

## COURSE OVERVIEW ME0002 Fans and Blowers

### Course Title

Fans and Blowers

### Course Date/Venue

October 21-25, 2024/Fujairah Meeting Room,  
Grand Millennium Al Wahda Hotel, Abu Dhabi,  
UAE

### Course Reference

ME0002

### Course Duration/Credits

Five days/3.0 CEUs/30 PDHs



### Course Description



***This practical and highly-interactive course includes real-life case studies and exercises where participants will be engaged in a series of interactive small groups and class workshops.***

Proper maintenance of industrial fans and blowers is crucial for their efficient operation and longevity. Maintenance tasks may include regular cleaning of fan blades, checking for signs of wear or damage, lubricating moving parts, and replacing worn or damaged components. It is important to follow the manufacturer's recommendations for maintenance intervals and procedures, and to keep detailed records of maintenance activities for future reference. Regular maintenance can help prevent breakdowns and costly repairs, and ensure that fans and blowers continue to operate safely and effectively.



This course is designed to provide participants with a detailed and up-to-date overview of Fans and Blowers. It covers the blower and fan terms and characteristics; the different types of fans and their applications; the different functions of fan and blowers; the fan capacity control; the systematic approach and methodology assessment of fans and blowers; the energy efficiency opportunities and the difficulties in assessing the performance of fans and blowers; the checklist and worksheets used in blower and fan technology; and the performance problems for fans and blowers.



## Course Objectives

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

- Apply and gain an in-depth knowledge on fans and blowers
- Define the blower and fan terms and characteristics and identify the different types of fans and their applications
- Review and carryout fan performance and explain the different functions of fan and blowers
- Employ fan capacity control and apply the systematic approach and methodology assessment of fans and blowers
- Emphasize the energy efficiency opportunities and determine the difficulties in assessing the performance of fans and blowers
- Discuss the checklist and worksheets used in blower and fan technology
- Employ fan and blower operation and maintenance methodology
- Troubleshoot performance problems for fans and blowers

## Exclusive Smart Training Kit - H-STK®



Participants of this course will receive the exclusive “Howard 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 fans and blowers for mechanical maintenance technicians and engineers.

## 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 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

### 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. Mohamed Refaat, MSc, BSc, is a Senior Mechanical & Maintenance Engineer** with almost **30 years** of extensive experience in **Rotating Equipment** and **Machinery** including **Pumps, Compressors, Turbines, Motors, Turbo-expanders, Gears, etc.** His wide experience also covers **Centrifugal Compressor & Steam Turbine, Centrifugal Pump, Pump Technology, Gas Turbine Technology, Heat Exchanger, Turbines & Motors, Variable Speed Drives, Seals, Control Valves, Advanced Valve Technology, Dry Seal, Fired Heaters, Air Coolers, Crude Desalter, Process Vessels & Valves, Industrial Equipment & Rotating Machinery, Mechanical Engineering, Mechanical Equipment & Turbomachinery, Piping, Pipelines, Valves, Lubrication Technology, Vibration Analysis, Power System Hydraulics, Security Detection Systems & Operation, Process Plant Equipment, Troubleshooting Process Operations, Maintenance Management Best Practices, Rotating Equipment Reliability Optimization, Practical Machinery Vibration, Vibration Techniques, Effective Reliability Maintenance, Excellence in Maintenance & Reliability Management, Preventive & Predictive Maintenance, Machinery Failure Analysis (RCFA), Reliability Optimization & Continuous Improvement, Maintenance Planning, Scheduling & Work Control, Maintenance Management Strategy, Mechanical & Rotating Equipment Troubleshooting, Preventive Maintenance, Predictive Maintenance, Reliability Centered Maintenance (RCM), Condition Based Monitoring (CBM), FMEA and Troubleshooting of machinery and rotating equipment including turbines, bearings, compressors, pumps etc.** He is currently the **Mechanical Maintenance Section Head** of the **Arab Petroleum Pipelines Company** where he is in charge of planning, scheduling & managing the execution of preventive & corrective mechanical maintenance activities for all equipment. He is responsible for executing the scheduled inspections & major overhauls for gas turbines, valves & pumps, carrying out off-line vibration monitoring plans, troubleshooting, fault diagnosing & investigating failures of machinery.

During his career life, Mr. Mohamed was able to modify the gas turbines self cleansing system to improve its maintainability and extend the air filters' lifetime. He was responsible for defining & updating the equipment codes and parameters for replacing the old **CMMS** with **MAXIMO**. He also worked as the Operations Supervisor wherein he was closely involved with the operation of the crude oil internal **pipeline** system between the tankers and tank farm, operation & control of the booster pumps for pumping crude oil for main pipelines and the development & implementation of the plans & procedures for draining the main terminal internal lines for maintenance purposes. He also held the position of Measurement Engineer where he was responsible for the crude oil custody transfer, performing loss control analysis and operating the crude oil automatic sampler & related equipment. Prior to that, he was the Design Engineer responsible for the design phase of the Truck Mixer Manufacturing Project of the Mechanical Design Department.

