COURSE OVERVIEW ME0020

Certified Boiler Operation, Control, Maintenance & Troubleshooting

Course Title

Certified Boiler Operation, Control, Maintenance & Troubleshooting

Course Date/Venue

May 18-22, 2025/Oryx Meeting Room, Double Tree by Hilton Al Saad, Doha, Qatar

Course Reference

ME0020

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs

Course Description

This practical, highly-interactive course includes various 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, water treatment, performance, optimization, inspection, control, troubleshooting, safety, emission and steam system management. Sections on boiler water treatment are now included in the course. 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.

Course Objectives

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

- Apply an up-to-date knowledge, skills and systematic techniques in boiler operation, inspection, maintenance, safety & water treatment, troubleshooting, performance, optimization and steam system management
- Implement the technology for boiler water treatment including laboratory control of boiler water chemical analysis results
- 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 and 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 conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of boiler operation, inspection, maintenance, safety & water treatment technology for utility superintendents, power house supervisors, maintenance engineers, design engineers, corrosion engineers, plant engineers, metallurgists, materials engineers, boiler engineers, supervisors and other technical staff. Further, reliability, mechanical integrity and safety engineers will also benefit from this important course.

Course Fee

US$ 6,000 per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
In addition to the Course Manual, participants will receive an e-book "*Boiler Operator's Guide"*, published by McGraw-Hill Professional.

Accommodation

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

Course Certificate(s)

(1) Internationally recognized Competency Certificates and Plastic Wallet Cards 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 Certificates

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 *

Haward Technology Middle East

Continuing Professional Development (HTME-CPD)

Page 1 of 1

CEU Official Transcript of Records

TOR Issuance Date: 14-Nov-19

HTME No. 8667-2014-9020-2555

Participant Name: Abdulsatar Al Otaibi

Program Ref.	Program Title	Program Date	No. of Contact Hours	CEU's
ME0020	Certified Boiler Operation, Control, Maintenance & Troubleshooting	November 10-14, 2019	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), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, 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

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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.

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 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. Karl Thanasis, PEng, MSc, MBA, BSc, is **Senior Mechanical & Maintenance Engineer** with over **45 years** of extensive industrial experience within the **Power & Water Utilities** and other **Energy Sectors**. His wide expertise includes **District Cooling Plant**, **District Cooling Plant Operations**, **HVAC** Basics, **HVAC&R**, **KOTZA**, **Refrigeration**, **Modern HVAC & Refrigeration Systems Design, Utilization, Operation & Effective Maintenance, Control Valve & Actuators**, **Fire Safe Valves**, **Piping & Pipeline**, Maintenance, Repair, **Shutdown**, **Turnaround & Outages**, **Maintenance & Reliability** Management, **Mechanical Maintenance** Planning, Scheduling & Work Control, Advanced Techniques in **Maintenance** Management, **Predictive & Preventive** Maintenance, **Maintenance & Operation Cost Reduction** Techniques, Reliability Centered Maintenance (**RCM**), **Machinery Failure** Analysis, **Rotating Equipment Reliability** Optimization & Continuous Improvement, **Material Cataloguing**, **Mechanical & Rotating Equipment** Troubleshooting & Maintenance, **Root Cause Analysis & Reliability** Improvement, **Condition** Monitoring, **Root Cause Failure Analysis** (RCFA), **Steam Generation**, **Steam Turbines**, **Power Generator Plants**, **Gas Turbines**, **Combined Cycle Plants**, **Boilers**, **Process Fired Heaters**, Air Preheaters, Induced Draft Fans, All Heaters Piping Work, Refractory Casting, Heater Fabrication, Thermal & Fired Heater Design, **Heat Exchangers**, Heat Transfer, Coolers, **Power Plant** Performance, Efficiency & Optimization, **Storage Tank** Design & Fabrication, **Thermal Power Plant** Management, **Boiler & Steam** System Management, **Pump** Operation & Maintenance, **Chiller & Chiller Plant** Design & Installation, **Pressure Vessel**, **Safety Relief Valve** Sizing & Selection, **Valve** Disassembling & Repair, Pressure Relief Devices (**PSV**), **Hydraulic & Pneumatic** Maintenance, Advanced **Valve** Technology, **Pressure Vessel** Design & Fabrication, **Pumps**, Turbo-Generator, Turbine **Shaft Alignment**, **Lubrication**, Mechanical **Seals**, Packing, **Blowers**, **Bearing** Installation, **Couplings**, **Clutches** and **Gears**. Further, he is also versed in **Wastewater Treatment** Technology, **Networking** System, **Water Network Design**, Industrial **Water Treatment** in Refineries & Petrochemical Plants, **Piping** System, Water Movement, Water Filtering, Mud Pumping, **Sludge Treatment** and **Drying**, **Aerobic Process** of **Water Treatment** that includes **Aeration**, **Sedimentation** and **Chlorination Tanks**. His strong background also includes **Design** and **Sizing** of all **Waste Water Treatment Plant Associated Equipment** such as **Sludge Pumps**, **Filters**, **Metering Pumps**, **Aerators** and **Sludge Decanters**.

