

COURSE OVERVIEW ME0791
Screw Compressor Overhauling

Course Title

Screw Compressor Overhauling

Course Date/Venue

Session 1: February 23-27, 2025/Business Meeting, Crowne Plaza Al Khobar, Al Khobar, KSA
 Session 2: July 27-31, 2025/Business Meeting, Crowne Plaza Al Khobar, Al Khobar, KSA



Course Reference
 ME0791



Course Duration/Credits

Five days/3.0 CEUs/30 PDHs

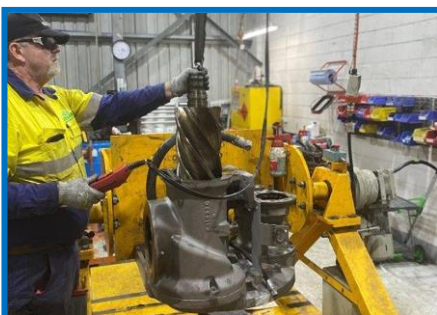
Course Description



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 participants with a detailed and up-to-date overview of Screw Compressor Overhauling. It covers the fundamentals of screw compressors including its types, working principles, applications, industrial uses, advantages and limitations; the key components of screw compressors covering compressor housing, casing, rotors, bearings, lubrication system, seals and cooling and filtration systems; the compressor overhauling, safety protocols and PPE for overhauling; the overhauling tools and equipment, document inspection findings and tracking replacement parts and consumables; the compressor disassembly procedure and accessing internal components; and the critical areas for inspection.



Further, the course will also discuss the rotor assembly, signs of rotor damage and bearing inspection and analysis; the seal inspection and replacement; the lubrication system and the cooling and filtration system inspection; the rotor repair techniques, bearing replacement and installation, seal replacement, alignment and leak testing; the lubrication system and cooling system maintenance; and the component testing and quality control.

During this interactive course, participants will learn the reassembly compressor components, lubrication and cooling system setup; the rotor alignment, balancing techniques for the rotor assembly, final alignment check for all components and minimizing vibration and noise; the leak testing and pressure checks, electrical and control system testing and operational testing and calibration; the performance testing and monitoring; diagnosing common compressor issues and analyzing root causes of failures; troubleshooting techniques for various components; the preventive maintenance practices and condition-based monitoring (CBM); and the documentation and reporting after overhaul, continuous improvement and best practices.

Course Objectives

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

- Apply and gain an in-depth knowledge on screw compressor overhauling
- Discuss the fundamentals of screw compressors including its types, working principles, applications, industrial uses, advantages and limitations
- Explain the key components of screw compressors covering compressor housing, casing, rotors, bearings, lubrication system, seals and cooling and filtration systems
- Apply compressor overhauling, safety protocols and PPE for overhauling
- Recognize the overhauling tools and equipment, document inspection findings and track replacement parts and consumables
- Carryout compressor disassembly procedure, access internal components and identify critical areas for inspection
- Inspect rotor assembly, identify signs of rotor damage and apply bearing inspection and analysis
- Perform seal inspection and replacement, check the lubrication system and apply cooling and filtration system inspection
- Employ rotor repair techniques, bearing replacement and installation, seal replacement, alignment and leak testing
- Refurbish the lubrication system and apply cooling system maintenance, component testing and quality control
- Reassemble compressor components and apply lubrication and cooling system setup
- Carryout rotor alignment, balancing techniques for the rotor assembly, final alignment check for all components and minimizing vibration and noise
- Conduct leak testing and pressure checks, electrical and control system testing and operational testing and calibration
- Carryout performance testing and monitoring, diagnose common compressor issues, analyze root causes of failures and apply troubleshooting techniques for various components
- Apply preventive maintenance practices, condition-based monitoring (CBM), documentation and reporting after overhaul, continuous improvement and best practices

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 screw compressor overhauling for engineers, supervisors and other technical staff who are responsible for the overhauling of compressors.

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\$ 7,000 per Delegate + **VAT**. 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 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: -

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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.

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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**. 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.

