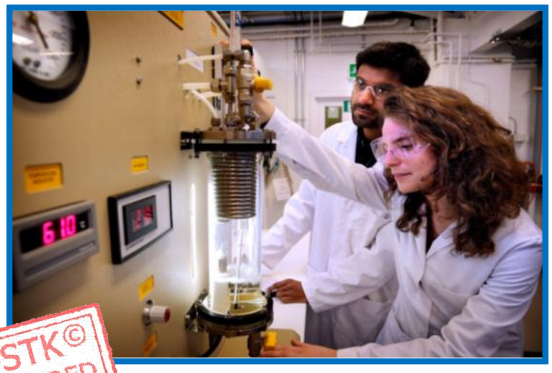
COURSE OVERVIEW PE0052
Chemical Engineering for Non-Chemical Engineers

Course Title
Chemical Engineering for Non-Chemical Engineers

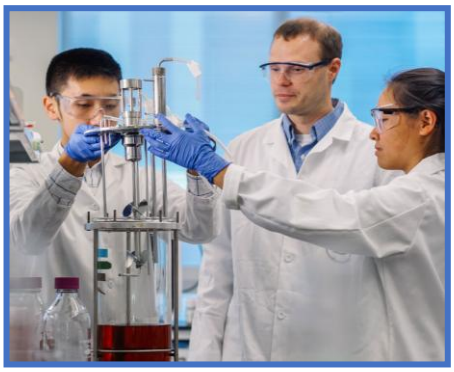


Course Date/Venue
October 12-16, 2025/Pierre Lotti Meeting Room, Movenpick Hotel Istanbul Golden Horn, Istanbul, Turkey

Course Reference
PE0052

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 covers the fundamental concepts of chemical engineering and provide you with a solid working knowledge associated with it. If you are a non-chemical engineer, this course will enable you to confidently talk to and work effectively with chemical engineers and process equipment. Many technical professionals today find themselves working with large-scale chemical processes even-though they do not have formal training in Chemical Engineering.

The course intends to fill this gap and provide you with this knowledge in the chemical engineering fundamentals and the ability to apply this knowledge to specify, design, operate, maintain and trouble-shoot chemical processes.

The course also discusses the specifications of pumps and heat exchangers; the mass transfer phenomena; the simple process calculations; troubleshooting process equipment and providing fixes; the process design activities; the process drawings; the safety guidelines to a process or chemical plant; and the basic chemical engineering jargon and terminology.

Course Objectives

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

- Apply and gain a good working knowledge on the fundamentals of chemical engineering
- Prepare specifications of pumps and heat exchangers
- Apply mass transfer phenomena including agitation scale-up
- Perform simple process calculations
- Troubleshoot process equipment and provide fixes
- Contribute to process design activities
- Determine process drawings and link them to plant operation
- Apply safety guidelines to a process or chemical plant
- Carryout water treatment covering ion-exchange, treatment for inhabitation of microbiological growth in circulating water and closed loop water treatment-corrosion prevention
- Determine oxygen scavenging (hydrazine treatment), coordinated phosphate treatment in boiler and condensate water polishing
- Identify basic chemical engineering jargon and terminology

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

The course provides an overview of all significant aspects and considerations of chemical engineering for non-chemical engineers such as industrial engineers, electrical engineers, mechanical engineers, civil engineers, control & instrumentation engineers, plastics and material engineers, maintenance engineers, food scientists, environmental engineers, chemists, maintenance supervisor, shift trades people and other environmental, chemical, laboratory, operations, process and production technical staff.

Course Fee

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.

