



COURSE OVERVIEW ME0780 **Reciprocating Compressor**

Course Title

Reciprocating Compressor

Course Date/ Venue

August 16-20, 2026/TBA Meeting Room, Royal Tulip Muscat, Muscat, Oman or, TBA Meeting Room, Dusit D2 Salwa, Doha, Qatar

Course Reference

ME0780

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 aim of this course is to provide delegates with a detailed and up-to-date overview of fundamentals and practice of reciprocating compressors. Many present-day compressors are likely to have been designed with the emphasis on reduced weight, less floor space and less initial cost. Today, it is also necessary to consider aspects of maintainability and life cycle cost. So the course looks at issues of design, operation, preventative maintenance, overhaul and repair, troubleshooting and safety in operation.



At the completion of the course, participant will be able to identify the various applications of reciprocating compressor; recognize the design and materials for compressor components; review and improve the operation and maintenance of reciprocating compressors; carryout overhauling and repairing techniques of reciprocating compressors; apply troubleshooting to various compressor problems; identify the importance of preventive maintenance of reciprocating compressors; and emphasize the safety in the operation and maintenance and reciprocating compressors.



Course Objectives/Outcomes & Benefits for the Participants

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

- Apply and gain an in-depth knowledge on reciprocating compressors and their various applications
- Recognize the design and materials for compressor components
- Review and improve the operation and maintenance of reciprocating compressors
- Carryout overhauling and repairing techniques of reciprocating compressors
- Employ troubleshooting to various compressor problems
- Identify the importance of preventive maintenance for reciprocating compressors
- Emphasize the safety in the operation and maintenance of reciprocating compressors

Who Should Attend

This course provides an overview of all significant aspects and considerations of reciprocating compressors for engineers, managers and other technical staff in all industries using reciprocating compressors.

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**.*

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.

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 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. Andrew Ladwig is a **Senior Process & Mechanical Maintenance Engineer** with over **25 years** of extensive experience within the **Oil & Gas, Refinery, Petrochemical & Power** industries. His expertise widely covers in the areas of **Centrifugal & Reciprocating Compressor, Screw Compressor Troubleshooting, Reciprocating Compressors Operation & Maintenance, Ammonia Manufacturing & Process Troubleshooting, Distillation Towers, Crude Oil Distillation, Ammonia Storage & Loading Systems, Operational Excellence in Ammonia Plants, Fertilizer Storage Management (Ammonia & Urea), Fertilizer Manufacturing Process Technology, Sulphur Recovery, Phenol Recovery & Extraction, Refining Process & Petroleum Products, Refinery Planning & Economics, Hydrotreating & Hydro-processing, Separators in Oil & Gas Industry, Gas Testing & Energy Isolations, Industrial Liquid Mixing, Extractors, Fractionation, Water Purification, Water Transport & Distribution, Environmental Emission Control, Process Plant Troubleshooting & Engineering Problem Solving, Process Plant Performance, Plant Startup & Shutdown, Process Troubleshooting Techniques** and Oil & Gas Operation/Surface Facilities. Further, he is also well-versed in **Rotating Machinery (BRM), Rotating Equipment Operation & Troubleshooting, Root Cause Analysis (RCA), Process Plant Shutdown, Turnaround & Troubleshooting, Planning & Scheduling Shutdowns & Turnarounds, Optimizing Equipment Maintenance & Replacement Decisions, Maintenance Planning & Scheduling, Material Cataloguing, Maintenance, Reliability & Asset Management Best Practices, Storage Tanks Operations & Measurements, Tank Inspection & Maintenance, Pressure Vessel Operation, Flare & Relief System, Flaring System Operation, PSV Inspection & Maintenance, Heat Exchanger Overhaul & Testing, Pipe Stress Analysis, Control Valves & Actuators, Vent & Relief System, Centrifugal & Reciprocating Pump Installation & Repair, Heat Exchanger Troubleshooting & Maintenance, Steam Trapping & Control, Control & ESD System and Detailed Engineering Drawings, Codes & Standards.**

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.

Course Fee

Muscat	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.
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.

Accommodation

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

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, 16th of August 2026

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	PRE-TEST
0830 – 0930	Reciprocating Compressors & their Applications Introduction • What is a Compressor? • How Compressors Work • Methods of Compression • Types of Compressors • Compressor • Definitions
0930 – 0945	Break
0945 – 1100	Reciprocating Compressors & their Applications (cont'd) Pressure • Pressure Definitions Associated with Compressors • Theory of Reciprocating Compressors • Characteristics of Reciprocating Compressors • Compressor Type Selection • Reciprocating Compressor Cylinder Arrangements
1100 – 1230	Design & Materials for Compressor Components Materials of Construction • Non-Lubricated or Oil-Free Cylinder Construction • Piston Rod Column or Frame Loading • Disturbing or Shaking Forces
1230 – 1245	Break
1245 – 1420	Design & Materials for Compressor Components (cont'd) Foundations for Reciprocating Compressors • Compressor Piping and Pulsation • Design Overview of Labyrinth • Piston Compressors
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	End of Day One

Day 2: Monday, 17th of August 2026

0730 – 0930	Operation & Maintenance of Reciprocating Compressors Lubrication of Reciprocating Compressors
0930 – 0945	Break

