



COURSE OVERVIEW ME0928 **Boilers - Safe Operation & Optimization**

Course Title

Boilers - Safe Operation & Optimization

Course Date/Venue

August 16-20, 2026/TBA Meeting Room,
Holiday Inn Corniche, Al Khobar, KSA

Course Reference

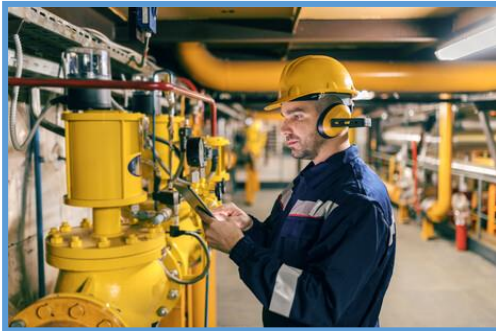
ME0928

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 Boilers - Safe Operation & Optimization. It covers the industrial boiler systems, boiler components and construction, boiler thermodynamics and heat transfer; the boiler fuel systems, boiler codes, standards and regulations and boiler safety fundamentals; the boiler start-up and shutdown procedures; the combustion fundamentals, burner management systems (BMS), boiler control systems and feedwater systems; the practical boiler operation, boiler water chemistry, feedwater treatment systems and boiler water problems; the preventive and predictive maintenance and boiler inspection techniques; and the boiler auxiliary equipment maintenance.



During this interactive course, participants will learn the boiler efficiency improvement, boiler performance monitoring and boiler troubleshooting; the emissions monitoring, environmental compliance, heat recovery systems and boiler safety management; the emergency response, incident management and boiler integrity management; and the boiler operational best practices covering load management strategies, multiple boiler operation, seasonal operating adjustments and reliability improvement methods.



Course Objectives/Outcomes & Benefits for the Participants

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

- Apply and gain an in-depth knowledge on safe operation and optimization of boilers
- Discuss industrial boiler systems, boiler components and construction as well as boiler thermodynamics and heat transfer
- Recognize boiler fuel systems, boiler codes, standards and regulations and boiler safety fundamentals
- Apply boiler start-up and shutdown procedures and discuss combustion fundamentals, burner management systems (BMS), boiler control systems and feedwater systems
- Carryout practical boiler operation and explain boiler water chemistry, feedwater treatment systems and boiler water problems
- Apply preventive and predictive maintenance, boiler inspection techniques and boiler auxiliary equipment maintenance
- Employ boiler efficiency improvement, boiler performance monitoring and boiler troubleshooting
- Carryout emissions monitoring and environmental compliance, heat recovery systems and boiler safety management
- Apply emergency response and incident management and boiler integrity management
- Implement boiler operational best practices covering load management strategies, multiple boiler operation, seasonal operating adjustments and reliability improvement methods

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 safe operation and optimization of boilers for boiler operators and shift supervisors, mechanical and maintenance engineers, power plant engineers and technicians, utility and facility engineers, process and production engineers, reliability and asset integrity professionals, HSE and safety officers, energy management specialists, plant managers and operations personnel, professionals responsible for boiler operation, safety compliance, efficiency improvement, and performance optimization.

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.

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 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 **Boilers & Balance of Plant (BOP), Boiler Tube Failure Mechanisms, Boiler Feed Pump Maintenance & Troubleshooting, 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, Centrifugal & Reciprocating Compressor, Screw Compressor Troubleshooting, 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.

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 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 workshop 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	Introduction to Industrial Boiler Systems Types of Industrial Boilers (Fire Tube, Water Tube & Package Boilers) • Boiler Applications Across Different Industries • Boiler Terminology and Operating Principles • Roles and Responsibilities of Boiler Operators
0930 – 0945	Break
0945 – 1030	Boiler Components & Construction Steam Drum, Mud Drum & Pressure Parts • Furnace, Burners & Combustion Chamber • Economizer, Superheater & Air Preheater • Feedwater and Steam Circulation Systems
1030 – 1130	Boiler Thermodynamics & Heat Transfer Basic Steam Generation Principles • Modes of Heat Transfer • Pressure-Temperature Relationships • Boiler Efficiency Fundamentals
1130 – 1215	Boiler Fuel Systems Natural Gas, Fuel Oil and Dual-Fuel Systems • Fuel Handling and Storage Requirements • Fuel Quality Considerations • Fuel Supply Safety Devices
1215 – 1230	Break

