

## <u>COURSE OVERVIEW ME0774</u> <u>Air Compressors-Diagnose/Troubleshoot & Repair</u>

## **Course Title**

Air Compressors-Diagnose/Troubleshoot & Repair

#### **Course Date/Venue**

June 23-27, 2025/Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

(30 PDHs)

## Course Reference

ME0774

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 a good working knowledge on air compressors. It covers the selection of suitable type of compressors for applications; suitable type of compressors for applications; function and classification of compressor; and some of the current common reasons of compressor component failure. Participants will be able to perform the better method for maintenance by recognizing the theoretical principles of compressor work; determine compressors. reciprocating rotary screw compressors, and compression process; recognize gas flow path, compressor components, balance drum and bearings; and interpret lubrication and cooling system, lube oil and oil seal systems, compressor drivers and coupling.

At the completion of the course, participants will be carryout compressor operation able to and compressor performance and efficiency; describe compressor surge and apply compressor control, protection and troubleshooting; compare and select compressors and implement compressor troubleshooting employ preventive guide; maintenance of compressors; and select, maintain and recognize future analysis as well as improve the mechanical skills performance through the implementation of international standards.



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## Course Objectives

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

- Maintain and troubleshoot air compressors in a professional manner
- Identify the various types of air compressors covering reciprocating units, rotary screw compressors, centrifugal compressors, casting, impeller, shaft and seals
- Recognize the design and function of air compressor as well as the lube quality
- Evaluate air compressor operating data
- Maintain air compressor, apply inspection and testing and troubleshoot compressor problems
- Discuss the do's and don'ts of DG as well as carryout best practices in operation and maintenance of compressor, compressor failure analysis and predictive maintenance of compressor
- Employ preventive maintenance and identify the types of maintenance programs and the purpose of preventive maintenance
- Fill-up inspection forms and list the vendor and contractor requirements
- Plan and implement preventive maintenance
- Illustrate methods of overhaul and repair, alignment and piston run-out
- Recognize foundation problems and apply component repair and rebuilding
- Troubleshoot compressor problems and perform basic approaches to compressor troubleshooting
- Enumerate typical problems and solutions, diagnose test and give various examples from recent failure incidents

## Exclusive Smart Training Kit - H-STK®



Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK**<sup>®</sup>). The **H-STK**<sup>®</sup> 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 air compressors for plant engineers, operators and technicians responsible for air compressors.

#### **Accommodation**

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



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## 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:



C 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 Fee

**US\$ 5,500** per Delegate + **VAT**. This rate includes H-STK<sup>®</sup> (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.



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#### 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. Dimitry Rovas, CEng, MSc, PMI-PMP, SMRP-CMRP is a Senior Mechanical & Maintenance Engineer with extensive industrial experience in Oil, Gas, Power and Utilities industries. His expertise includes Centrifugal Pumps & Troubleshooting, Reciprocating & Centrifugal Compressors, Air Compressor, Screw Compressor, Compressor Control & Protection, Gas & Steam Turbines, Turbine Operations, Gas Turbine Technology, Valves, Process Control Valves, Bearings & Lubrication, Advanced Machinery Dynamics, Pipeline System Design, Construction, Maintenance and Repair, Facilities & Pipeline Integrity Assessment, Pipeline Welding Practices, Internal Corrosion of Pipelines, Pipeline Integrity Management & Risk Assessment, Thermal Insulation, Insulation Standards &