0945 – 1100	Operation & Maintenance of Reciprocating Compressors (cont'd) <i>Operational Problems and Maintenance of Compressor Valves</i>
1100 – 1230	Operation & Maintenance of Reciprocating Compressors (cont'd) <i>Compressor Piston Rod Packing • Compressor Control Systems • Compressor Cylinder Cooling</i>
1230 – 1245	<i>Break</i>
1245 – 1420	Operation & Maintenance of Reciprocating Compressors (cont'd) <i>Non-Lubricated Compressor Maintenance • Labyrinth-Piston Compressors</i>
1420 – 1430	Recap <i>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</i>
1430	<i>End of Day Two</i>

Day 3: Tuesday, 18th of August 2026

0730 – 0930	Overhaul & Repair of Reciprocating Compressors <i>Rule of Thumb for General Running Clearances • Compressor Alignment • Web Deflection Measurements</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Overhaul & Repair of Reciprocating Compressors (cont'd) <i>Compressor Cylinder Alignment • Foundation Problems and Repairs • Compressor Bearing Maintenance and Replacement</i>
1100 – 1230	Overhaul & Repair of Reciprocating Compressors (cont'd) <i>Cylinder Repair and Maintenance • Compressor Piston Maintenance • Rebuilding Compressor Pistons</i>
1230 – 1245	<i>Break</i>
1245 – 1420	Overhaul & Repair of Reciprocating Compressors (cont'd) <i>Installing Pistons on Piston Rods • Other Compressor Component Repairs • Compressor Part Replication</i>
1420 – 1430	Recap <i>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</i>
1430	<i>End of Day Three</i>

Day 4: Wednesday, 19th of August 2026

0730 – 0930	Troubleshooting Compressor Problems <i>Compressor Problems • Typical Compressor Problems • Troubleshooting Lubrication Systems • Significance of Inter-Cooler Pressures • Inter-Stage Pressures</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Troubleshooting Compressor Problems (cont'd) <i>Belt Drives • Motor Controls • Diagnostic Tests • Evaluating Reciprocating Compressor Condition Using Ultrasound and Vibration Patterns • Compressor Service Technician Reports • Basic Air Compressor System Evaluation</i>
1100 – 1230	Preventive Maintenance for Reciprocating Compressors <i>Compressor Maintenance • Emergency Repairs should be Minimized</i>
1230 – 1245	<i>Break</i>

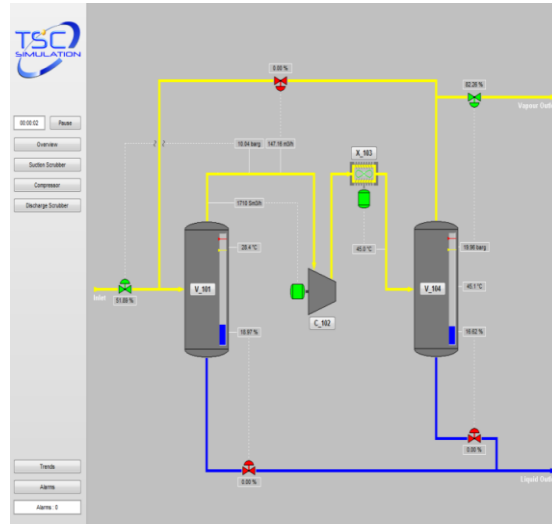
1245 – 1420	Preventive Maintenance for Reciprocating Compressors (cont'd) Effectiveness of Preventive Maintenance • Compressor Preventive Maintenance Program
1420 - 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	End of Day Four

Day 5: Thursday, 20th of August 2026

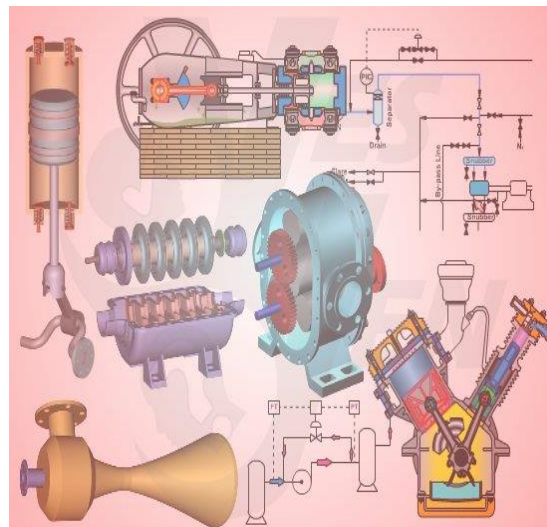
0730 – 0930	Preventive Maintenance for Reciprocating Compressors (cont'd) Spare Parts Vendor Selection • Personnel Training • Maintenance Contractors
0930 – 0945	Break
0945 – 1100	Preventive Maintenance for Reciprocating Compressors (cont'd) Predictive Maintenance • Integrated Condition Monitoring Systems
1100 – 1230	Safety in Operation & Maintenance Basic Safety Rules • Lock-Out/Tag-Out Program • Safe Maintenance Procedures Restated
1230 - 1245	Break
1245 - 1345	Safety in Operation & Maintenance (cont'd) Valve Installation • Fires and Explosions • Summary • Air Piping
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	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 “SIM 3300 Centrifugal Compressor” and “CBT on Compressors”.



SIM 3300 Centrifugal Compressor Simulator



CBT on Compressors

Course Coordinator

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