Accommodation

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

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. Emad Al-Hasany, PhD is a **Senior Process & Petroleum Engineer** with **Offshore & Onshore** experience within the **Oil & Gas**, **Refinery** and **Petrochemical** industries. His wide expertise covers in the areas of **Process Plant Commissioning**, **Cost Estimation**, **Process Plant Start-Up Management**, **Clean Fuel** Technology & Standards, **Heat Exchangers & Fired Heaters** Operation & Troubleshooting, **Heat Medium Fired Heater** Troubleshooting & Maintenance, **Process Reactor** Operation & Troubleshooting, **Process Equipment** Design, Sizing, Selection, Applications & Troubleshooting, **Process Engineering Calculations**, **Gas Processing Plant** Operations & Control, **Gas Processing** Monitoring & Troubleshooting, **Process Plant** Optimization & Energy Conservation, **Hydro-Treating** Technology, **Oil & Gas** Field Operations, **Oil Movement**, Storage & Troubleshooting, **Start-Up & Shutdown**, **Gas/Oil Separates**, **Surge Vessels**, **Sludge Catcher**, **Knockout LP & HP Flare System**, **Close & Open Drain System**, **Skimmer Pit Evaporation Pit System**, **Filters**, **Driers**, **Pumps**, **Turbines**, **Compressors**, **York Refrigeration Compressors**, **Heaters & Combustion Gases Fire**, **Emergency Diesel Generators**, **Electrical & Diesel Fire Water Pumps**, **Gas & Fire Detectors**, **Pig Launcher**, **Purging Pipelines**, **Pressurized Vessels**, **Heat Exchangers**, **Atmospheric**, **Flash**, **Vacuum**, **Azeotrpic**, **Weiss Fractional Distillation**, **Oil & Gas Treatment**, **Separators**, **Filtration**, **Dehydration (Glycol & Molecular Sieves System)**, **Fire Tube Heaters**, **Combustion Gas**, **Temperature Level**, **Control Valves**, **Solenoid Valves**, **Cascade Control**, **Switches**, **Transmitter**, **Transducer**, **RTD Sensitivity**, **Orifice Plat**, **I/P Converter**, **Rot Meter**, **Floating**, **Displacer**, **DP Cells**, **PIDs**, **Flare Blowdown & Pressure Relief Systems**, **Pumps**, **Compressors**, **Turbines** & Troubleshooting, **Centrifugal Compressor & Steam Turbine**, **Valves**, **Safety Relief Valve Sizing**, Selection, Operation, Inspection, Maintenance & Troubleshooting, **Tank & Tank Farms**, **Hydraulic Pump**, **Well Engineering**, **Acidation**, **Wellheads** Preparing & Maintenance, **Well Operations & Surveys**, **Well Stimulation**, **Logging** and **Reservoir Engineering**. Further, he is also well-versed in **HYSYS**, **PRO II**, **OLGA**, **PIPESIM, PETREL**, **Artificial Lift**, **First Aid & Firefighting**, **Environment Protection**, **NORM Awareness**, **SHOC** (**Safe Handling of Chemicals**), **Permit to Work** (**PTW**), **HSE** Auditing & Reporting, **Emergency Response**, **Defensive Driving**, **H2S**, **Accident/Incident Investigation**, **Process Safety Management**, **Root Cause Analysis**, **OSHA** General Industry, **Water Injection**, **Water Treatment**, **HAZOP**, **Risk Assessment**, **Gas Chromatography**, **Corrosion** and **Cathodic Protection**.

During his career life, Dr. Emad has gained his practical and field experience through his various significant positions and dedication as the **Production Main Station Manager**, **Manager**, **Production Superintendent**, **Production Supervisor**, **Production Engineer**, **HAZOP Consultant**, **Instructor** and **Lecturer** for various companies and universities such as the AL-Euphrates University, Dero Oilfields, Syrian Petroleum Company (SPC), Kokab Co. and Alharratah Oilfield.

Dr. Emad has a **PhD** in **Reservoir Management**, a **Master** degree in **Production Engineering** and a **Bachelor** degree in **Petroleum Engineering**. Further, he is a **Certified Instructor/Trainer** and has further delivered numerous training, courses, workshops, seminars and conferences worldwide.

