



COURSE OVERVIEW ME0358

Reciprocating & Rotary Pumps & Compressors

Course Title

Reciprocating & Rotary Pumps & Compressors

Course Date/Venue

September 22-26, 2024/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs

Course Reference

ME0358

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 participants with a detailed and up-to-date overview of Reciprocating & Rotary Pumps and Compressors. It covers the basic principles of operation and types of pumps and compressors; the types of positive displacement pumps covering rotary pumps and reciprocating pumps; the advantages and disadvantages of positive displacement pumps, rotary pumps and reciprocating pumps; the operating principles, components, designs and advantages and disadvantages of centrifugal pumps; the types of compressors covering reciprocating, rotary and centrifugal; and the operating principles, performance characteristics and advantages and disadvantages of compressors.



During the interactive course, participants will learn the reciprocating compressor and rotary compressor; the types of reciprocating compressors and rotary compressor; the applications and advantages of reciprocating compressors and rotary compressor; the operating principles, components, design and advantages and disadvantages of centrifugal compressors; the maintenance strategies for pumps and compressors; troubleshooting common problems; the inspection and repair techniques; and the safety considerations for maintenance and repair.

Course Objectives

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

- Apply and gain an in-depth knowledge on reciprocating and rotary pumps and compressors
- Discuss the basic principles of operation and types of pumps and compressors
- Identify the types of positive displacement pumps covering rotary pumps and reciprocating pumps
- Differentiate the advantages and disadvantages of positive displacement pumps, rotary pumps and reciprocating pumps
- Discuss the operating principles, components, designs and advantages and disadvantages of centrifugal pumps
- Recognize the types of compressors covering reciprocating, rotary and centrifugal
- Explain the operating principles, performance characteristics and advantages and disadvantages of compressors
- Design and operate reciprocating compressor and rotary compressor
- List the types of reciprocating compressors and rotary compressor
- Explain the applications and advantages of reciprocating compressors and rotary compressors
- Discuss the operating principles, components, design and advantages and disadvantages of centrifugal compressors
- Carryout maintenance strategies for pumps and compressors and troubleshoot common problems
- Employ inspection and repair techniques as well as safety considerations for maintenance and repair

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, sample video clips of the instructor’s actual lectures & practical sessions during the course conveniently saved in a **Tablet PC**.

Who Should Attend

This course provides an overview of all significant aspects and considerations of reciprocating and rotary pumps and compressors for those rotating equipment/machinery engineers, plant engineers and/or maintenance engineers involved in turbomachinery operations and/or maintenance, superintendents, supervisors, foremen and other technical staff involved in turbomachinery management, operation and/or maintenance, operations, process and/or process unit contact engineers and mechanical and/or project engineers.

Course Fee


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

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.

- 

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.

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. Andrew Ladwig is a **Senior Process & Mechanical Engineer** with over **25 years** of extensive experience within the **Oil & Gas, Refinery, Petrochemical & Power** industries. His expertise widely covers in the areas of **Ammonia Manufacturing & Process Troubleshooting, Distillation Towers, Crude Oil Distillation, Fundamentals of Distillation** for Engineers, **Distillation Operation and Troubleshooting, Advanced Distillation Troubleshooting, Distillation Technology, Vacuum Distillation, Ammonia Storage & Loading Systems, Ammonia Plant Operation, Troubleshooting & Optimization, Ammonia Recovery, Ammonia Plant**

