COURSE OVERVIEW ME0669
Centrifugal, Reciprocating & Screw Compressor

Course Title
Centrifugal, Reciprocating & Screw Compressor



Course Date/Venue
Session 1: January 03-07, 2027/Meeting Plus 9, City Centre Rotana, Doha, Qatar
Session 2: November 28-December 02, 2027/Meeting Plus 9, City Centre Rotana, Doha, Qatar

Course Reference
ME0669

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 reciprocating and screw compressors. It covers the various types of compressors; the principles of gas compression; the effect of staging, stage and interstage cooling; the practical compressor theory; the mechanical design and compressor systems; the systematic alignment techniques; the support criteria of centrifugal compressors; and the centrifugal compressor parameters.

Further, the course will also cover centrifugal process compressors; the process conditions; the positive displacement compressors; the compressor operation; the reciprocating compressor cycle; the effect of staging; the oil free cylinders of floating pistons; condensation and liquid slugs; and the valve response and capacity control of reciprocating compressor.

During this interactive course, participants will learn the compressor control; performance considerations; the gas pulsations and reduction of pulsations; the proper techniques in starting up, running and shutting down compressors; the practical screw compressor theory; the screw compressor process packages; the areas of application; the operating principles and capacity control; the power requirement and fitting control; and the performance, condition monitoring and troubleshooting.

Course Objectives/Outcomes & Benefits for the Participants

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

- Apply and gain a good working knowledge on centrifugal, reciprocating and screw compressor
- Discuss the various types of compressors and employ the principles of gas compression
- Identify the effect of staging, stage and interstage cooling
- Illustrate mechanical design, employ systematic alignment techniques and determine the support criteria of centrifugal compressors
- Describe centrifugal compressor parameters and select centrifugal process compressors
- Recognize positive displacement compressors, reciprocating compressor cycle and effect of staging
- Discuss oil free cylinders of floating pistons as well as condensation and liquid slugs
- Describe the valve response and capacity control of reciprocating compressor
- Explain performance considerations as well as gas pulsations and reduction of pulsations
- Employ proper techniques in starting up, running and shuting down compressors in a professional manner
- Discuss screw compressors, its areas of application, operating principles, capacity control and performance

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 is intended for 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 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.

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. Saleh Aich is a **Senior Mechanical & Maintenance Engineer** with over **20 years** of extensive experience within the **Oil & Gas**, **Petrochemical** and **Refining** industries. His expertise widely covers in the areas of **Combustion** Techniques, **Combustion** System Performance, **Pump** Operation & Maintenance, **Compressor** Maintenance & Troubleshooting, **Gas Turbine** Control & Protection Systems, **Valve** Troubleshooting & Maintenance, **Vibration** Analysis, **Oil** Analysis, **Dry Gas Seals**, Packing & Mechanical **Seals**, **Seal** Support Systems, **Mechanical Seal** Failure Analysis & Troubleshooting, **Seal** Maintenance & Repair, **Bearing** Care & Maintenance, **Couplings & Alignment**, **Alignment Methods**, Troubleshooting **Piping & Pipe Support** Systems, **Heat Exchangers** Maintenance & Inspection, **Pressure Vessel** Design, Fabrication & Testing, **Burners**, **Blowers**, Piston & Plunger **Gearboxes**, Fin-Fans, Separators, Expansion Drums, Filters, Molecule Sieve, Tanks, Fittings, Root Cause Failure Analysis (**RCFA**), Computerized Maintenance Management System (**CMMS**), **Maintenance** Management, **Planning & Scheduling** Work Management, **Parts & Inventory** Management, **Turnaround & Shutdowns**, **Condition Monitoring**, Regeneration Unit, NGL & Condensate, **Furnace** Operation & Troubleshooting, Performance Measure & Indicators, Total Productive Maintenance (**TPM**), **Preventive & Predictive** Maintenance Analysis, **Rotating & Static Equipment**, **Machinery & Equipment** Failure Analysis, **Gas & Steam Turbines**, **Boilers**, **Coolers**, **Diesel & Gas Engines**, **Heaters**, **Separators**, **Storage Tanks**, H_2S and ISO 9001:2008 Internal Quality Management System.

During his career life, Mr. Saleh has gained his practical and field experience through his various significant positions and dedication as the **Maintenance Instructor**, **Mechanical Supervisor**, **Maintenance Engineer**, **Mechanical Engineer**, **Contract Engineer**, **Planning Engineer** and **Senior Instructor/Lecturer** for various multi-national companies such as the ADNOC Gas Processing (**GASCO**), **ConocoPhillips** and Syrian Gas Company.