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: ***Sunday, 12th of October 2025***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Process Flow Sheet*** *Process Flow Diagrams (PFD's) • Piping and Instrumentation Diagrams (P& ID's) • Process Legends Used in Flow Sheets*
0930 – 0945	*Break*
0945 – 1230	***Stoichiometry*** *Dimensions and Units • Processes and Process Variable • Process Data Representation and Analysis • Basic Chemical Calculations*
1230 – 1245	*Break*
1245 – 1330	***Stoichiometry (cont'd)*** *Material Balance without Chemical Reactions • Material Balance with Chemical Reactions • Energy Balance • Combustion*
1330 - 1420	***Fluid Mechanics*** *Fluid Statics and its Applications • Fluid-Flow Phenomena • Basic Equations and Fluid Flow • Flowo Incompressible Fluids in Conduits and Thin Layers • Flow of Compressible Fluids • Flow Past Immersed Bodies • Transportation & Metering of Fluids • Agitation & Mixing*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2: ***Monday, 13th of October 2025***

0730 – 0930	***Heat Transfer and Its Applications*** *Heat Transfer By Conduction in Solids • Principles of Heat Flow in Fluids • Heat Transfer to Fluids Without Phase Change*
0930 – 0945	*Break*
0945 – 1030	***Heat Transfer and Its Applications (cont'd)*** *Heat Transfer to Fluids with Phase Change • Radiation Heat Transfer • Heat-Exchange Applications • Evaporation*

1030 – 1230	***Mass Transfer and Its Applications*** *Equilibrium-Stage Operation • Distillation • Leaching & Extraction • Introduction to Multi Component Distillation*
1230 – 1245	*Break*
1245 – 1420	***Mass Transfer and Its Applications (cont'd)*** *Principles of Diffusion and Mass Transfer Between Phases • Gas Absorption • Humidification Operations • Adsorption • Drying of Solids*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3: Tuesday, 14th of October 2025

0730 – 0930	***Chemical Engineering Thermodynamics*** *Fundamental Quantities • First Law of Thermodynamics • Volumetric Properties of Pure Fluids • Heat Effects • Second Law of Thermodynamics • Thermodynamic Properties of Fluids*
0930 – 0945	*Break*
0945 – 1030	***Chemical Engineering Thermodynamics (cont'd)*** *Thermodynamic Properties of Homogenous Mixtures • Phase Equilibria • Chemical Reaction Equilibrium • Thermodynamics of Flow Processes • Conversion of Heat into Work by Power Cycles • Refrigeration & Liquification • Thermodynamic Analysis of Processes*
1030 – 1230	***Water Treatment*** *Ion-Exchange • Treatment for Inhibition of Microbiological Growth in Circulating Water*
1230 – 1245	*Break*
1245 – 1420	***Water Treatment (cont'd)*** *Closed Loop Water Treatment-Corrosion Prevention • Oxygen Scavenging (Hydrazine Treatment)*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4: Wednesday, 15th of October 2025

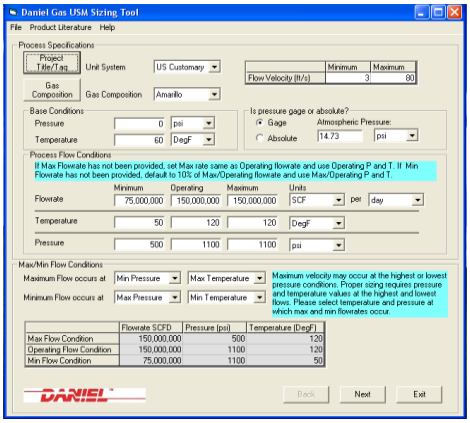
0730 – 0830	***Water Treatment (cont'd)*** *Coordinated Phosphate Treatment in Boiler • Condensate Water Polishing*
0830 – 0930	***Chemical Kinetics*** *Basic Definitions • Kinetics of Homogenous Reactions • Interpretation of Batch Reactor Data • Introduction to Reactor Design • Single Ideal Reactors • Design for Single Reactions • Design for Multiple Reactions • Temperature and Pressure Effects*
0930 – 0945	*Break*
0945 – 1030	***Chemical Kinetics (cont'd)*** *Non Ideal Flow • Mixing of Fluids • Introduction to Design for Heterogeneous Reacting Systems • Fluid -Particle Reactions • Fluid -Fluid Reactions • Solid-Catalyst Reactions • Reactivating Catalysts*
1030 – 1230	***Process Equipment Design*** *Design Considerations • Storage Vessels • Pressure Vessels*
1230 – 1245	*Break*
1245 – 1420	***Process Equipment Design (cont'd)*** *Reactors • Heat Exchangers • Evaporators and Crystallizers*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5: **Thursday, 16th of October 2025**