Mr. Thanasis has acquired his thorough and practical experience as the **Project Manager**, **Plant Manager**, **Area Manager - Equipment Construction**, **Construction Superintendent**, **Project Engineer** and **Design Engineer**. His duties covered **Plant Preliminary Design**, **Plant Operation**, **Write-up** of **Capital Proposal**, **Investment Approval**, **Bid Evaluation**, **Technical Contract Write-up**, **Construction** and **Sub-contractor Follow up**, **Lab Analysis**, **Sludge Drying** and **Management** of **Sludge Odor** and **Removal**. He has worked in various companies worldwide in the **USA**, **Germany**, **England** and **Greece**.

Mr. Thanasis is a **Registered Professional Engineer** in the **USA** and **Greece** and has a **Master's** and **Bachelor's** degree in **Mechanical Engineering** with **Honours** from the **Purdue University** and **SIU** in **USA** respectively as well as an **MBA** from the **University of Phoenix** in **USA**. Further, he is a **Certified Internal Verifier/Trainer/Assessor** by the **Institute of Leadership & Management** (**ILM**) a **Certified Instructor/Trainer** and has delivered numerous trainings, courses, seminars, workshops and conferences worldwide.

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: ***Sunday, 18th of May 2025***

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*
0930 – 0945	*Break*
0945 – 1100	***Boiler & Boiler Systems (cont'd)*** *Combustion • Boiler Fluid Flow Paths • Thermodynamics • Fuel • Air • Feedwater • Steam or Hot Water*
1100 – 1215	***Burners, Superheaters & Reheaters*** *Gas Burners • Oil Burners • Combination Gas/Oil Burners • Gas & Oil Trains • Waste Heat Recovery*
1215 – 1230	*Break*
1230 – 1420	***Burners, Superheaters & Reheaters (cont'd)*** *Superheaters • Reheaters • Attemperators Configuration & Characteristics of each Type • Relevant Metallurgy & Alloy Materials & Creep Factor*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day One*

Day 2: ***Monday, 19th of May 2025***

0730 – 0930	***Boiler Instrumentation & Controls*** *Modulating Control System • Fixed Positioning • Parallel Positioning with Operator Trim • Fuel & Air Metering • Oxygen Trim • Feed Water Control*
0930 – 0945	*Break*
0945 – 1100	***Boiler Instrumentation & Controls (cont'd)*** *Primary Control Sequence of Operation • Flame Monitoring Devices • Y-S 7800 Control System • Fireye Flame Monitor • Microprocessor based Burner Management System • Controls & Safety Devices for Automatically Fired Boilers • NFPA-85 Series*
1100 – 1215	***Boiler Startup & Shutdown*** *Preparation for Startup • The Pre-Startup Walk Through • Filling the Boiler Drum • Establishing Flow through the Boiler • Establishing a Boiler Flame*
1215 – 1230	*Break*
1230 – 1420	***Boiler Startup & Shutdown (cont'd)*** *Basic Shutdown Procedures • Reducing Firing Rate • Reducing Steam Flow • Reducing Air & Gas Flow • Maintaining Flow through Superheater*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Two*

Day 3: **Tuesday, 20th of May 2025**

0730 – 0930	***Boiler Operation & Steam System Management*** *Normal Operation & Steady State Conditions • Maintaining Design Steam Temperature & Pressure • Maintaining Proper Combustion Conditions*
0930 – 0945	*Break*
0945 – 1100	***Boiler Operation & Steam System Management (cont'd)*** *Maintaining Proper Feed Water Conditions • Monitoring the Steam/Water Circuit • Safety Valves & Low Water Cutoff Control*
1100 – 1215	***Safety Valves & Low Water Cutoff Controls*** *Codes & Standards • Set Pressures & Capacity • Control Blowdown Test • Slow Drain Test • Evaporative Test*
1215 – 1230	*Break*
1230 – 1420	***Boiler Water Chemistry & Treatment*** *Boiler Feed Water Quality • Mechanical & Chemical Deriation • Boiler Water Chemical Selection & Dozing*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Three*