Safety, Hazard of Ammonia Handling, Storage & Shipping, Operational Excellence in Ammonia Plants, Fertilizer Storage Management (Ammonia & Urea), Fertilizer Manufacturing Process Technology, Sulphur Recovery, Phenol Recovery & Extraction, Wax Sweating & Blending, Petrochemical & Fertilizer Plants, Nitrogen Fertilizer Production, Petroleum Industry Process Engineering, Refining Process & Petroleum Products, Refinery Planning & Economics, Safe Refinery Operations, Hydrotreating & Hydro-processing, Separators in Oil & Gas Industry, Gas Testing & Energy Isolations, Gas Liquor Separation, Industrial Liquid Mixing, Wax Bleachers, Extractors, Fractionation, Operation & Control of Distillation, Process of Crude ATM & Vacuum Distillation Unit, Water Purification, Water Transport & Distribution, Steam & Electricity, Flame Arrestors, Coal Processing, Environmental Emission Control, R&D of Wax Blending, Wax Molding/Slabbing, Industrial Drying, Principles, Selection & Design, Certified Process Plant Operations, Control & Troubleshooting, Operator Responsibilities, Storage Tanks Operations & Measurements, Process Plant Troubleshooting & Engineering Problem Solving, Process Plant Performance, Efficiency & Optimization, Continuous Improvement & Benchmarking, Process Troubleshooting Techniques, Oil & Gas Operation/Introduction to Surface Facilities, Pressure Vessel Operation, Process Equipment Performance & Troubleshooting, Plant Startup & Shutdown, Startup & Shutdown the Plant While Handling Abnormal Conditions, Flare & Relief System, Process Gas Plant Start-up, Commissioning & Problem Solving, Process Liquid and Process Handling & Measuring Equipment. Further, he is also well-versed in Compressors & Turbines Operation, Maintenance & Troubleshooting, Heat Exchanger Overhaul & Testing Techniques, Balancing of Rotating Machinery (BRM), Pipe Stress Analysis, Valves & Actuators Technology, Inspect & Maintain Safeguarding Vent & Relief System, Certified Inspectors for Vehicle & Equipment, Optimizing Equipment Maintenance & Replacement Decisions, Certified Maintenance Planner (CMP), Certified Planning and Scheduling Professional (AACE-PSP), Tank Design, Construction, Inspection & Maintenance, Material Cataloguing, Specifications, Handling & Storage, Steam Trap Design, Operation, Maintenance & Troubleshooting, Steam Trapping & Control, Column, Pump & Exchangers, Troubleshooting & Design, Rotating Equipment Operation & Troubleshooting, Control & ESD System, Detailed Engineering Drawings, Codes & Standards, Budget Preparation, Allocation & Cost Control, Root Cause Analysis (RCA), Production Optimization, Permit to Work (PTW), HAZOP Study, Sampling & Analysis, Training Analysis, Job Analysis Techniques, Storage & Handling of Toxic Chemicals & Hazardous Materials, Hazardous Material Classification & Storage/Disposal, Dangerous Goods, Environmental Management System (EMS), Supply Chain, Purchasing, Procurement, Logistics Management & Transport & Warehousing & Inventory, Risk Monitoring Authorized Gas Tester (AGT), Confined Space Entry (CSE), Personal Protective Equipment (PPE), Fire & Gas, First Aid and Occupational Health & Safety.

During his career life, Mr. Ladwig has gained his practical experience through his various significant positions and dedication as the **Mechanical Engineer, Project Engineer, Reliability & Maintenance Engineer, Maintenance Support Engineer, Process Engineer, HSE Supervisor, Warehouse Manager, Quality Manager, Business Analyst, Senior Process Controller, Process Controller, Safety Officer, Mechanical Technician, Senior Lecturer** and **Senior Consultant/Trainer** for various companies such as the Sasol Ltd., Sasol Wax, Sasol Synfuels, just to name a few.

Mr. Ladwig has a **Bachelor's** degree in **Chemical Engineering** and a **Diploma in Mechanical Engineering**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management (ILM)** and has delivered various trainings, workshops, seminars, courses and conferences internationally.



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, 22nd of September 2024

0730 - 0800	<i>Registration & Coffee</i>
0800 - 0815	<i>Welcome & Introduction</i>
0815 - 0830	PRE-TEST
0830 - 0930	<i>Introduction to Reciprocating Rotary Pumps & Compressors</i>
0930 - 1000	<i>The Basic Principles of Operation</i>
1000 - 1045	<i>Types of Pumps & Compressors</i>
1045 - 1100	<i>Break</i>
1100 - 1145	<i>Positive Displacement Pumps & How they Work</i>
1145 - 1230	<i>Types of Positive Displacement Pumps: Rotary Pumps, Reciprocating Pumps</i>
1230 - 1245	<i>Break</i>
1245 - 1330	<i>Advantages & Disadvantages of Positive Displacement Pumps</i>
1330 - 1420	<i>Rotary Pumps: Screw Pumps, Vane Pumps, Rotary Pumps & Lobe Pumps</i>
1420 - 1430	Recap
1430	<i>Lunch & End of Day One</i>

Day 2: Monday, 23rd of September 2024

0730 - 0830	<i>Advantages & Disadvantages of Rotary Pumps</i>
0830 - 0930	<i>Reciprocating Pumps: Piston Pumps, Diaphragm Pumps & Plunger Pumps</i>
0930 - 0945	<i>Break</i>
0945 - 1045	<i>Advantages & Disadvantages of Reciprocating Pumps</i>
1045 - 1145	<i>Centrifugal Pumps</i>
1145 - 1230	<i>Operating Principles of Centrifugal Pumps</i>
1230 - 1245	<i>Break</i>
1245 - 1330	<i>Components & Designs of Centrifugal Pumps</i>
1330 - 1420	<i>Advantages & Disadvantages of Centrifugal Pumps</i>
1420 - 1430	Recap
1430	<i>Lunch & End of Day Two</i>



Day 3: Tuesday, 24th of September 2024

0730 – 0830	<i>Compressors</i>
0830 – 0930	<i>Types of Compressors: Reciprocating, Rotary & Centrifugal</i>
0930 – 0945	<i>Break</i>
0945 – 1045	<i>Operating Principles & Performance Characteristics</i>
1045 – 1145	<i>Advantages & Disadvantages of Compressors</i>
1145 – 1230	<i>Reciprocating Compressors</i>
1230 – 1245	<i>Break</i>
1245 – 1330	<i>Reciprocating Compressor Design & Operation</i>
1330 – 1420	<i>Types of Reciprocating Compressors: Single-Acting, Double-Acting & Diaphragm</i>
1420 – 1430	<i>Recap</i>
1430	<i>Lunch & End of Day Three</i>