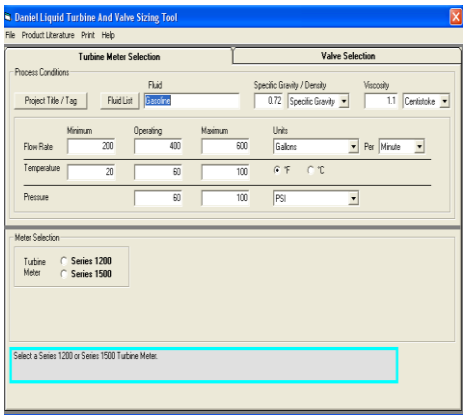
0730 – 0830	***Process Equipment Design (cont'd)*** *Distillation and Fractionation Equipments • Agitators • Filters • Dryers • Process Hazards and Safety Measures • Fundamentals of Computer Aided Design*
0830 – 0930	***Process Control and Instrumentation*** *Quantities of Measurement • Process Instrumentation • Temperature*
0930 – 0945	*Break*
0945 – 1230	***Process Control and Instrumentation (cont'd)*** *Pressure • Level • Flow*
1230 – 1245	*Break*
1245 - 1345	***Process Economics*** *Investment & Profitability • Accounting & Cost Control • Manufacturing - Cost Estimation • Fixed & Capital Cost Estimation*
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulator (Hands-on Practical Sessions)

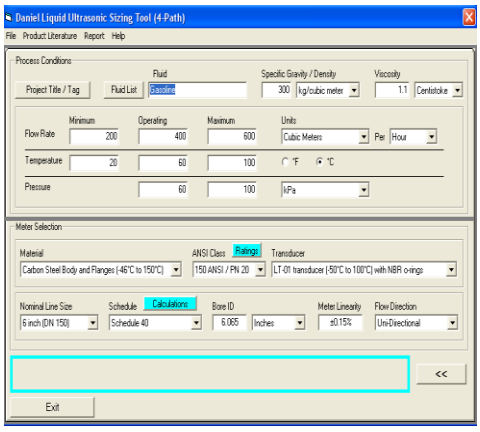
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using "Gas Ultrasonic Meter (USM) Sizing Tool Software", "Liquid Turbine Meter and Control Valve Sizing Tool Software", "Liquid Ultrasonic Meter Sizing Tool Software", "Orifice Flow Calculator Software", "Centrifugal Pumps and Troubleshooting Guide 3.0", "SIM 3300 Centrifugal Compressor Simulator", "CBT on Compressors", "Steam Turbines & Governing System CBT", "Single Shaft Gas Turbine Simulator", "Two Shaft Gas Turbine Simulator", "Valve Sizing Software", "Valve Software 3.0", "Valvestar 7.2 Software", "PRV²SIZE Software" and "ASPEN HYSYS" simulator.



