



COURSE OVERVIEW ME0398

Selection, Operation & Maintenance of Pumps, Compressors & Turbines

Course Title

Selection, Operation & Maintenance of Pumps, Compressors & Turbines

Course Date/Venue

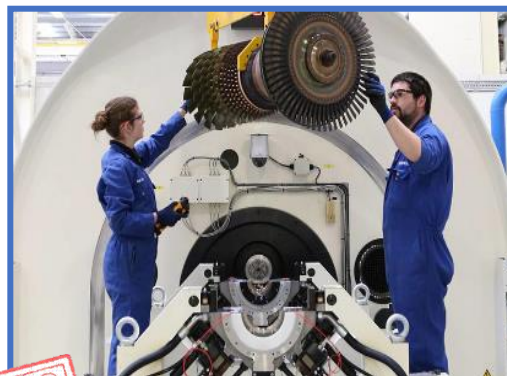
October 13-17, 2025/TBA Meeting Room,
London Marriott Hotel Regents Park,
London, UK

Course Reference

ME0398

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 the fluid mechanic fundamentals and operating practice of pumps, compressors and turbines. It will address aspects of both axial and centrifugal compressors. Upon the successful completion of this course, participants will have acquired the practical knowledge to enable them not only to choose the correct device for a particular application but also be in a position to resolve many commonly occurring operating problems.



The course is ideal for those personnel in the oil, gas, petrochemical, chemical, power and other process industries who require a wider and deeper appreciation of pumps, compressors and turbines, including their design, performance and operation. No prior knowledge of the topic is required. Participants will be taken through an intensive primer of turbo-machinery principles, using the minimum of mathematics, and will learn how to solve the many and varied practical industrial problems that are encountered. The course makes use of an extensive collection of VIDEO material.



Course Objectives

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

- Apply a comprehensive knowledge in pumps, compressors & turbines and troubleshoot rotating equipment in a professional manner
- Identify the different types of turbomachinery including basic design aspects and highlighted problem areas
- Minimize the compressor work by understanding the processes involved and identifying their efficiency
- Discuss the axial flow compressor and the corresponding velocity triangles including torque and power calculations
- List the different types of centrifugal machines including their design, installation, operation, maintenance, re-rate/retrofit and troubleshooting
- Recognize the various beneficial design aspects of turbomachines and understand the crucial process of cavitation in pumps
- Carryout the proper methods of centrifugal pumps installation, operation, maintenance and troubleshooting

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 significant aspects and considerations of pumps, compressors and turbines for those who are involved in the design, selection, maintenance or troubleshooting of such equipment. This includes maintenance, reliability, integrity, engineering, production and operations managers, engineers and other technical staff. Project managers and engineers will also benefit from this program.

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\$ 12,500 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: -

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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**. 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.

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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.

Accommodation

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



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. Dimitry Rovas, CEng, MSc, PMI-PMP, SMRP-CMRP is a **Senior Mechanical & Maintenance Engineer** with extensive industrial experience in **Oil, Gas, Power and Utilities** industries. His expertise includes **Pump Technology, Fundamentals of Pumps, Pump Selection & Installation, Centrifugal Pumps & Troubleshooting, Reciprocating & Centrifugal Compressors, Screw Compressor, Compressor Control & Protection, Gas & Steam Turbines, Turbine Operations, Gas Turbine Technology, Valves, Process Control Valves, PV Elite & Fracture Mechanics, Static Equipment**