1230 – 1330	Boiler Codes, Standards & Regulations ASME Boiler & Pressure Vessel Code • National Boiler Inspection Code (NBIC) • OSHA and Occupational Safety Requirements • Environmental Regulations and Emissions Compliance
1330 – 1420	Boiler Safety Fundamentals Boiler Hazards and Accident Prevention • Pressure Safety Devices and Relief Valves • Safe Operating Limits • Personal Protective Equipment (PPE) Requirements
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: Monday, 17th of August 2026

0730 – 0830	Boiler Start-Up & Shutdown Procedures Cold Start Procedures • Warm Start Procedures • Normal Shutdown Methods • Emergency Shutdown Procedures
0830 – 0930	Combustion Fundamentals Combustion Chemistry • Air-to-Fuel Ratio Optimization • Excess Air Control • Complete versus Incomplete Combustion
0930 – 0945	Break
0945 – 1100	Burner Management Systems (BMS) Burner Operating Sequence • Flame Monitoring Systems • Ignition Safety Systems • Burner Interlocks and Permissives
1100 – 1215	Boiler Control Systems Drum Level Control • Pressure Control • Temperature Control • Automatic Boiler Control Systems
1215 – 1230	Break
1230 – 1330	Feedwater Systems Boiler Feed Pumps • Feedwater Heaters • Condensate Return Systems • Feedwater Control Strategies
1330 – 1420	Practical Boiler Operation Operator Rounds and Inspections • Operating Log Sheets • Routine Operating Adjustments • Abnormal Operating Condition Identification
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 Two

Day 3: Tuesday, 18th of August 2026

0730 – 0830	Boiler Water Chemistry Importance of Water Treatment • Boiler Water Contaminants • Water Quality Standards • Water Sampling Techniques
0830 – 0930	Feedwater Treatment Systems Water Softening • Reverse Osmosis Systems • Deaerators • Chemical Dosing Systems
0930 – 0945	Break

0945 – 1100	Boiler Water Problems Scale Formation • Corrosion Mechanisms • Foaming and Priming • Carryover Prevention
1100 – 1215	Preventive & Predictive Maintenance Preventive Maintenance Planning • Predictive Maintenance Techniques • Condition Monitoring • Maintenance Scheduling
1215 – 1230	Break
1230 – 1330	Boiler Inspection Techniques Internal Inspections • External Inspections • Non-Destructive Testing (NDT) • Thickness Measurement and Assessment
1330 – 1420	Boiler Auxiliary Equipment Maintenance Pumps and Valves • Fans and Blowers • Steam Traps • Instrumentation Maintenance
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 Three

