COURSE OVERVIEW ME0021
Certified Boiler Operation, Maintenance, Failure Analysis, Performance, Optimization & Steam System Management

Course Title
Certified Boiler Operation, Maintenance, Failure Analysis, Performance, Optimization & Steam System Management

Course Reference
ME0021

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Date/Venue

Session(s)	Date	Venue
1	April 06-10, 2025	TBA Meeting Room, Taksim Square Hotel, Istanbul, Turkey
2	July 06-10, 2025	Al Khobar Meeting Room, Hilton Garden Inn, Al Khobar, KSA
3	October 06-10, 2025	Ajman Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
4	December 07-11, 2025	Slaysel 02 Meeting Room, Movenpick Hotel & Resort Al Bida'a Kuwait, City of Kuwait

Course Description

This practical and highly-interactive course includes practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.

This course provides a comprehensive coverage of the modern high pressure boilers. It has been completely revised, reorganized and updated to include the latest techniques in boiler operation, maintenance, failure analysis, failure prevention, performance, optimization, life assessment, inspection, protection, control, troubleshooting, safety, emission and steam system management. Major sections on boiler failure analysis, examinations and prevention are now included in the course to reflect the new trend in the industry of extending the life of capital equipment and improving the plant overall reliability. The course utilizes actual case studies from around the world to highlight the topics discussed.

The course provides practical information that can be readily applied to pinpoint and minimize energy losses in boiler plants and energy distribution systems. Participants will be guided through their plant system component by component, showing exactly where and how performance can be improved. Facts will be given on different fuel types and firing methods, and how modern high-efficiency boiler designs and control systems work.

Following easy-to-implement guidelines and helpful time-saving diagrams, participants will go over strategies to methodically achieve the maximum utilization of fuel and energy to keep operating costs low and equipment performance high.

In addition to the comprehensive training manual, the course includes an e-book entitled "*Boiler Operator's Guide*", published by McGraw-Hill Professional, which will be given to the participants to help them appreciate the principles presented in the course.

Course Objectives

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

- Apply a comprehensive knowledge, skills and proper techniques in boiler operation, maintenance, failure analysis, troubleshooting, performance, optimization and steam system management
- Implement proper procedures for boiler failure analysis, investigation & examination and follow the modern techniques in preventing boiler failures and increasing the life of your boiler
- Pinpoint and minimize energy losses in your boiler plant and improve its performance and efficiency
- Employ systematic techniques in boiler maintenance, inspection, testing, control, operation, tuning, start-up & shutdown and troubleshoot your boiler system in a safe manner and clean environment

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 covers systematic techniques on boiler operation, maintenance, failure analysis, performance, optimization & steam system management for utility superintendents, power house supervisors, maintenance engineers, design engineers, corrosion engineers, plant engineers, metallurgists, materials engineers, boiler engineers, supervisors, foremen and other technical staff. further, reliability, mechanical integrity and safety engineers will benefit from this important course.

Training Methodology

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:-

30% Lectures
20% Workshops & Work Presentations
30% Case Studies & Practical Exercises
20% Software, Simulators & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

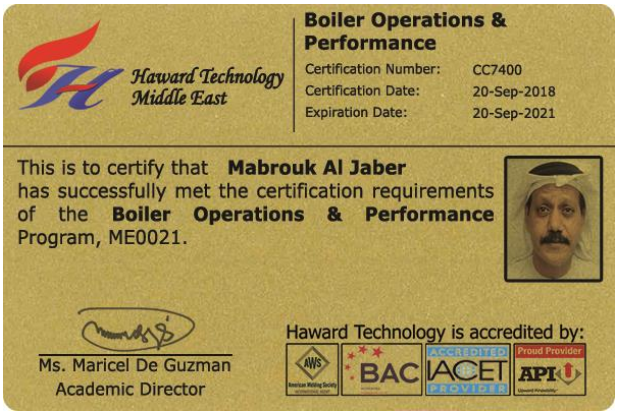
Course Certificate(s)

(1) Internationally recognized Wall Competency Certificates and Plastic Wallet Card Certificates will be issued to participants who completed a minimum of 80% of the total tuition hours and successfully passed the exam at the end of the course. Certificates are valid for 5 years.

Recertification is FOC for a Lifetime.