Selection & Design, Design Against Fracture Mechanics, Elastic-Plastic Fracture Mechanics, Boiler Inspection & Maintenance, Boiler Systems, Boiler instrumentation & Controls, Boiler Start-up & Shutdown, Boiler Operation & Steam System Management, Boiler Inspection & Testing, Boiler Maintenance, Boiler Troubleshooting & Safety Control, Combustion Analysis & Tuning Procedures, Water Treatment Technology, Heat Recovery Steam Generating (HRSG), Impulse Tube Installation & Inspection, Parker Compression Fittings, Pipes & Fittings, PSV Inspection, Root Cause Failure Analysis, Tank Design & Engineering, Tank Shell, Tanks & Tank Farms, Vacuum Tanks, Gas Turbine Operating & Maintenance, Diesel Engine, Engine Cycles, Governors & Maintenance, Crankshafts & Maintenance, Lubrication System Troubleshooting & Maintenance, Engines/Drivers, Motor Failure Analysis & Testing, Motor Predictive Maintenance, Engine Construction & Maintenance, HP Fuel Pumps & Maintenance, Fired Equipment Maintenance, Combustion Techniques, Process Heaters, Glass Reinforced Epoxy (GRE), Glass Reinforced Pipes (GRP), Glass Reinforced Vent (GRV), Mechanical Pipe Fittings, Flange Joint Assembly, Adhesive Bond Lamination, Butt Jointing, Joint & Spool Production, Isometric Drawings, Flange Assembly Method, Fabrication & Jointing, Jointing & Spool Fabrication, CAESAR, Pipe Stress Analysis, Pipe Cuttings, Flange Bolt Tightening Sequence, Hydro Testing, Bearings & Lubrication, Advanced Machinery Dynamics, Rubber Compounding, Elastomers, Thermoplastic, Industrial Rubber Products, Rubber Manufacturing Systems, Heat Transfer, Vulcanization Methods, Process Plant Shutdown & Turnaround, Professional Maintenance Planner, Advanced Maintenance Management, Maintenance Optimization & Best Practices, Maintenance Auditing & Benchmarking, Material Cataloguing, Reliability Management, Rotating Equipment, Energy Conservation, Energy Loss Management in Electricity Distribution Systems, Energy Saving, Thermal Power Plant Management, Thermal Power Plant Operation & Maintenance, Heat Transfer, Machine Design, Fluid Mechanics, Heating & Cooling Systems, Heat Insulation Systems, Heat Exchanger & Cooling Towers, Mechanical Erection, Heavy Rotating Equipment, Material Unloading & Storage, Commissioning & Start-Up. He is currently the **Project Manager wherein he is managing, directing and controlling all activities and functions associated with the domestic heating/cooling facilities projects.**

During his life career, Mr. Rovas has gained his practical and field experience through his various significant positions and dedication as the **EPC Project Manager, Maintenance Manager, Mechanical Engineer, Field Engineer, Preventive Maintenance Engineer, Lead Rotating Equipment Commissioning Engineer, Construction Commissioning Engineer, Offshore Lead Maintenance Engineer, Researcher, Instructor/Trainer, Telecom Consultant and Consultant** from various companies such as the Mytilineos Aluminium Group, Podaras Engineering Studies, Metka and Diadikasia, S.A., **Hellenic Petroleum Oil Refinery** and COSMOTE.

Mr. Rovas has **Master's** degrees in **Energy Production & Management** and **Mechanical Engineering** from the **National Technical University of Athens (NTUA), Greece**. Further, he is a **Certified Instructor/Trainer**, a **Certified Maintenance and Reliability Professional (CMRP)** from the Society of Maintenance & Reliability Professionals (SMRP), **Certified Project Management Professional (PMI-PMP)**, **Certified Six Sigma Black Belt**, **Certified Internal Verifier/Assessor/Trainer** by the Institute of Leadership & Management (ILM), **Certified Construction Projects Contractor**, **Certified Energy Auditor** and a **Chartered Engineer**. Moreover, he is an active member of **American Society for Quality**, Project Management Institute (PMI), **Body of Certified Energy Auditors** and **Technical Chamber of Greece**. He has further received various recognition and awards and delivered numerous trainings, seminars, courses, workshops and conferences internationally.