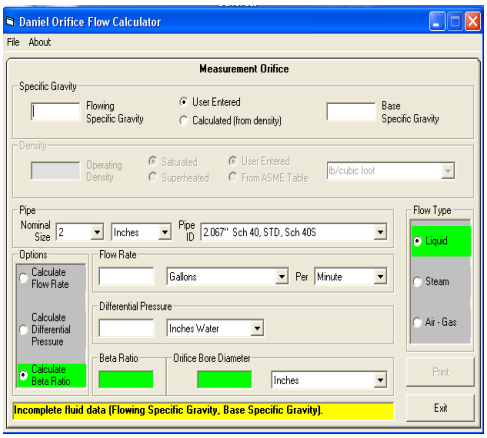
Gas Ultrasonic Meter (USM) Sizing Tool Software



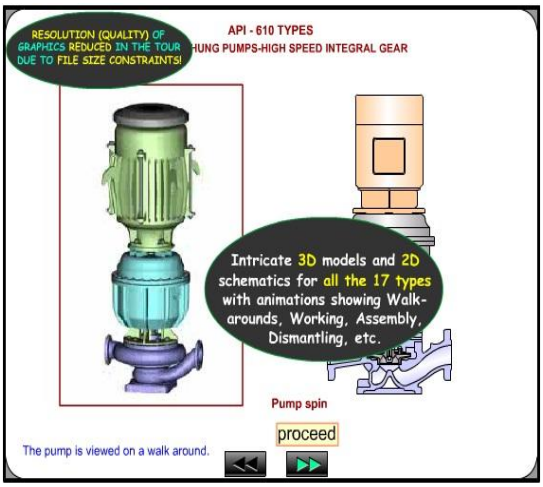
Liquid Turbine Meter and Control Valve Sizing Tool



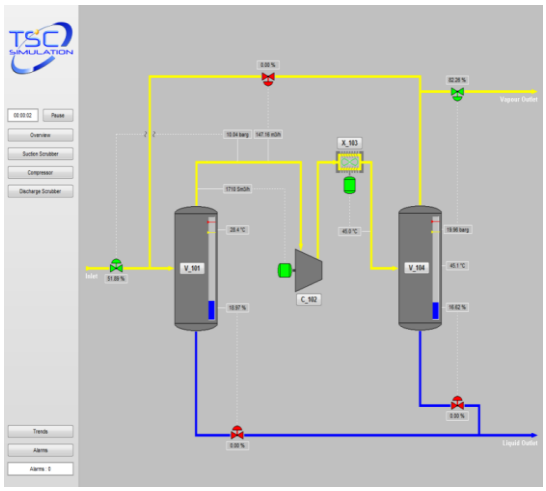
Liquid Ultrasonic Meter Sizing Tool Software



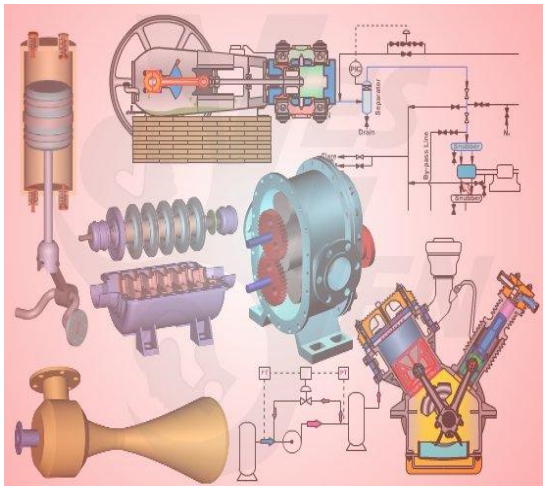
Orifice Flow Calculator Software



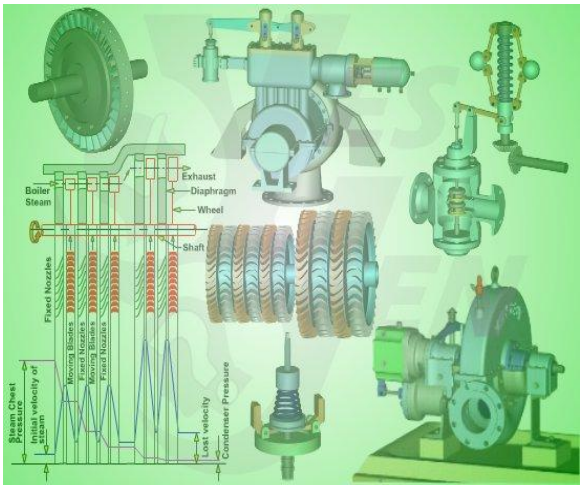
Centrifugal Pumps and Troubleshooting Guide 3.0