Sample of Certificate(s)

The following are samples of the certificates that will be awarded to course participants: -



(2) Official Transcript of Records will be provided to the successful delegates with the equivalent number of ANSI/IACET accredited Continuing Education Units (CEUs) earned during the course.

* Haward Technology * CEUs * Haward Technology * CEUs * Haward Technology * CEUs * Haward Technology *

Page 1 of 1

Haward Technology Middle East

Continuing Professional Development (HTME-CPD)

CEU Official Transcript of Records

TOR Issuance Date: 20-Sep-18

HTME No. PAR10165

Participant Name: Mabrouk Al Jaber

Program Ref.	Program Title	Program Date	No. of Contact Hours	CEU's
ME0021	Boiler Operations & Performance	September 16-20, 2018	30	3.0

Total No. of CEU's Earned as of TOR Issuance Date **3.0**

TRUE COPY

Maricel De Guzman
Academic Director

Haward Technology has been approved as an Authorized Provider by the International Association for Continuing Education and Training (IACET), 1760 Old Meadow Road, Suite 500, McLean, VA 22102, USA. In obtaining this approval, Haward Technology has demonstrated that it complies with the ANSI/IACET 1-2013 Standard which is widely recognized as the standard of good practice internationally. As a result of their Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for programs that qualify under the ANSI/IACET 1-2013 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 Association 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 is accredited by

P.O. Box 26070, Abu Dhabi, United Arab Emirates | Tel.: +971 2 3091 714 | Fax: +971 2 3091 716 | E-mail: info@haward.org | Website: www.haward.org

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 **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.

- 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(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. Alex Iliadis is a **Senior Process Engineer** with over **40 years** of in-depth industrial experience within the **Petrochemical**, **Oil & Gas** and **Refinery** industries. His wide expertise covers in the areas of **Process Reactors**, **Catalytic Reformer Unit**, **Process Systems** Foundations, **Gas Processing Plant** Operations & Control, **Gas Processing** Monitoring & Troubleshooting, **Chemical Engineering**, **Process Equipment Design & Troubleshooting**, **Polymers & Polymerization**, Applied **Process Engineering**, **Process Plant** Optimization, **Process Plant** Troubleshooting & Engineering Problem Solving, **Process** Plant Performance & Efficiency, **Flare Blowdown & Pressure Relief Systems**, **Polypropylene** Manufacturing, **Polyethylene** & Process Troubleshooting, **Ammonia**, **Ethylene**, **Solvents**, **Gas Feed**, **EDC**, **VCM**, **PP**, **PVC**, **Chlorine**, **Fluidized Bed Reactor**, **Oil Movement & Storage**, **Power Plant Chemistry**, **Catalyst** Manufacturing Techniques, **Fuel Systems** Management, **Process Design & Optimization**, **Aviation Fuel**, **Diesel Engine**, **Jet Fuel**, **Petrol**, IP Octane, Cetane Control, **Pipeline Distribution**, **Boiler** Fundamental Preparation, Flocculation Sedimentation, Hotline Water Softening Processes, **Desalination Processes**, **Reverse Osmosis**, **Molecular Sieves**, Loop Water Management System, **Sludge Removal**, **Cooling Water System**, **Tank Farms**, **Hydrocarbons**, **Energy Conservation**, **Plant Electrical Power Generation & Cogeneration**, **Natural Gas Equipment & Networks**, **Furnaces/Combustion Facilities**, **Equipment Engineering Design**, **Rotating Equipment** (**Pumps**, **Compressors**, **Gas Turbines**, **Refrigeration Systems**, etc), **LPG Storage Installations**, **Petroleum Refining Storage Tunnel Installations**, **Industrial & Commercial Refrigeration Systems** and various application codes such as the API, ANSI, ASME, SHRAE, NFPA, ASTM, etc.

During his career life, Mr. Iliadis has gained his practical and field experience through his various significant positions and dedications as the **Production & Technical Manager**, **Technical & Logistics Manager**, **Project Manager**, **Project Director**, **Start-up Leader**, **Technical Section Head**, **Engineering Consultant** and **Process Design & Project Engineer** for **Hellenic Petroleum**, **EXXON**, **ESSD-PAPPAS** Refining & Petrochemicals and EBZ Sugar Production Plant industry within the **European** & the **USA** regions.

