



COURSE OVERVIEW ME1018-4D
API-618: Reciprocating Compressors for Petroleum, Petrochemical & Gas Industries

Course Title

API-618: Reciprocating Compressors for Petroleum, Petrochemical & Gas Industries

Course Date/Venue

October 21-24, 2024/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference

ME1018-4D

Course Duration/Credits

Four days/2.4 CEUs/24 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 participants with a detailed and up-to-date overview of reciprocating compressors for petroleum, petrochemical and gas industries in accordance with the API 618 standards. It covers the types of compressors including the fundamentals and basic design of reciprocating compressors; the bolting and flanges; calculating cold runout; the allowable speeds, discharge temperature, rod and gas loads and critical speeds; the compressor cylinders, valves and unloaders; and the pistons, piston rods and piston rings.



During this interactive course, participants will learn the crankcases, crankshafts, connecting rods, bearings and crossheads; the distance pieces, packing cases and pressure packing; the lubrication, materials, nameplates and rotation arrows; the compressor drivers, couplings and guards; the reduction gears, belt drives, mounting plates and controls and instrumentation; the piping and appurtenances, intercoolers, aftercoolers and separators; the pulsation, vibration control and air intake filters; and the special tools and inspection and testing of reciprocating compressor.

Course Objectives

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

- Apply and gain an in-depth knowledge on reciprocating compressors for petroleum, petrochemical and gas industries in accordance with API-618 standards
- Identify the types of compressors and discuss the fundamentals and basic design of reciprocating compressors
- Recognize bolting and flanges and calculate cold runout as well as discuss allowable speeds and discharge temperature
- Identify rod and gas loads, critical speeds, compressor cylinders, valves and unloaders
- Determine pistons, piston rods, and piston rings including crankcases, crankshafts, connecting rods, bearings and crossheads
- Discuss distance pieces, packing cases, pressure packing, lubrication, materials, nameplates and rotation arrows
- Identify compressor drivers, couplings and guards, reduction gears, belt drives, mounting plates and controls and instrumentation
- Recognize piping, appurtenances, intercoolers, aftercoolers, separators, pulsation, vibration control and air intake filters
- Identify special tools and apply proper inspection and testing of reciprocating compressor

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 compressors for petroleum, petrochemical and gas industries in accordance with API 618 standards for mechanical, process and chemical engineers, product engineers and technologists, operation, technical service and maintenance professionals, engineers, consultants and sales professionals and technical professionals responsible for rotating equipment inspection and technical professionals responsible for interdisciplinary energy projects.

Course Fee


US\$ 4,500 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 **2.4 CEUs** (Continuing Education Units) or **24 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, Process Safety Design, Certified Process Plant Operations, Control & Troubleshooting, Operator Responsibilities, Storage Tanks Operations & Measurements, Tank Design, Construction, Inspection & Maintenance, Atmospheric Tanks, 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, Plant & Equipment Integrity, 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**), **Material Cataloguing**, Specifications, Handling & Storage, **Steam Trap Design, Operation, Maintenance & Troubleshooting, Steam Trapping & Control, Column, Pump Technology, Pump Selection & Installation, Centrifugal Pumps Troubleshooting, Pumps Design, Selection & Operation, 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), Project Engineering, Data Analysis, Process Hazard Analysis (PHA), 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: Monday, 21st of October 2024

0730 – 0800	<i>Registration & Coffee</i>
0800 – 0815	<i>Welcome & Introduction</i>
0815 – 0830	PRE-TEST
0830 – 0900	<i>Introduction to API-618</i>
0900 – 0930	<i>Types of Compressors</i>
0930 – 0945	<i>Break</i>
0945 – 1030	<i>Fundamentals of Reciprocating Compressors</i>
1030 – 1130	<i>Basic Design of Reciprocating Compressors</i>
1130 – 1230	<i>Bolting & Flanges</i>
1230 – 1245	<i>Break</i>
1245 – 1315	<i>Calculating Cold Runout</i>
1315 – 1345	<i>Allowable Speeds</i>
1345 – 1420	<i>Allowable Discharge Temperature</i>
1420 – 1430	Recap
1430	<i>Lunch & End of Day One</i>

Day 2: Tuesday, 22nd of October 2024

0730 – 0830	Rod & Gas Loads
0830 – 0930	Critical Speeds
0930 – 0945	<i>Break</i>
0945 – 1030	Compressor Cylinders
1030 – 1130	Valves & Unloaders
1130 – 1230	Pistons, Piston Rods, & Piston Rings
1230 – 1245	<i>Break</i>
1245 – 1315	Crankcases, Crankshafts, Connecting Rods, Bearings & Crossheads
1315 – 1345	Distance Pieces
1345 – 1420	Packing Cases & Pressure Packing
1420 – 1430	Recap
1430	<i>Lunch & End of Day Two</i>



