Treating*
1230 – 1245	*Break*
1245 – 1420	***Oil Treating, Dehydration & Desalting (cont'd)*** *Separators – Free Water Knockout ● Heater Theatres – Other Treating Methods ● Chemical – Electrical – Crude Oil Coolers (Heat Exchangers) ● Control Valves Principles ● Pumps Operation ● Air Compressor Operation*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0930	***Sequence of Desalter Plant Start-up***
0930 – 0945	*Break*
0945 – 1100	***Sequence of Desalter Plant Start-up (cont'd)***
1100 – 1230	***Direct-Fired Heaters*** *Design Considerations – Process & Combustion*
1230 – 1245	*Break*
1245 – 1420	***Direct-Fired Heaters (cont'd)*** *Control System*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0930	***Air Coolers*** *Types – Forced and Induced Air ● Key Operational Considerations*
0930 – 0945	*Break*
0945 – 1100	***Air Coolers (cont'd)*** *Air vs Water Cooling ● Troubleshooting*
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 Three*

Day 4

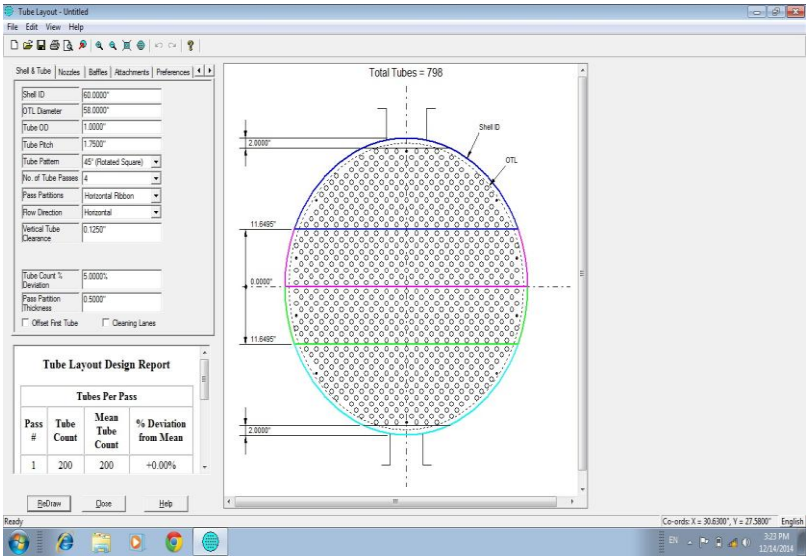
0730 – 0930	***Pumps*** *Development of Static and Dynamic Head in the Operating Volume of Pumps for Efficiency and Control Operation ● The Affinity Laws as Tools for Efficient Operation ● Pump Auxiliaries*
0930 – 0945	*Break*
0945 – 1100	***Pumps (cont'd)*** *Wear Components ● Canned Motor and Magnetic Drive Pumps ● High Speed/Low Flow Pumps ● Servicing and Condition Monitoring*
1100 – 1230	***Compressors*** *Types, Styles and Configurations of Centrifugal and Axial Compressors ● Construction Features ● Mode of Operation*
1230 – 1245	*Break*
1245 – 1420	***Compressors (cont'd)*** *Compressor Auxiliaries and Support Systems ● Analyse Operating Curves for Surge, Stall and Choke ● Define Appropriate Equipment for Safe Operation*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

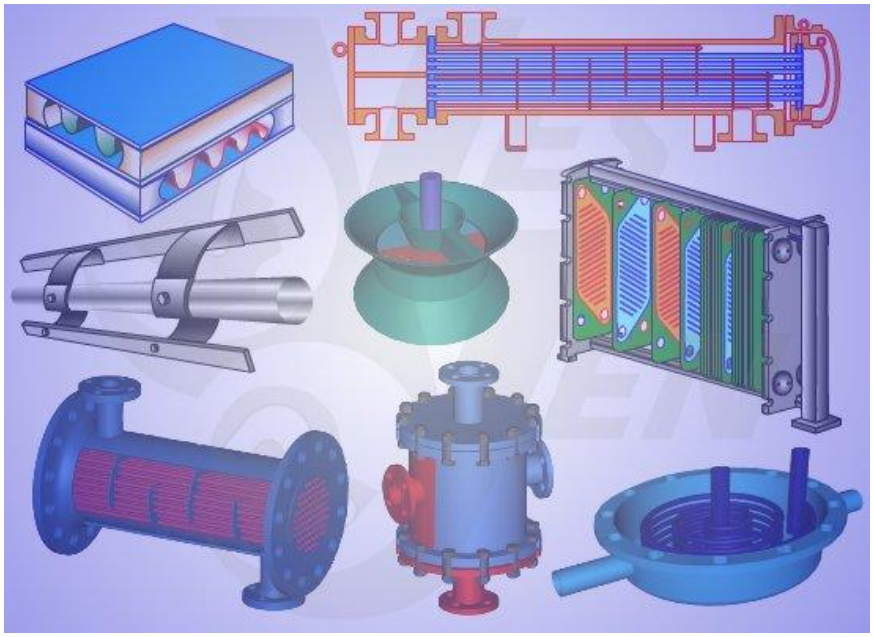
0730 – 0930	***Process Vessels*** *Types and Functions ● Safety Aspects*
0930 – 0945	*Break*
0945 – 1100	***Valves*** *Valve Theory ● Valve Types ● Applications ● Function ● Operation ● Troubleshooting*
1100 – 1230	***Troubleshooting of Different Equipment & Processes***
1230 – 1245	*Break*
1245 – 1345	***Troubleshooting of Different Equipment & Processes (cont'd)***
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulator (Hands-on Practical Sessions)