Mr. Saleh has a **Bachelor** degree in **Mechanical Engineering**. Further, he is a **Certified Instructor/Trainer** and has acquired various certifications and has further delivered numerous trainings, courses, workshops, seminars and conferences worldwide.

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.

Training Methodology

Our courses employ an interactive, learner-centred methodology that integrates theoretical knowledge with practical application. The training is delivered through a suitable combination of some or all of the following methods, selected according to the course content and learning objectives:

- Instructor-led presentations and facilitated discussions
- Practical workshops and participant presentations
- Hands-on exercises and real-world case studies
- Equipment demonstrations and technical drawings
- Hardware- and software-based simulations
- Gamification & Role Play in soft-skills courses only
- Virtual Reality (VR) and Augmented Reality (AR)
- Instructional videos and other relevant training resources

This blended approach encourages active participation, strengthens practical skills and supports the effective application of acquired knowledge in the workplace.

Learning Design & Customization

This course can be customized to the exact requirements of clients. Haward Technology is so proud of our huge capabilities in tailoring our courses to the training needs of our valued clients.

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	***Compressor Types***
0930 – 0945	*Break*
0945 – 1100	***Principles of Gas Compression***
1100 – 1230	***Effect of Staging, Stage and Interstage Cooling***
1230 – 1245	*Break*
1245 – 1330	***Mechanical Design of Centrifugal Compressors***
1330 – 1420	***Centrifugal Compressor Alignment Techniques & Support Criteria***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0930	***Centrifugal Compressor Parameters***
0930 – 0945	*Break*
0945 – 1100	***Selection of Centrifugal Process Compressors***
1100 – 1230	***Positive Displacement Compressors***
1230 – 1245	*Break*
1245 – 1330	***Reciprocating Compressor Cycle***
1330 – 1420	***Effect of Staging***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0930	***Oil Free Cylinders–Floating Pistons***
0930 – 0945	*Break*
0945 – 1100	***Condensation***
1100 – 1230	***Liquid Slugs***
1230 – 1245	*Break*
1245 – 1330	***Reciprocating Compressor Valves–Valve Response***
1330 – 1420	***Reciprocating Compressor Capacity Control***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

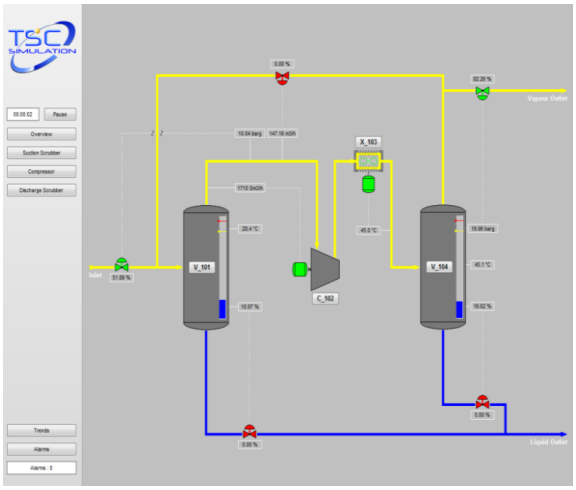
0730 – 0930	***Performance Considerations***
0930 – 0945	*Break*
0945 – 1100	***Gas Pulsations–Reduction of Pulsations***
1100 – 1230	***Stating up, Running, Shutting Down***
1230 – 1245	*Break*
1245 – 1420	***Screw Compressors***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

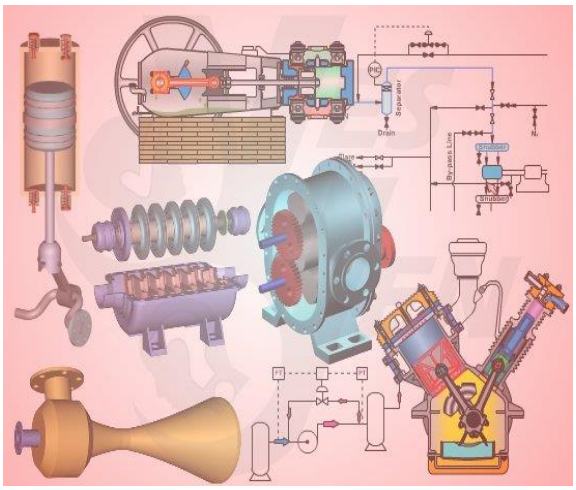
0730 – 0930	***Areas of Application***
0930 – 0945	*Break*
0945 – 1100	***Operating Principles***
1100 – 1230	***Capacity Control***
1230 – 1245	*Break*
1245 – 1345	***Performance***
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulator (Hands-on Practical Sessions)

Practical 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" and "CBT on Compressors".



SIM 3300 Centrifugal Compressor Simulator



CBT on Compressors

Course Coordinator

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