Day 3: Wednesday, 23rd of October 2024

0730 - 0830	<i>Lubrication</i>
0830 - 0930	<i>Materials, Nameplates & Rotation Arrows</i>
0930 - 0945	<i>Break</i>
0945 - 1030	<i>Compressor Drivers</i>
1030 - 1130	<i>Couplings & Guards</i>
1130 - 1230	<i>Reduction Gears</i>
1230 - 1245	<i>Break</i>
1245 - 1345	<i>Belt Drives</i>
1345 - 1420	<i>Mounting Plates</i>
1420 - 1430	<i>Recap</i>
1430	<i>Lunch & End of Day Three</i>

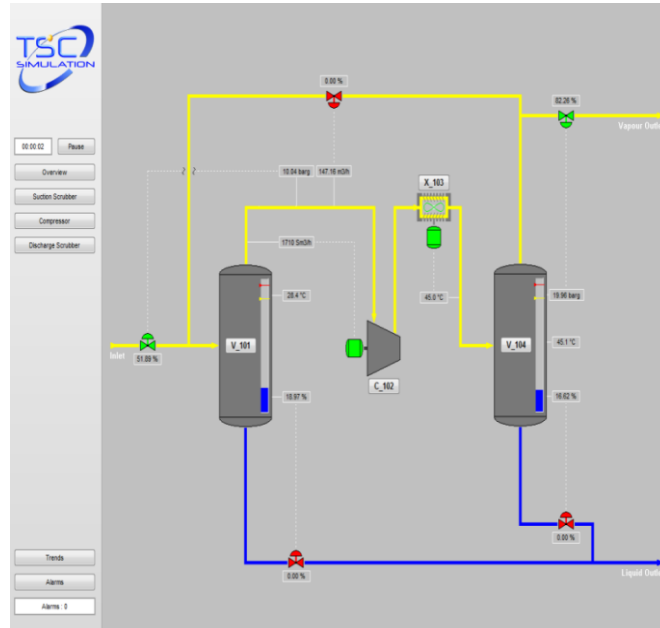
Day 4: Thursday, 24th of October 2024

0730 - 0830	<i>Controls & Instrumentation</i>
0830 - 0930	<i>Piping & Appurtenances</i>
0930 - 0945	<i>Intercoolers, Aftercoolers & Separators</i>
0945 - 1030	<i>Break</i>
1030 - 1130	<i>Pulsation & Vibration Control</i>
1130 - 1230	<i>Air Intake Filters</i>
1230 - 1245	<i>Break</i>
1245 - 1330	<i>Special Tools</i>
1330 - 1345	<i>Inspection & Testing of Reciprocating Compressor</i>
1345 - 1400	<i>Course Conclusion</i>
1400 - 1415	<i>POST-TEST</i>
1415 - 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch & End of Course</i>

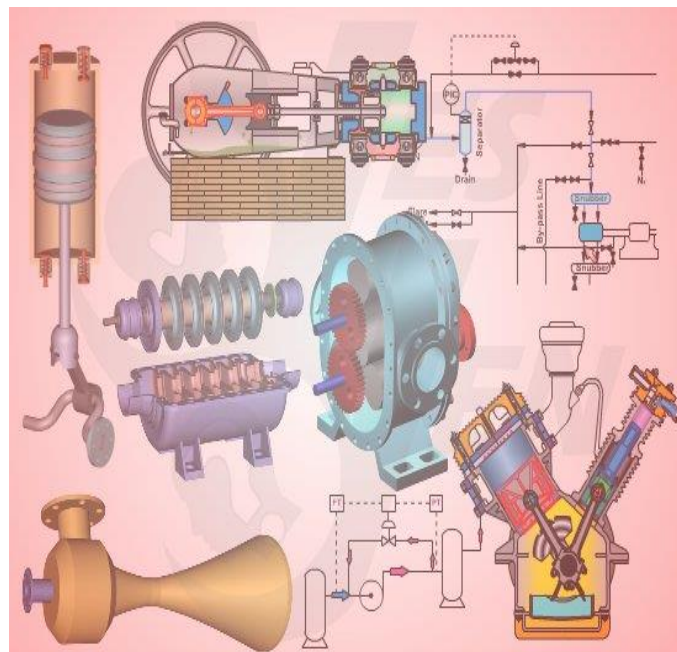


Simulator (Hands-on Practical Sessions)

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