Course Instructor

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, Tank Farm Operations, 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), 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.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the workshop 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	Fundamentals of Screw Compressors Types of Screw Compressors (Single & Twin-Screw) • Working Principles of Screw Compressors • Applications & Industrial Uses • Advantages & Limitations
0930 – 0945	Break
0945 – 1030	Key Components of Screw Compressors Compressor Housing & Casing • Rotors & Bearings • Lubrication System & Seals • Cooling & Filtration Systems
1030 – 1130	Understanding Compressor Overhauling Definition & Purpose of Overhauling • Identifying When Overhauling is Necessary • Overview of Common Maintenance Versus Overhauling • Key Considerations in Overhauling
1130 – 1215	Preparation & Safety Measures Safety Protocols & PPE for Overhauling • Isolating & De-Energizing the Compressor • Safety Hazards Specific to Screw Compressors • Setting Up a Safe Work Area
1215 – 1230	Break
1230 – 1330	Overhauling Tools & Equipment Essential Tools for Disassembly & Reassembly • Measurement & Diagnostic Tools • Cleaning & Inspection Equipment • Proper Storage & Maintenance of Tools
1330 – 1420	Documentation & Record-Keeping Importance of Maintenance Records • Documenting Inspection Findings • Tracking Replacement Parts & Consumables • Creating an Overhaul Report
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

0730 – 0830	Compressor Disassembly Procedure Step-By-Step Disassembly Process • Removing External Components • Accessing Internal Components • Identifying Critical Areas for Inspection
0830 – 0930	Inspection of Rotor Assembly Rotor Condition & Wear Analysis • Clearance Measurements • Rotor Balance & Alignment • Identifying Signs of Rotor Damage
0930 – 0945	Break
0945 – 1100	Bearing Inspection & Analysis Types of Bearings in Screw Compressors • Signs of Bearing Wear or Failure • Bearing Clearance Measurement • Bearing Reconditioning or Replacement Criteria



1100 – 1215	Seal Inspection & Replacement <i>Types of Seals in Screw Compressors • Visual Inspection for Leaks & Wear • Criteria for Seal Replacement • Seal Installation Best Practices</i>
1215 – 1230	<i>Break</i>
1230 – 1330	Checking the Lubrication System <i>Importance of Lubrication in Screw Compressors • Inspecting Oil Filters & Separators • Testing Oil Quality & Viscosity • Flushing & Replacing the Lubrication System</i>
1330 – 1420	Cooling & Filtration System Inspection <i>Inspecting Heat Exchangers & Coolers • Cleaning or Replacing Air Filters • Checking Coolant Flow & Temperature • Maintaining Optimal Cooling Efficiency</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>Lunch & End of Day Two</i>

Day 3

0730 – 0830	Rotor Repair Techniques <i>Rotor Resurfacing & Coating • Balancing & Alignment Procedures • Rotor Rebuild Versus Replacement • Testing Rotor for Defects After Repair</i>
0830 – 0930	Bearing Replacement & Installation <i>Bearing Selection & Compatibility • Techniques for Bearing Installation • Ensuring Proper Fit & Clearance • Lubrication During Bearing Installation</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Seal Replacement & Alignment <i>Types of Seals & Selection Criteria • Removing & Replacing Seals Correctly • Ensuring Proper Seal Alignment • Leak Testing After Seal Replacement</i>
1100 – 1215	Refurbishing the Lubrication System <i>Cleaning & Flushing the Lubrication System • Replacing Oil Filters & Separators • Replenishing Oil & Checking for Leaks • Adjusting Lubrication Settings</i>
1215 – 1230	<i>Break</i>
1230 – 1330	Cooling System Maintenance <i>Cleaning & Descaling Heat Exchangers • Checking Coolant Levels & Flow Rates • Replacing Coolant if Necessary • Testing Cooling Efficiency Post-Repair</i>
1330 – 1420	Component Testing & Quality Control <i>Testing Components After Repair or Replacement • Ensuring Quality Control Standards • Checking for Vibrations & Alignment • Documenting Test Results & Adjustments</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>Lunch & End of Day Three</i>