Day 4: **Wednesday, 21st of May 2025**

0730 – 0930	***Boiler Water Chemistry & Treatment (cont'd)*** *Steam Purity & Controlling Steam pH • Laboratory Control of Boiler Water Chemical Analysis Results • Sampling Boiler Water & Steam Produced*
0930 – 0945	*Break*
0945 – 1100	***Boiler Efficiency & Waste Heat Recovery*** *Heat Exchanger Efficiency • Combustion Efficiency Data Collection • Optimum Oxygen Percentage • Optimum Stack Temperature • Waste Heat Recovery*
1100 – 1215	***Combustion Analysis & Tuning Procedures*** *Combustion Efficiency Data Collection • Optimum Oxygen Percentage • Optimum Stack Temperature • Tips & Generally Accepted Practices*
1215 – 1230	*Break*
1230 – 1420	***Boiler Inspection & Testing*** *Internal Inspection • External Inspection • Operational Inspection • Hydrostatic Pressure Test • Common Inspection Code Violations*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Four*

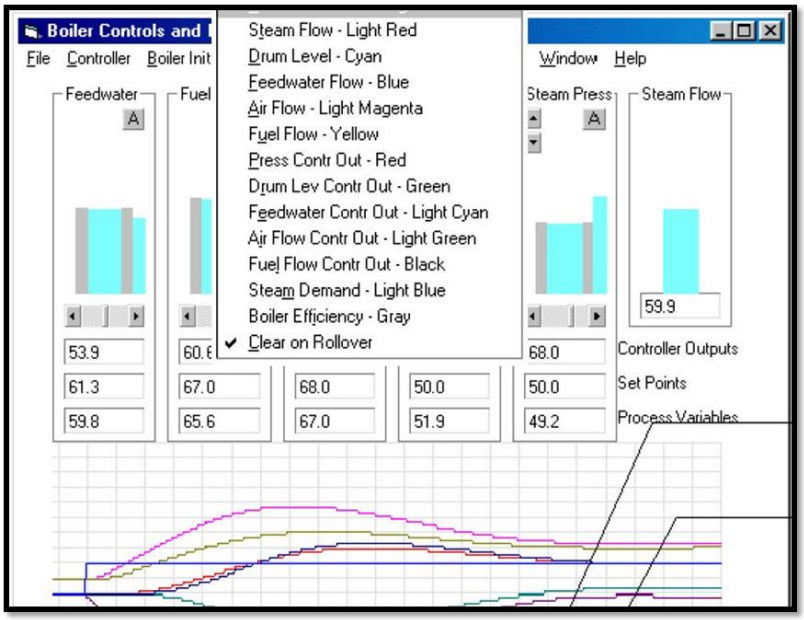
Day 5: **Thursday, 22nd of May 2025**

0730 – 0930	***Boiler Maintenance & Protection*** *Waterside Maintenance • Fireside Maintenance • Operating & Safety Control Maintenance • General Maintenance • Daily Maintenance • Weekly Maintenance • Monthly Maintenance • Annual Maintenance • Preventive Maintenance*
0930 – 0945	*Break*
0945 – 1100	***Boiler Emissions & Pollution Control*** *Six Criteria Air Pollutants • NOx & SOx • VOCs • Pollution Control Systems*

1100 – 1215	***Boiler Troubleshooting & Safety*** *Steam Traps • Loss of Boiler Flame • Low & High water • Loss of Boiler Auxiliaries • Boiler leaks*
1215 – 1230	*Break*
1230 – 1300	***Boiler Troubleshooting & Safety (cont'd)*** *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)

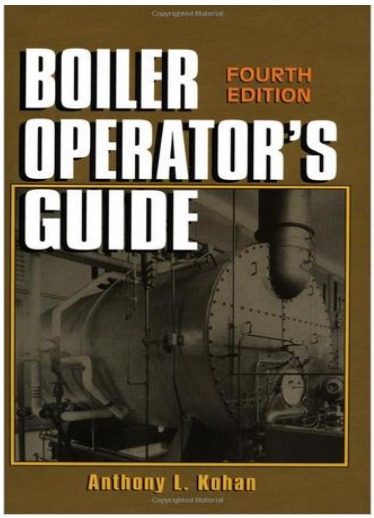
Practical session will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the simulator "Win Boiler Sim".



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

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