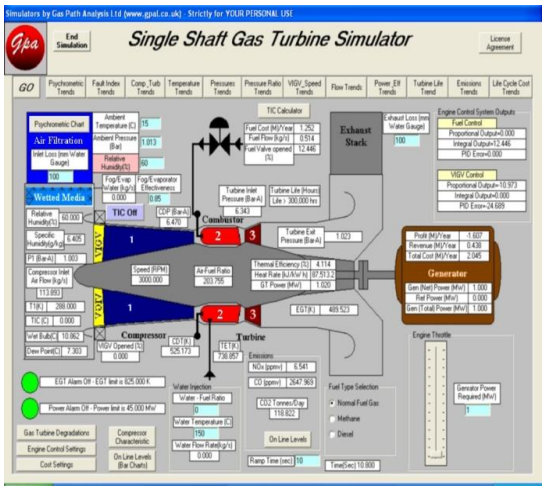
SIM 3300 Centrifugal Compressor Simulator



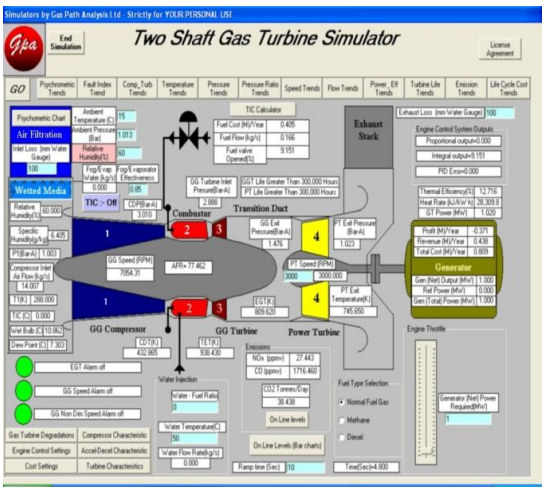
CBT on Compressors



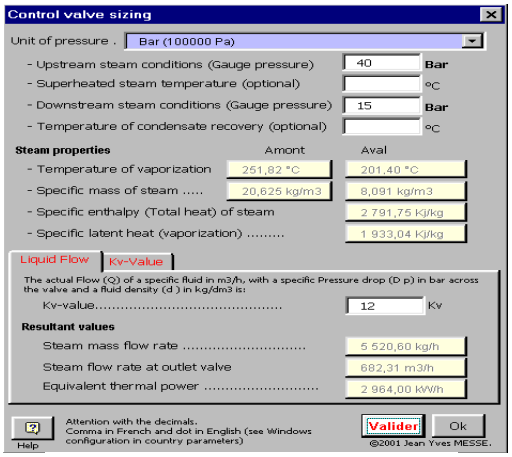
Steam Turbines & Governing System CBT



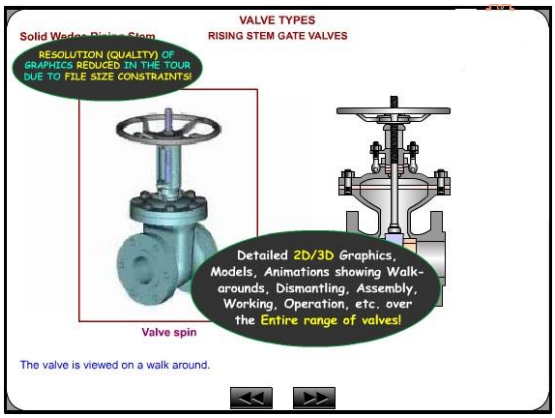
Single Shaft Gas Turbine Simulator