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

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	PRE-TEST
0830 – 0930	Introduction to Turbomachinery Highlighted Problem Areas
0930 – 0945	Break
0945 – 1000	Ideal Gas Equation & Practical Application Isentropic Processes • Property Diagrams Involving Entropy
1000 – 1100	Isentropic Processes of Ideal Gases Constant Specific Heats • Relative Pressure and Relative Specific Volume
1100 – 1230	Minimizing Compressor Work Polytropic Processes • Multi-Stage Compression with Inter-Cooling • Isentropic Efficiency of Turbines • Isentropic Efficiency of Compressors and Pumps
1230 – 1245	Break
1245 – 1330	Momentum & Bernoulli's Relations General Relationship • Relationships for Incompressible Fluids
1330 – 1420	VIDEO: Basic Pump Types & Technology
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 One

Day 2: **Tuesday, 14th of October 2025**

0730 – 0800	General Description of Turbomachines Centrifugal Pump • Centrifugal Turbine • Centrifugal Air Compressor
0800 – 0830	Impulse Turbine Velocity Triangles
0830 – 0900	Axial Flow Compressor Velocity Triangles • Torque Calculation and Torque Coefficient • Power Calculation and Power Coefficient
0900 – 0930	Centrifugal Machines Torque Calculation • Head Coefficient • Flow Coefficient • Torque Coefficient
0930 – 0945	Break
0945 – 1015	Performance Curves
1015 – 1100	Centrifugal Pump Centrifugal Multistage Pump • Mixed Flow Machines • Centrifugal Air Compressor
1100 – 1130	Affinity Laws Effect of Impeller Speed • Effect of Impeller Diameter
1130 – 1200	Specific Speed
1200 – 1230	Specific Radius
1230 – 1245	Break
1245 – 1315	Hydraulic Turbines



1315 – 1330	VIDEO: Fundamentals of Pump Performance 1
1330 – 1400	Design Aspects of Turbomachines Linear Cascades • Radial Cascades • Three- Dimensional Aspects of Axial- Flow Machines •Elementary Design Considerations
1400 – 1420	Cavitation
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 Two

Day 3: Wednesday, 15th of October 2025

0730 – 0930	Centrifugal Pumps Basics Types of Centrifugal Pumps • Self- Priming Pumps • Specific Speeds • Suction Specific Speed • Best Efficiency Point • Affinity Laws
0930 – 0945	Break
0945 – 1100	Centrifugal Pump Design Balancing Disc • Impeller NPSHR • Impeller Centre-Rib • Mechanical Seals • Velocity Head
1100 – 1230	Pump Sales Affinity Laws • Pump Software • Suction Lift • Viscosity • Re-Rate/Retrofit • Head-Rise • Radial/Horizontal Split Case
1230 – 1245	Break
1245 – 1330	Centrifugal Pump Installation Foundation • Soft Foot • Suction Pipe • Suction Strainer
1330 – 1420	VIDEO: Fundamentals of Pump Performance 2 Discussion Forum
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: Thursday, 16th of October 2025

0730 – 0930	Centrifugal Pump Operation Start-Up • Minimum Flow • Maximum Pump RPM • Motor Amps/Specific Gravity • Entrained Gas
0930 – 0945	Break
0945 – 1100	Centrifugal Pump Operation (cont'd) Operation at Shut Off • Temperature-Rise • Thermal Shock
1100 – 1230	Centrifugal Pump Maintenance Case Gasket • Checking for Wear Clearance • Oil Change • Storage
1230 – 1245	Break
1245 – 1315	Centrifugal Pump Re-Rate/Retrofit Impeller Cut • NPSH • De-Staging • Electric Motor Sizing • Viscosity Changes



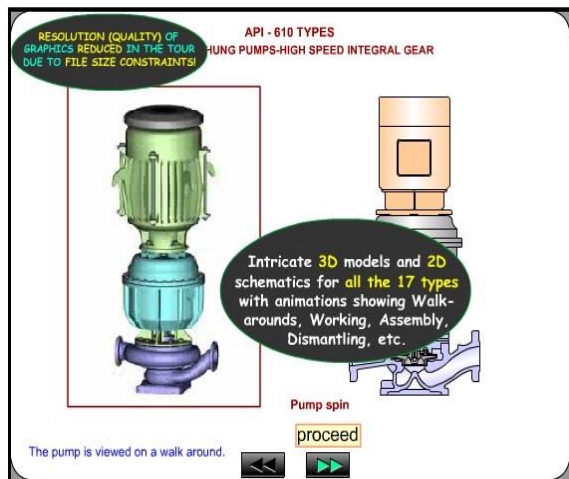
1315 – 1420	VIDEO: Hydraulic Loads, Critical Speed & Torque Discussion Forum
1420 – 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day Four