Regulations, Insulation Materials & Selection, Piping System Insulation, Insulation Installation Techniques, Insulation Inspection & Quality Control, Insulation Thickness Calculation, Insulation & Corrosion Protection, Heat Exchanger & Boiler Insulation, Tanks & Vessels Insulation, Pipeline & Piping Insulation, Insulation Testing & Quality Assurance, Insulation Maintenance & Repair, Insulation Retrofitting, Impulse Tube Installation & Inspection, Parker Compression Fittings, Pipes & Fittings, PSV Inspection, Boiler Operation, Maintenance & Inspection, Root Cause Failure Analysis, Tank Design & Engineering, Tank Shell, Tanks & Tank Farms, Vacuum Tanks, Gas Turbine Operating & Maintenance, Diesel Engine, Engine Cycles, Governors & Maintenance, Crankshafts & Maintenance, Lubrication System Troubleshooting & Maintenance, Engines/Drivers, Motor Failure Analysis & Testing, Motor Predictive Maintenance, Engine Construction & Maintenance, HP Fuel Pumps & Maintenance, Fired Equipment Maintenance, Combustion Techniques, Process Heaters, Glass Reinforced Epoxy (GRE), Glass Reinforced Pipes (GRP), Glass Reinforced Vent (GRV), Mechanical Pipe Fittings, Flange Joint Assembly, Adhesive Bond Lamination, Butt Jointing, Joint & Spool Production, Isometric Drawings, Flange Assembly Method, Fabrication & Jointing, Jointing & Spool Fabrication, CAESAR, Pipe Stress Analysis, Pipe Cuttings, Flange Bolt Tightening Sequence, Hydro Testing, Pump Technology, Fundamentals of Pumps, Pump Selection & Installation, Rubber Compounding, Elastomers, Thermoplastic, Industrial Rubber Products, Rubber Manufacturing Systems, Heat Transfer, Vulcanization Methods, Process Plant Shutdown & Turnaround, Professional Maintenance Planner, Advanced Maintenance Management, Maintenance Optimization & Best Practices, Maintenance Auditing & Benchmarking, Material Cataloguing, Reliability Management, Rotating Equipment, Energy Conservation, Energy Loss Management in Electricity Distribution Systems, Energy Saving, Thermal Power Plant Management, Thermal Power Plant Operation & Maintenance, Heat Transfer, Machine Design, Fluid Mechanics, Heating & Cooling Systems, Heat Insulation Systems, Heat Exchanger & Cooling Towers, Mechanical Erection, Heavy Rotating Equipment, Material Unloading & Storage, Commissioning & Start-Up. Further, he is also well-versed in MS project & AutoCAD, EPC Power Plant, Power Generation, Combined Cycle Powerplant, Leadership & Mentoring, Project Management, Strategic Planning/Analysis, Construction Management, Team Formation, Relationship Building, Communication, Reporting and Six Sigma. He is currently the Project Manager wherein he is managing, directing and controlling all activities and functions associated with the domestic heating/cooling facilities projects.

During his life career, Mr. Rovas has gained his practical and field experience through his various significant positions and dedication as the EPC Project Manager, Field Engineer, Thermal Insulation Engineer, Mechanical Engineer, Preventive Maintenance Engineer, Senior Thermal Insulation Technician, Researcher, Instructor/Trainer, Telecom Consultant and Consultant from various companies such as the Podaras Engineering Studies, Metka and Diadikasia, S.A., Hellenic Petroleum Oil Refinery and COSMOTE.

Mr. Rovas has a Master's degree in Energy Production & Management and Mechanical Engineering from the National Technical University of Athens (NTUA), Greece. Further, he is a Certified Instructor/Trainer, a Certified Maintenance and Reliability Professional (CMRP) from the Society of Maintenance & Reliability Professionals (SMRP), Certified Project Management Professional (PMI-PMP), Certified Six Sigma Black Belt, Certified Internal Verifier/Assessor/Trainer by the Institute of Leadership & Management (ILM), Certified Construction Projects Contractor, Certified Energy Auditor and a Chartered Engineer. Moreover, he is an active member of American Society for Quality, Project Management Institute (PMI), Body of Certified Energy Auditors and Technical Chamber of Greece. He has further received various recognition and awards and delivered numerous trainings, seminars, courses, workshops and conferences internationally