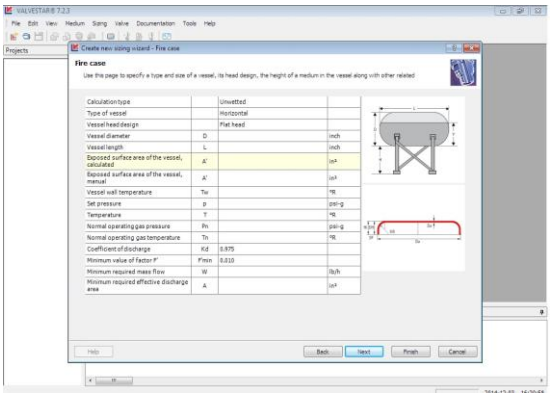
Two Shaft Gas Turbine Simulator



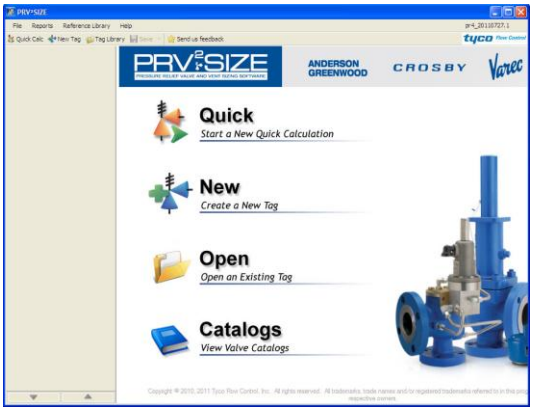
Valve Sizing Software



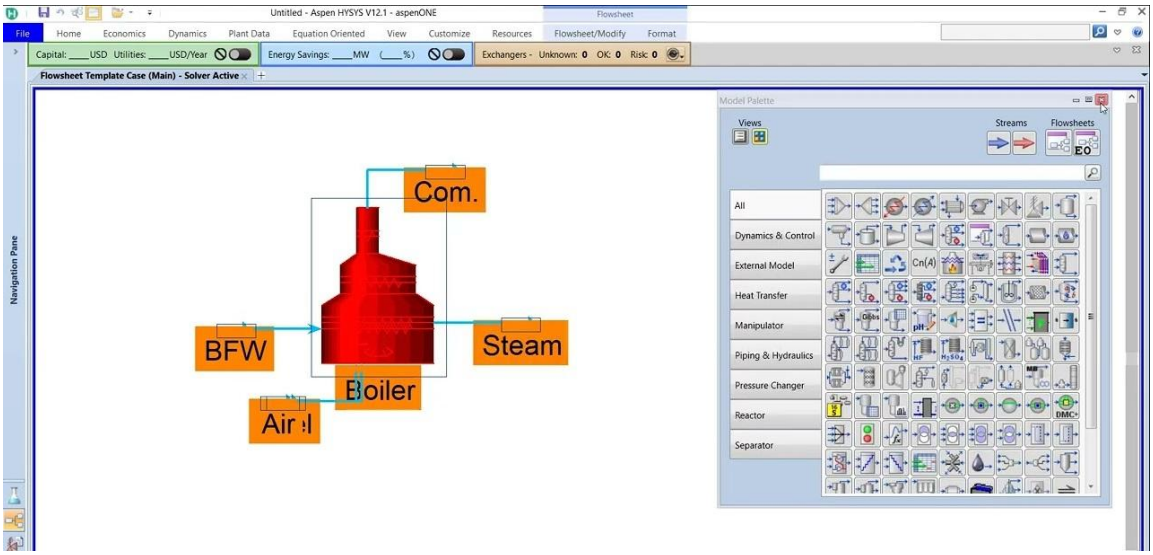
Valve Software 3.0



Valvestar 7.2 Software



PRV²SIZE Software



ASPEN HYSYS V14 Simulator

Course Coordinator
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