Day 4: Wednesday, 19th of August 2026

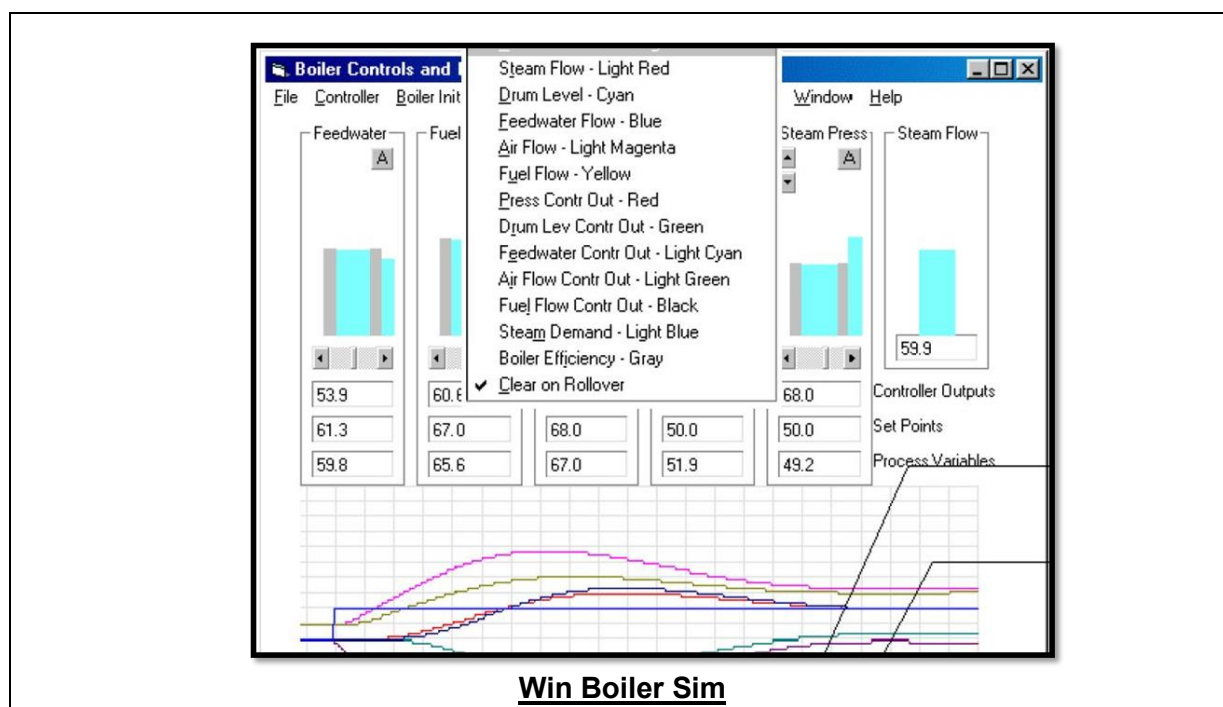
0730 – 0830	Boiler Efficiency Improvement Heat Loss Analysis • Combustion Optimization • Blowdown Optimization • Energy Conservation Opportunities
0830 – 0930	Boiler Performance Monitoring Key Performance Indicators (KPIs) • Boiler Efficiency Calculations • Fuel Consumption Analysis • Steam Generation Performance
0930 – 0945	Break
0945 – 1100	Boiler Troubleshooting Low Steam Pressure Diagnosis • Flame Failure Troubleshooting • Water Level Instability • Feedwater System Faults
1100 – 1215	Emissions Monitoring & Environmental Compliance NO _x Reduction Techniques • SO _x and Particulate Control • Flue Gas Monitoring • Environmental Reporting Requirements
1215 – 1230	Break
1230 – 1330	Heat Recovery Systems Economizer Optimization • Air Preheater Performance • Waste Heat Recovery • Condensate Recovery Systems
1330 – 1420	Boiler Optimization Case Studies Energy-Saving Opportunities • Combustion Tuning Examples • Performance Improvement Case Studies • Lessons Learned from Industrial Applications
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 Four

Day 5: Thursday, 20th of August 2026

0730 – 0830	Boiler Safety Management Process Safety Management (PSM) • Permit-to-Work Requirements • Lockout/Tagout (LOTO) • Risk Assessment Techniques
0830 – 0930	Emergency Response & Incident Management Boiler Tube Failure Response • Furnace Explosion Response • Steam Leak Emergency Procedures • Fire Emergency Response
0930 – 0945	Break
0945 – 1100	Boiler Integrity Management Remaining Life Assessment • Fitness-for-Service Principles • Boiler Life Extension Strategies • Risk-Based Inspection (RBI)
1100 – 1215	Boiler Operational Best Practices Load Management Strategies • Multiple Boiler Operation • Seasonal Operating Adjustments • Reliability Improvement Methods
1215 – 1230	Break
1230 – 1345	Practical Workshop & Performance Evaluation Boiler Operational Checklist Exercises • Combustion Tuning Demonstration • Efficiency Calculation Workshop • Troubleshooting Simulation Exercises
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)

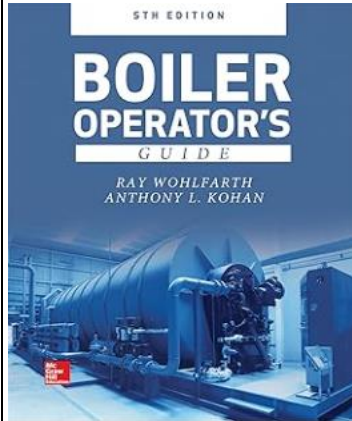
Practical session will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the simulator “Win Boiler Sim”.





Book(s)

As part of the course kit, the following e-book will be given to all participants:



Title : Boiler Operator's Guide
ISBN : 978-1260026993
Author : Ray Wohlfarth and Anthony L. Kohan
Publisher : McGraw-Hill
Pages : 752 pages

Course Coordinator

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