Mr. Refaat has **Master** and **Bachelor** degrees in **Mechanical Engineering** and a General Certificate of Education (**GCE**) from the **University of London, UK**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management (ILM)** and a member of the Engineering Syndicate of Egypt. He has further delivered numerous training, courses, workshops, seminars and conferences worldwide.

**Course Fee**

**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.

**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, 21<sup>st</sup> of October 2024**

0730 - 0800	Registration & Coffee
0800 - 0815	Welcome & Introduction
0815 - 0830	<b>PRE-TEST</b>
0830 - 0930	<b>Introduction to Fans &amp; Blowers</b> What Are Fans and Blowers • Difference Between Fans, Blowers and Compressors • Typical Fan System Components • Atmospheric Pressure • Static Pressure
0930 - 0945	Break
0945 - 1100	<b>Introduction to Fans &amp; Blowers (cont'd)</b> Airflow Through a Round Duct of Constant Diameter, Velocity Pressure • Airflow Through a Converging • Cone • Airflow Through a Diverging Cone • Venturi Inlet
1100 - 1215	<b>Fan Performance</b> Fan Performance Test • Determining Air Flow • Example • Fan Performance Curve • Fan Speed • Input Power • Fan Surge • Fan Surge Line • Percent of Wide-Open Air Flow
1215 - 1230	Break
1230 - 1420	<b>Fan Performance (cont'd)</b> Tabular Performance Data • System Resistance Curve • System Resistance • Fan System Interaction • Higher System Resistance • Lower System Resistance • Static Efficiency • Constant-Volume System • Variable-Pitch Vaneaxial
1420 - 1430	<b>Recap</b> 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: Tuesday, 22<sup>nd</sup> of October 2024**

0730 - 0930	<b>Fan &amp; Blowers Types</b> Centrifugal Fans • Axial Fans • Forward Curved Fan • Backward Inclined Fan • Backward Curved Fan • Positive - Displacement Blowers
0930 - 0945	Break
0945 - 1100	<b>Fan &amp; Blowers Types (cont'd)</b> Foil Fan • Plug (Or Plenum) Fan • Vaneaxial Fan • Variable-Pitch Vaneaxial Fan
1100 - 1215	<b>Fan Capacity Control</b> Variable-Air-Volume System • Riding The Fan Curve • Forward Curved Centrifugal Fan • Fan Control Loop
1215 - 1230	Break





1230 - 1420	<b>Fan Capacity Control (cont'd)</b> Methods of Fan Capacity Control • Fan Speed Control • Variable –Pitch Blade Control
1420 - 1430	<b>Recap</b> 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 Two

**Day 3: Wednesday, 23<sup>rd</sup> of October 2024**

0730 - 0930	<b>Assessment of Fans &amp; Blowers</b> What Is Fan Efficiency and Performance
0930 - 0945	Break
0945 - 1100	<b>Assessment of Fans &amp; Blowers (cont'd)</b> Methodology of Fan Performance Assessment
1100 - 1215	<b>Fan &amp; Blower Operation</b> Safety
1215 - 1230	Break
1230 - 1420	<b>Fan &amp; Blower Operation (cont'd)</b> Operation Check List
1420 - 1430	<b>Recap</b> 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 Three

**Day 4: Thursday, 24<sup>th</sup> of October 2024**

0730 - 0930	<b>Maintenance &amp; Troubleshooting of Fans &amp; Blowers</b> General Motor Maintenance
0930 - 0945	Break
0945 - 1100	<b>Maintenance &amp; Troubleshooting of Fans &amp; Blowers (cont'd)</b> Drive Maintenance • Bearing Maintenance
1100 - 1215	<b>Maintenance &amp; Troubleshooting of Fans &amp; Blowers (cont'd)</b> Lubrication • Wheel and Shaft Maintenance
1215 - 1230	Break
1230 - 1420	<b>Maintenance &amp; Troubleshooting of Fans &amp; Blowers (cont'd)</b> Structural Maintenance • Air Capacity Problems
1420 - 1430	<b>Recap</b> 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 Four

**Day 5: Friday, 25<sup>th</sup> of October 2024**

0730 - 0930	<b>Maintenance &amp; Troubleshooting of Fans &amp; Blowers (cont'd)</b> Noise Problems • Vibration Problems
0930 - 0945	Break
0945 - 1100	<b>Maintenance &amp; Troubleshooting of Fans &amp; Blowers (cont'd)</b> Vibration Problems
1100 - 1215	<b>Maintenance &amp; Troubleshooting of Fans &amp; Blowers (cont'd)</b> Motor Problems





1215 - 1230	Break
1230 - 1345	<b>Maintenance &amp; Troubleshooting of Fans &amp; Blowers (cont'd)</b> Motor Problems • Drive Problems
1345 - 1400	<b>Course Conclusion</b> Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course
1400 - 1415	<b>POST-TEST</b>
1415 - 1430	Presentation of Course Certificates
1430	Lunch & End of Course

**Practical Sessions**

This practical and highly-interactive course includes real-life case studies and exercises:-



**Course Coordinator**

Mari Nakintu, Tel: +971 2 30 91 714, Email: [mari1@haward.org](mailto:mari1@haward.org)