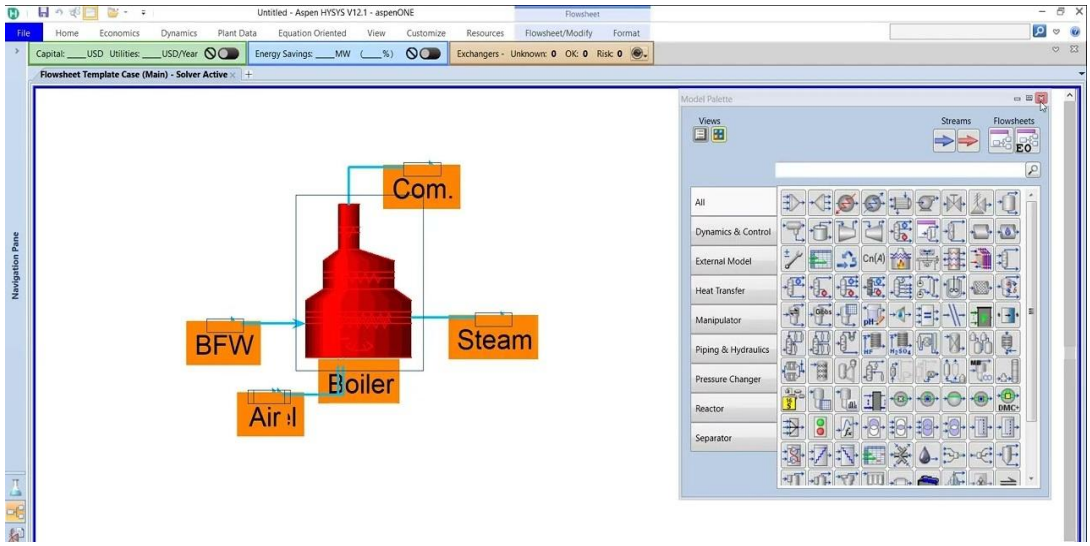
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art simulators “Heat Exchanger Tube Layout”,”Heat Exchanger CBT”, “ASPEN HYSYS V12.1”, “Centrifugal Pumps and Troubleshooting Guide 3.0”, “SIM 3300 Centrifugal Compressor”, “CBT on Compressors”, “Valve Sizing Simulator”, “Valve Simulator 3.0”, “Valvestar 7.2 Simulator” and “PRV^{2}SIZE Simulator”.