Mr. Iliadis has a **Bachelor** degree in **Chemical Engineering** from the **University of Thessaloniki** (**Greece**). Further, he is a **Certified Instructor/Trainer** and has delivered numerous trainings, courses, workshops, seminars and conferences internationally.

Accommodation

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

Course Fee

Istanbul	**US$ 6,000** per Delegate + **VAT**. This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Al Khobar	**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
Abu Dhabi	**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.
Kuwait	**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

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Boiler & Boiler Systems*** *Types of Boilers • Configurations & Characteristics of Each Type • Codes & Standards • How to Use Steam Tables • Circulation of Boiler Water • Combustion • Boiler Fluid Flow Paths • Thermodynamics • Fuel • Air • Feedwater • Steam or Hot Water*
0930 – 0945	*Break*
0945 – 1100	***Burners, Superheaters & Reheaters*** *Gas burners • Oil Burners • Combination Gas/Oil Burners • Gas and Oil Trains • Waste Heat Recovery • Superheaters • Reheaters • Attemperators Configuration and Characteristics of Each Type • Relevant Metallurgy and Alloy Materials and Creep Factor*
1100 – 1230	***Boiler Instrumentation and Controls*** *Modulating Control System • Fixed Positioning • Parallel Positioning with Operator Trim • Fuel and Air Metering • Oxygen Trim • Feed Water Control • Primary Control Sequence of Operation*
1230 – 1245	*Break*
1245 – 1420	***Boiler Instrumentation and Controls (cont'd)*** *Flame Monitoring Devices • Y-S 7800 Control System • Fireye Flame Monitor • Microprocessor Based Burner Management System • Controls and Safety Devices for Automatically Fired Boilers • NFPA-85 series*
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 – 0930	***Boiler Startup and Shutdown*** *Preparation for Startup • The Pre-Startup Walk Through • Filling the Boiler Drum • Establishing Flow Through the Boiler • Establishing a Boiler Flame*
0930 – 0945	*Break*
0945 – 1100	***Boiler Startup and Shutdown (cont'd)*** *Basic Shutdown Procedures • Reducing Firing Rate • Reducing Steam Flow • Reducing Air and Gas Flow • Maintaining Flow Through Superheater*
1100 – 1230	***Boiler Operation & Steam System Management*** *Normal Operation and Steady State Conditions • Maintaining Design Steam Temperature and Pressure • Maintaining Proper Combustion Conditions • Maintaining Proper Feed Water Conditions • Monitoring the Steam/Water Circuit • Safety Valves & Low Water Cutoff Control*
1230 – 1245	*Break*
1245 – 1420	***Boiler Efficiency & Waste Heat Recovery*** *Heat Exchanger Efficiency • Combustion Efficiency Data Collection • Optimum Oxygen Percentage • Optimum Stack Temperature • Waste Heat Recovery*
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

0730 – 0930	***Combustion Analysis & Tuning Procedures*** *Combustion Efficiency Data Collection • Optimum Oxygen Percentage • Optimum Stack Temperature • Tips and Generally Accepted Practices*
0930 – 0945	*Break*
0945 – 1100	***Boiler Inspection & Testing*** *Internal Inspection • External Inspection • Operational Inspection • Hydrostatic Pressure Test • Common Inspection Code Violations*
1100 – 1230	***Boiler Maintenance & Protection*** *Waterside Maintenance • Fireside Maintenance • Operating and Safety Control Maintenance • General Maintenance*
1230 – 1245	*Break*
1245 – 1420	***Boiler Maintenance & Protection(cont'd)*** *Daily Maintenance • Weekly Maintenance • Monthly Maintenance • Annual Maintenance • Preventive 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

0730 – 0830	***Reliability-Centered Maintenance (RCM)*** *Overview of the RCM Process • Failure Consequences • Managing & Resourcing the RCM Process*
0830 – 0930	***Boiler Failure Analysis*** *Overview of Failure Analysis • Principles & Approaches in Failure Analysis • Objectives of Failure Analysis • Scope of Planning • Complexity of Investigation • Physical Causes & Time of Occurrence • Root Cause • Avoiding Errors • Planning & Preparation*