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## Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-ofthe-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, 23 <sup>rd</sup> of June 2025
0730 – 0800	Registration & Coffee
0800 - 0815	Welcome & Introduction
0815 - 0830	PRE-TEST
0830 - 0930	Types of Air CompressorsReciprocating UnitsRotary Screw CompressorsCentrifugal Compressors
0930 - 0945	Break
0945 – 1100	<i>Types of Air Compressors (cont'd)</i> <i>Casting</i> • <i>Impeller</i> • <i>Shaft and Seals</i>
1100 – 1230	Design & Function of Air CompressorAir Systems • Receiver Tanks • Air Dryers • Filters
1230 - 1245	Break
1245 - 1420	Design & Function of Air Compressor (cont'd)Piping Distribution System• Electrical System• PLC, Instrumentation &Control• Lube and Seal Oil
1420 - 1430	Recap
1430	Lunch & End of Day One
Day 2:	Tuesday, 24 <sup>th</sup> of June 2025
<b>Day 2:</b> 0730 - 0930	Tuesday, 24th of June 2025Lube QualityLube Oil Reservoir • Lube Oil Pump • Lube Oil Cooler • Lube Oil Filter •Lube Oil Supply to Bearing • Lube Oil Supply to Governor • Lube Oil HeadTank
<b>Day 2:</b> 0730 - 0930 0930 - 0945	Tuesday, 24 <sup>th</sup> of June 2025     Lube Quality   Lube Oil Reservoir • Lube Oil Pump • Lube Oil Cooler • Lube Oil Filter •     Lube Oil Supply to Bearing • Lube Oil Supply to Governor • Lube Oil Head     Tank     Break
<b>Day 2:</b> 0730 - 0930 0930 - 0945 0945 - 1100	Tuesday, 24 <sup>th</sup> of June 2025     Lube Quality     Lube Oil Reservoir • Lube Oil Pump • Lube Oil Cooler • Lube Oil Filter •     Lube Oil Supply to Bearing • Lube Oil Supply to Governor • Lube Oil Head     Tank     Break     Lube Quality (cont'd)     Seal Oil Pump • Seal Oil Filter • Seal Oil Head Tank • Shaft Sealing •     Degassing Tank
<b>Day 2:</b> 0730 - 0930 0930 - 0945 0945 - 1100 1100 - 1230	Tuesday, 24th of June 2025Lube QualityLube Oil Reservoir • Lube Oil Pump • Lube Oil Cooler • Lube Oil Filter •Lube Oil Supply to Bearing • Lube Oil Supply to Governor • Lube Oil HeadTankBreakLube Quality (cont'd)Seal Oil Pump • Seal Oil Filter • Seal Oil Head Tank • Shaft Sealing •Degassing TankEvaluation of Air Compressor Operating DataPerformance Curves • Surge Phenomenon • Compressor Heating and Cooling •Compressed Air Audits
<b>Day 2:</b> 0730 - 0930 0930 - 0945 0945 - 1100 1100 - 1230 1230 - 1245	Tuesday, 24 <sup>th</sup> of June 2025     Lube Quality   Lube Oil Reservoir • Lube Oil Pump • Lube Oil Cooler • Lube Oil Filter •     Lube Oil Supply to Bearing • Lube Oil Supply to Governor • Lube Oil Head     Tank     Break     Lube Quality (cont'd)     Seal Oil Pump • Seal Oil Filter • Seal Oil Head Tank • Shaft Sealing •     Degassing Tank     Evaluation of Air Compressor Operating Data     Performance Curves • Surge Phenomenon • Compressor Heating and Cooling •     Compressed Air Audits     Break
Day 2: 0730 - 0930 0930 - 0945 0945 - 1100 1100 - 1230 1230 - 1245 1245 - 1420	Tuesday, 24th of June 2025Lube QualityLube Oil Reservoir • Lube Oil Pump • Lube Oil Cooler • Lube Oil Filter •Lube Oil Supply to Bearing • Lube Oil Supply to Governor • Lube Oil HeadTankBreakLube Quality (cont'd)Seal Oil Pump • Seal Oil Filter • Seal Oil Head Tank • Shaft Sealing •Degassing TankEvaluation of Air Compressor Operating DataPerformance Curves • Surge Phenomenon • Compressor Heating and Cooling •Compressed Air AuditsBreakEvaluation of Air Compressor Operating Data (cont'd)Heat Recovery • Economics, Operating Costs and Energy Efficiency • LoadFactor
Day 2: 0730 - 0930 0930 - 0945 0945 - 1100 1100 - 1230 1230 - 1245 1245 - 1420 1420 - 1430	Tuesday, 24 <sup>th</sup> of June 2025     Lube Quality     Lube Oil Reservoir • Lube Oil Pump • Lube Oil Cooler • Lube Oil Filter •     Lube Oil Supply to Bearing • Lube Oil Supply to Governor • Lube Oil Head     Tank     Break     Lube Quality (cont'd)     Seal Oil Pump • Seal Oil Filter • Seal Oil Head Tank • Shaft Sealing •     Degassing Tank     Evaluation of Air Compressor Operating Data     Performance Curves • Surge Phenomenon • Compressor Heating and Cooling •     Compressed Air Audits     Break     Evaluation of Air Compressor Operating Data (cont'd)     Heat Recovery • Economics, Operating Costs and Energy Efficiency • Load     Factor     Recap