Day 4: Wednesday, 25th of September 2024

0730 – 0830	<i>Applications & Advantages of Reciprocating Compressors</i>
0830 – 0930	<i>Rotary Compressors</i>
0930 – 0945	<i>Break</i>
0945 – 1045	<i>Rotary Compressor Design & Operation</i>
1045 – 1145	<i>Types of Rotary Compressors: Screw, Scroll & Vane</i>
1145 – 1230	<i>Applications & Advantages of Rotary Compressors</i>
1230 – 1245	<i>Break</i>
1245 – 1330	<i>Centrifugal Compressors</i>
1330 – 1420	<i>Operating Principles of Centrifugal Compressors</i>
1420 – 1430	<i>Recap</i>
1430	<i>Lunch & End of Day Four</i>

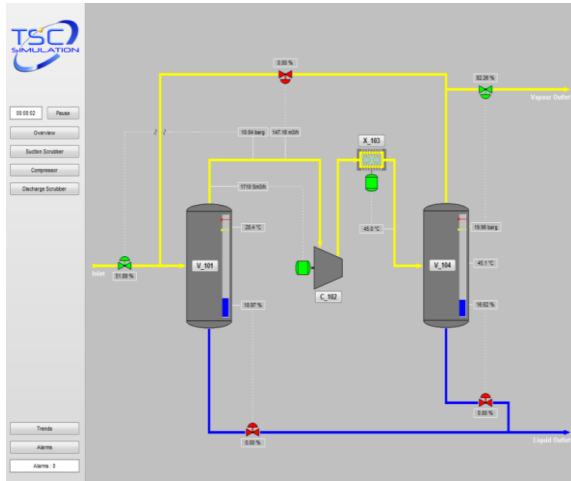
Day 5: Thursday, 26th of September 2024

0730 - 0830	<i>Components & Designs of Centrifugal Compressors</i>
0830 - 0930	<i>Advantages & Disadvantages of Centrifugal Compressors</i>
0930- 0945	<i>Break</i>
0945 – 1045	<i>Maintenance & Troubleshooting</i>
1045 – 1145	<i>Maintenance Strategies for Pumps & Compressors</i>
1145 – 1215	<i>Troubleshooting Common Problems</i>
1215- 1230	<i>Break</i>
1230 – 1300	<i>Inspection & Repair Techniques</i>
1300 – 1345	<i>Safety Considerations for Maintenance & Repair</i>
1345 - 1400	<i>Course Conclusion</i>
1400 - 1415	POST-TEST
1415 - 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch & End of Course</i>

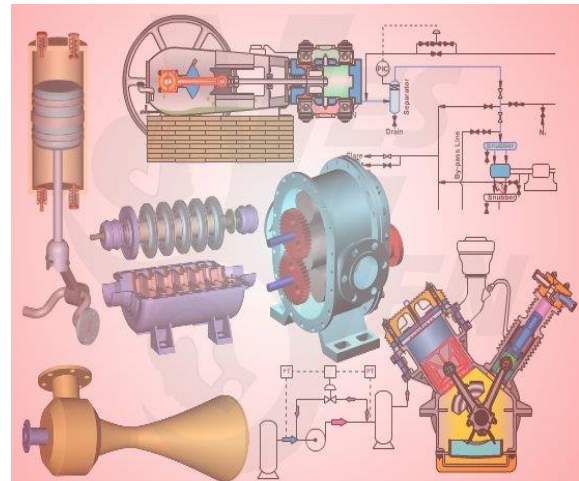


Simulator (Hands-on Practical Sessions)

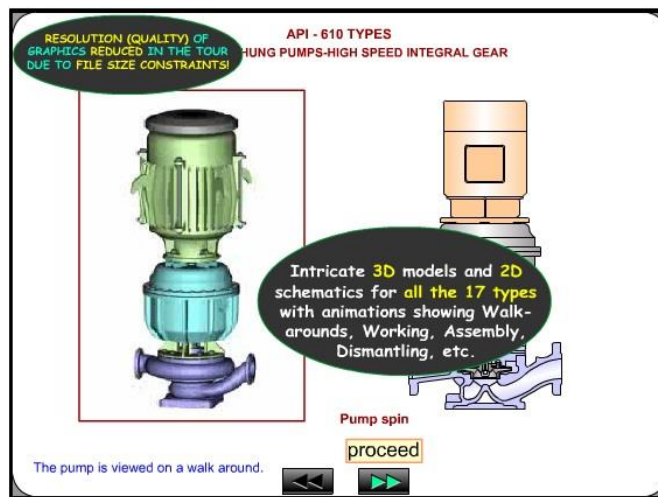
Practical session will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the state-of-the-art simulators “SIM 3300 Centrifugal Compressor”, “CBT on Compressors” and “Centrifugal Pumps and Troubleshooting Guide 3.0”.



SIM 3300 Centrifugal Compressor Simulator



CBT on Compressors



Centrifugal Pumps and Troubleshooting Guide 3.0

Course Coordinator

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org