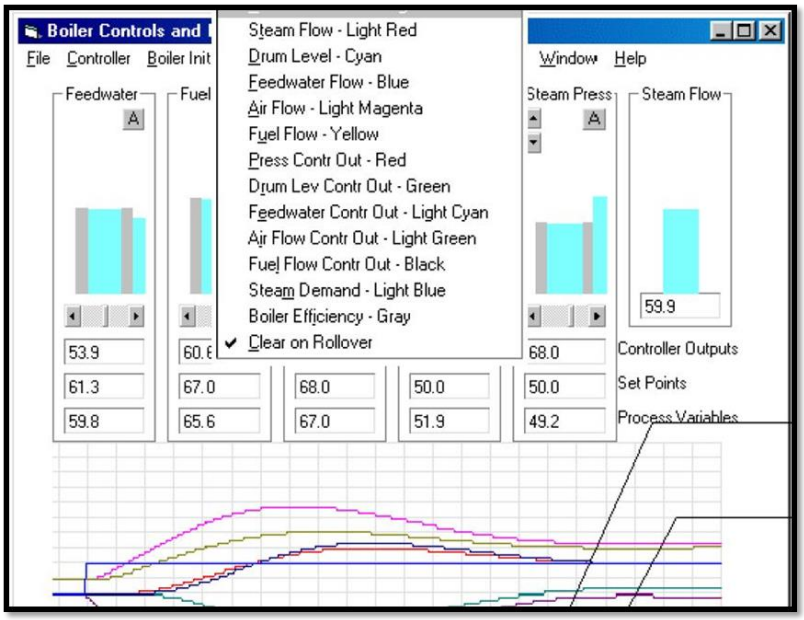
0930 – 0945	Break
0945 – 1100	***Boiler Failure Analysis(cont'd)*** Open-Mind/Open-Toolbox Approach • Structural Decision Making & Problem Solving • Practices & Procedures • Failure Mode & Effect Analysis (FMEA)
1100 – 1230	***Organization of a Boiler Failure Investigation*** What is a Failure • Why do Failure Happen • Why is a Failure Investigation Performed • Problem Solving Process • Nine Steps of a Failure Investigation • Failure Investigation Pitfalls
1230 – 1245	Break
1245 – 1420	***Conducting a Boiler Failure Examination*** Basic Approach to Failure Analysis • Failure Analysis Procedures • Assembling Background Data • Non-Destructive Testing (NDT) • Fractures • Corrosion Failures • Thermal & Creep Fatigue
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

0730 – 0930	***Boiler Failure Prevention*** Concepts of Failure Prevention • Material Selection for Failure Prevention • Design & Failure Prevention • Product Liability & Design • Hazard, Risk & Danger • Manufacturing Defects • Design Defects • Failure Related to Casting • Failure Related to Welding
0930 – 0945	Break
0945 – 1100	***Boiler Life Assessment & NDT*** Industry Perspectives • Life Assessment • Liquid Penetrant • Magnetic Particles • Ultrasonic • Eddy Current • Radiography • Elevated Temperature
1100 – 1230	***Boiler Emissions & Pollution Control*** Six Criteria Air Pollutants • NOx and SOx • VOCs • Pollution Control Systems
1230 – 1245	Break
1245 – 1300	***Boiler Troubleshooting & Safety*** Steam Traps • Loss of Boiler Flame • Low and High Water • Loss of Boiler Auxiliaries • Boiler leaks • Boiler Overpressure • Equipment Fires • Foaming • Lockout/Tagout • Confined Spaces • Boiler Accidents – Cause & Effect
1300 – 1315	***Course Conclusion*** Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course
1315 – 1415	***COMPETENCY EXAM***
1415 – 1430	Presentation of Course Certificates
1430	Lunch & End of Course

Simulator (Hands-on Practical Sessions)

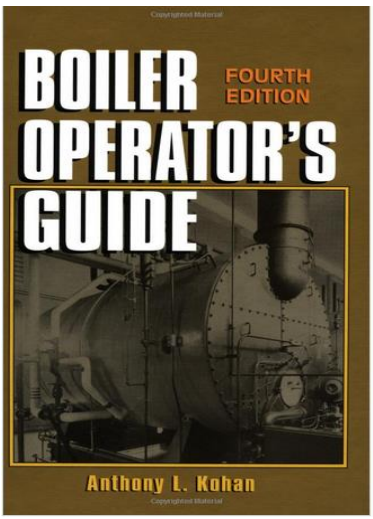
Practical session will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the simulator "Win Boiler Sim".



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 : 978-0070365742
Author : Anthony Kohan
Publisher : McGraw-Hill Professional

Course Coordinator

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