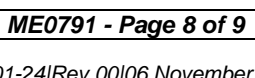


Day 4

0730 – 0830	Reassembly of Compressor Components <i>Step-By-Step Reassembly Process • Ensuring Proper Fit of All Components • Bolt Tightening Sequences & Torque Specs • Checking for Alignment & Clearances</i>
0830 – 0930	Lubrication & Cooling System Setup <i>Refilling & Testing the Lubrication System • Ensuring Coolant Flow & Temperature Control • Priming the Lubrication System • Final Lubrication & Coolant Checks</i>
0930 – 0945	Break
0945 – 1100	Alignment & Balancing <i>Importance of Rotor Alignment & Balance • Balancing Techniques for the Rotor Assembly • Final Alignment Check for All Components • Minimizing Vibration & Noise</i>
1100 – 1215	Leak Testing & Pressure Checks <i>Conducting Pressure Tests for Seals • Checking for Leaks in the System • Testing the Pressure Relief System • Ensuring System Integrity & Safety</i>
1215 – 1230	Break
1230 – 1330	Electrical & Control System Testing <i>Inspecting & Testing Electrical Connections • Checking Control Panel Functionality • Testing Sensors & Safety Devices • Calibration of Control Settings</i>
1330 – 1420	Operational Testing & Calibration <i>Running the Compressor Under Controlled Conditions • Checking Operational Parameters (Pressure, Temperature) • Fine-Tuning Control Settings • Monitoring Performance for Irregularities</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	Lunch & End of Day Four

Day 5

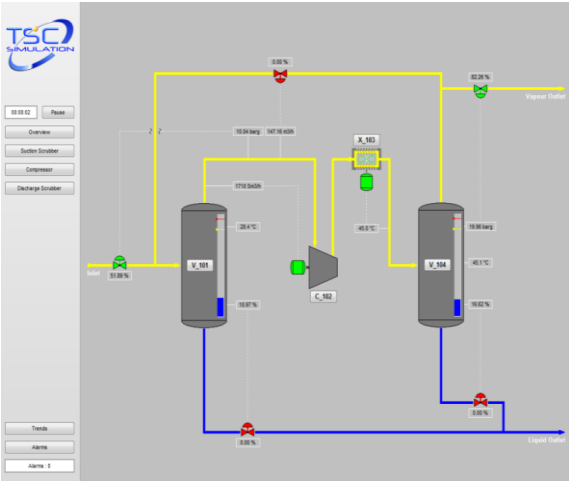
0730 – 0830	Performance Testing & Monitoring <i>Running Full-Load & No-Load Tests • Measuring Operational Efficiency • Checking Temperature & Pressure Readings • Analyzing Vibration & Noise Levels</i>
0830 – 0930	Troubleshooting Common Issues <i>Diagnosing Common Compressor Issues (e.g., Leaks, Vibrations) • Analyzing Root Causes of Failures • Troubleshooting Techniques for Various Components • Steps for Immediate Corrective Action</i>
0930 – 0945	Break
0945 – 1030	Preventive Maintenance Practices <i>Developing a Preventive Maintenance Schedule • Regular Inspection & Servicing Tasks • Monitoring Lubrication & Cooling Systems • Predictive Maintenance Techniques</i>
1030 – 1130	Condition-Based Monitoring (CBM) <i>Overview of CBM in Screw Compressors • Using Sensors & Analytics for Monitoring • Key Indicators for CBM (Vibration, Temperature, etc.) • Integrating CBM with Maintenance Planning</i>



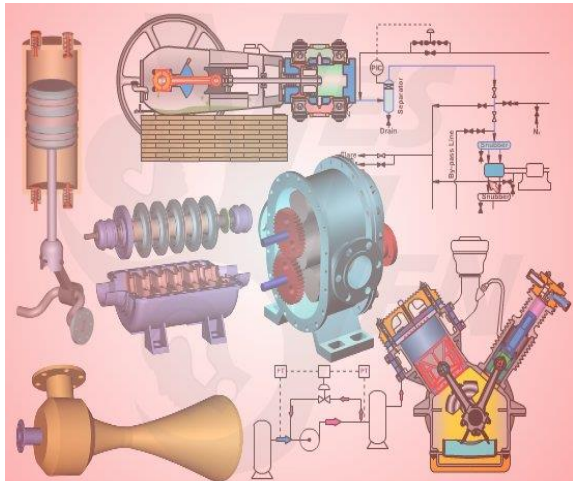
1130 – 1230	Documentation & Reporting After Overhaul Recording All Maintenance Activities • Creating a Post-Overhaul Performance Report • Documenting Component Replacements • Recommendations for Future Maintenance
1230 – 1245	Break
1245 – 1345	Continuous Improvement & Best Practices Reviewing Lessons Learned from Overhauling • Implementing Improvements in Maintenance Practices • Keeping up with Technological Advancements • Building a Knowledge Base for Efficient Overhauling
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)

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 simulators “SIM 3300 Centrifugal Compressor” and “CBT on Compressors”.



SIM 3300 Centrifugal Compressor Simulator



CBT on Compressors

Course Coordinator

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