Day 5: Friday, 17th of October 2025

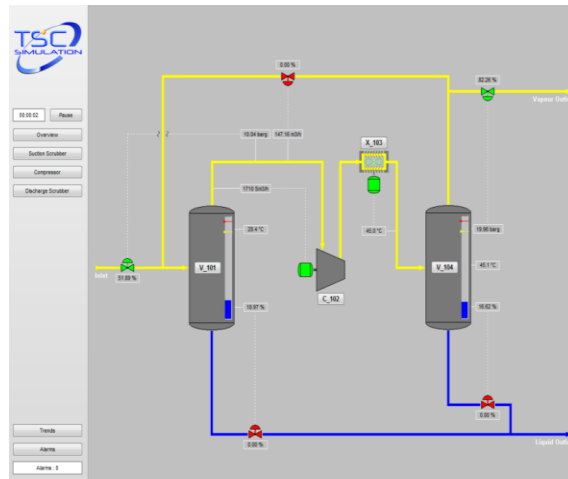
0730 – 0830	Centrifugal Pump Troubleshooting Bearing Failures • Bearing Housing Oil Leakage • Cavitation Noise and Damage
0830 – 0930	VIDEO: Bearings, Seals & Couplings
0930 – 0945	Break
0945 – 1100	Centrifugal Pump Troubleshooting (cont'd) Impeller Cavitation/Erosion • Vibration • Cracked Volute Tongues • NPSH • Viscosity Effects
1100 – 1230	Group Discussions
1230 – 1245	Break
1245 – 1345	VIDEO: Special Pump Topics & Final Discussion
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

Simulator (Hands-on Practical Sessions)

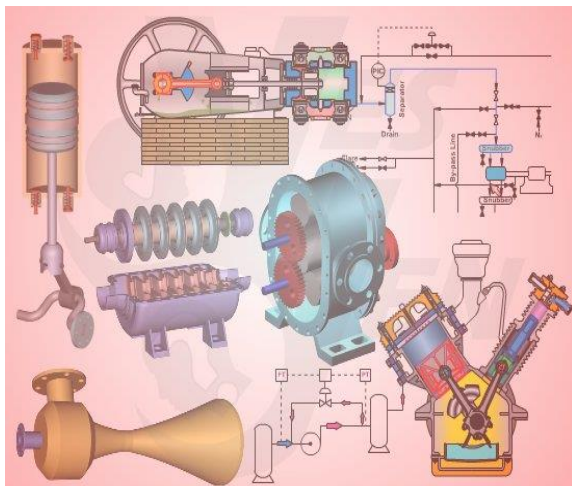
Hands-on practical sessions will be arranged for all participants throughout the course duration using “Centrifugal Pumps and Troubleshooting Guide 3.0”, “SIM 3300 Centrifugal Compressor Simulator”, “CBT on Compressors” and “Steam Turbine & Governing System CBT” simulators.



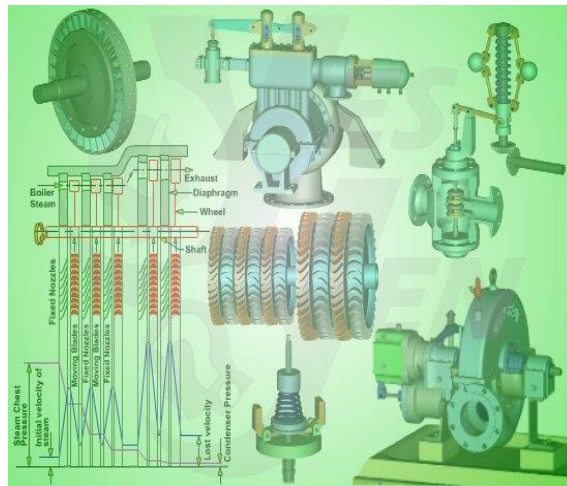
Centrifugal Pumps and Troubleshooting Guide 3.0



SIM 3300 Centrifugal Compressor Simulator



CBT on Compressors



Steam Turbine & Governing System CBT

Course Coordinator

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