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Day 3:	Wednesday, 25 <sup>th</sup> of June 2025
0730 - 0930	<i>Air Compressor Maintenance</i> <i>Inspection and Testing</i> • <i>Basic Compressor Spares</i> • <i>Troubleshooting Compressor</i> <i>Problems</i> • <i>Maintenance Chart</i>
0930 - 0945	Break
0945 - 1100	Air Compressor Maintenance (cont'd)Do's and Don'ts of DGBest Practices in Operation & Maintenance ofCompressorCompressorPredictive Maintenance ofCompressor
1100 - 1230	Preventive MaintenanceTypes of Maintenance ProgramsPurpose of Preventive MaintenanceInspection & Inspection Forms
1230 – 1245	Break
1245 - 1420	<b>Preventive Maintenance (cont'd)</b> Vendor & Contractor Requirements • Planning & Implementation
1420 - 1430	Recap
1430	Lunch & End of Day Three

Day 4:	Thursday, 26 <sup>th</sup> of June 2025
0730 - 0930	Overhaul & Repair
	Methods of Repair & Overhaul
0930 - 0945	Break
0945 – 1100	Overhaul & Repair (cont'd)
	Alignment & Piston Rod Run Out
1100 – 1230	Overhaul & Repair (cont'd)
	Foundation Problems & Repair
1230 - 1245	Break
1245 – 1420	Overhaul & Repair (cont'd)
	Component Repair & Rebuilding
1420 - 1430	Recap
1430	Lunch & End of Day Four

Day 5:	Friday, 27 <sup>th</sup> of June 2025
0730 - 0930	Troubleshooting Compressor Problems
	Basic Approaches to Compressor Troubleshooting
0930 - 0945	Break
0945 - 1100	Troubleshooting Compressor Problems (cont'd)
	<i>Typical Problems &amp; Solutions</i>
1100 – 1230	Troubleshooting Compressor Problems (cont'd)
	Diagnostic Test
1230 - 1245	Break
1245 - 1345	Troubleshooting Compressor Problems (cont'd)
	Examples from Recent Failure Incidents
1345 - 1400	Course Conclusion
1400 - 1415	Presentation of Course Certificates
1415 - 1430	POST-TEST
1430	Lunch & End of Course



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## 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 the state-of-the-art simulator "SIM 3300 Centrifugal Compressor" and "CBT on Compressors".



### **Course Coordinator**

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



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