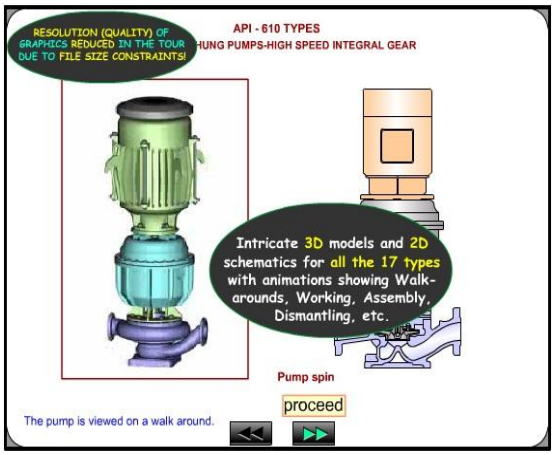
Heat Exchanger Tube Layout Simulator



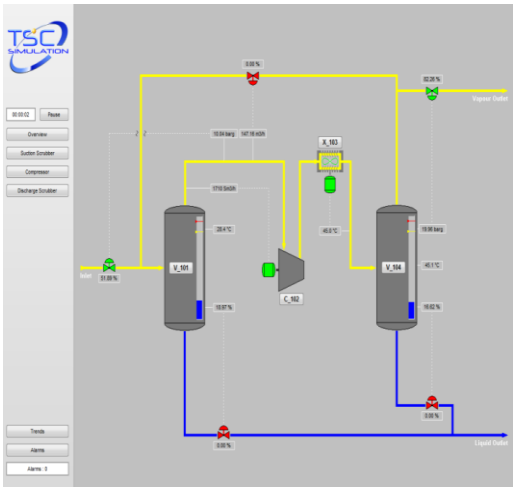
Heat Exchanger CBT



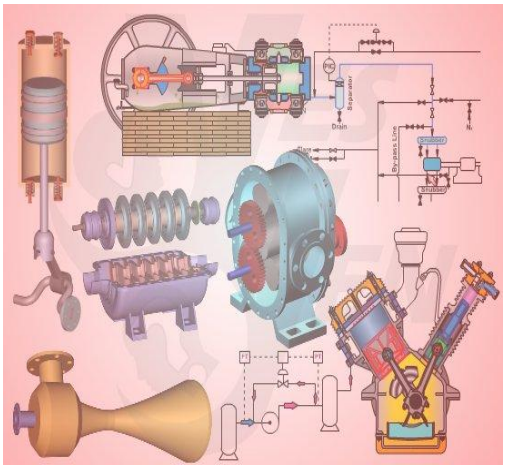
ASPEN HYSYS V12.1 Simulator



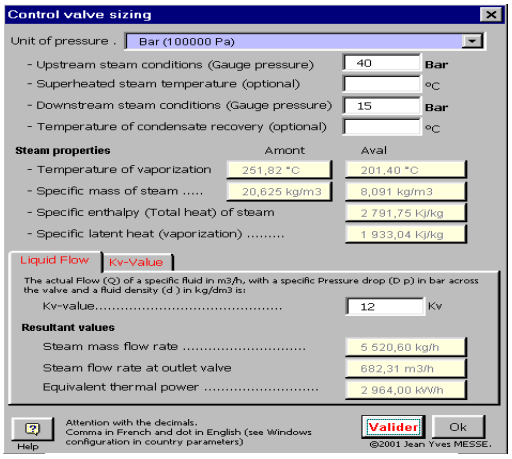
Centrifugal Pumps and Troubleshooting Guide



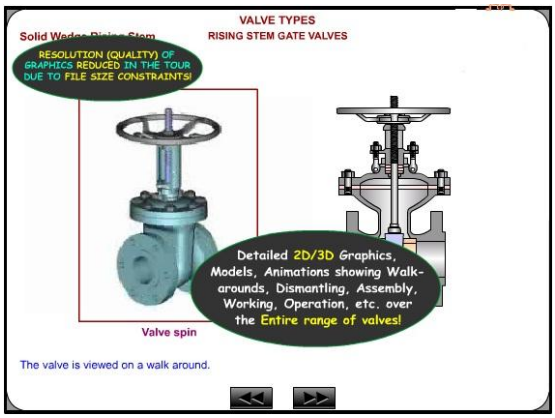
SIM 3300 Centrifugal Compressor



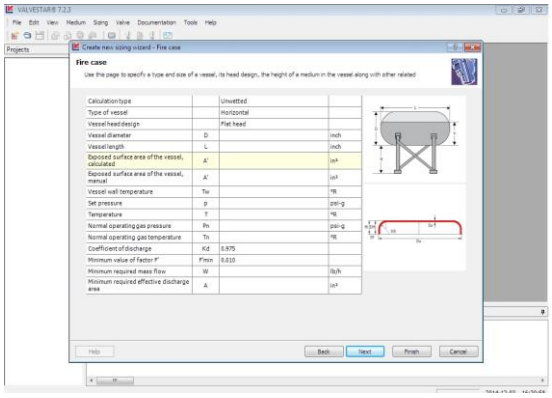
CBT on Compressors



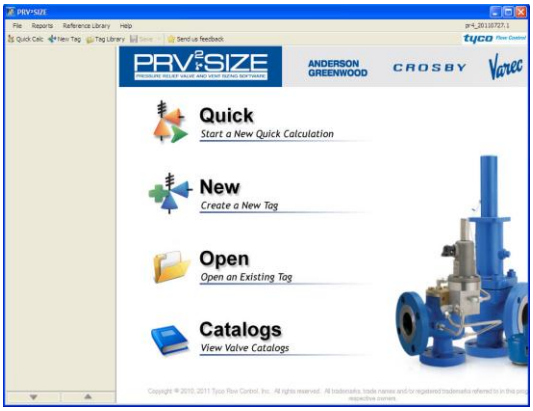
Valve Sizing Simulator



Valve Simulator 3.0



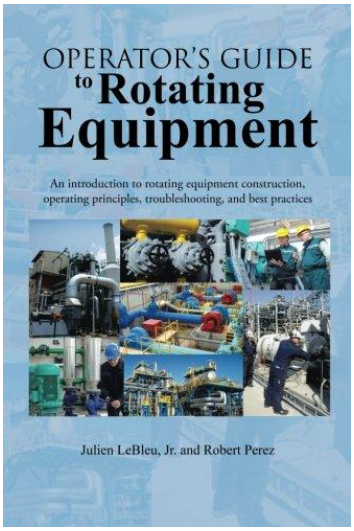
Valvestar 7.2 Simulator



PRV²SIZE Simulator

Book(s)

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



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

Course Coordinator

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