COURSE OVERVIEW TE0145
Water Treatment for Plant Utilities, Offsites and Cogeneration

Course Title
Water Treatment for Plant Utilities, Offsites and Cogeneration

Course Date/Venue
Please refer to page number 2

Course Reference
TE0145

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.

Water is one of the most essential and abundant resources in nature. Three quarters of the earth's surface is covered with water. Pure water is colorless, odorless, and tasteless. Pure water is actually a rarity in nature. Oceans, rivers, lakes and underground water contain varying amounts of impurities picked up from the earth as well as dissolved gases picked up from the atmosphere. The impurities present in a water supply can cause many problems when that water is used in industrial or commercial heating and cooling systems.

Plant utilities or offsites are a vital service to the operation of most major industrial plants. Unfortunately, they are all too often ignored until they cause problems. It's too late to start thinking about them when the plant gets hit with a major derating or outage that could have been avoided. This course is a must for the key personnel in any industry that requires reliable sources of water and control of its usage for process applications, cooling water and steam production.

This course is designed to provide the background knowledge needed to design, operate and maintain the water treatment processes used for heating, cooling and process applications at peak efficiency with minimal deratings or outages.

The course will concentrate on **Reverse Osmosis (RO)** water treatment system. However, other water treatment systems will be discussed.

Course Objectives

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

- Apply and gain an in-depth knowledge on water treatment for plant utilities, offsites and cogeneration
- Determine the importance, role & use of alkalinity in water treatment as well as the features of dissolved oxygen
- Carryout external treatment for boiler applications and review & employ reverse osmosis (RO) membrane desalination to plant utilities, offsites & cogeneration
- Recognize the role & application of Reverse Osmosis (RO) technology and design of reverse osmosis systems
- Describe the step-by-step process and perform monitoring of internal treatment operation
- Enumerate cooling water treatment program requirements and determine the three critical points to consider in the operation of any cooling system
- Discuss cooling system designs and emphasize the role of water treatment
- Identify the parts of the selected cooling systems including its features & functions
- Conduct performance monitoring and improve in-service cleaning including chemical & mechanical methods for both off-line on-line cleaning

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 water treatment for plant utilities, offsites and cogeneration for utility engineers, water treatment engineers, chemists, boiler plant engineers and designers responsible for plant utilities; energy conservation and environmental engineers; managers and other technical staff who are using steam and/or cooling water for industrial processes; managers and other technical staff of combined cycle generating plants; technical representatives for chemical treatment and service companies and for companies that are involved in the manufacture or sales of boilers, heat exchangers, cooling towers and related instruments.

Course Date/Venue

Session(s)	Date	Venue
1	January 26-30, 2026	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
2	April 26-30, 2026	Crowne Meeting Room, Crowne Plaza Al Khobar, an IHG Hotel, Al Khobar, KSA
3	July 26-30, 2026	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
4	November 22-26, 2026	Safir Meeting Room, Divan Istanbul, Taksim, Turkey

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. Kyle Bester is a **Senior Water Engineer** with extensive years of practical experience within the **Oil & Gas**, **Power & Water Utilities** and other **Energy** sectors. His expertise includes **Water Reservoir**, **Water Tanks**, **Water Pumping** Station, **Water Distribution** System, **Water Network** System, **Water Pipes & Fittings**, **Water Hydraulic** Modelling, **Water Storage Reservoir**, **Reservoirs & Pumping** Stations Design & Operation, **Pumping** Systems, Interconnecting **Pipelines**, **Water Network Hydraulic** Simulation Modelling, **Water Supply** Design, **Water Balance Modelling**, **Water Distribution Network**, **Water Network** System Analysis, **Water Forecasts** Demand, **Water Pipelines** Materials & Fittings, **Water Network** System Design, Pump Houses & Booster Pumping Stations, **Potable Water Transmission**, **Water Distribution Network**, Districts Meters Areas (DMAs), **Water Supply & Desalination Plants** Rehabilitation, **Water Reservoirs & Pumping Stations**, **Water Network System** Extension, Water Network System Replacement & Upgrade, **Water Networks** Optimization, **Water Supply & Distribution** Systems Efficiency & Effectiveness, **Pipe** Materials & Fittings, **Service Reservoir** Design & Operation, **Pipes & Fittings**, **Water Network** System Design & Operation, **Supply Water Network** Rehabilitation, **Water Loss** Reduction, **Main Water** System Construction, **Main Water Line** Construction, Transmission & Distribution **Pipelines**, **Water Distribution** Design & Modelling, **Water Supply** System, Oilfield **Water Treatment**, Best Practice in **Sewage** & Industrial **Wastewater Treatment** & Environmental Protection, **Water Distribution** Design & Modelling, **Desilting**, Treating & Handling Oily **Water**, **Water Chemistry** for **Power Plant**, **Water** Sector Orientation, Environmental Impact Assessment (**EIA**), **Potable Water**, **Reverse Osmosis** Treatment Technology and **Chlorination** System, **Well** Inventory, Monitoring & Conservation, **Qualitative Analysis** of Soil & Ground Water, **Water** Networking, **Hydraulic Modelling** Systems, **Pumping** Stations, **Centrifugal Pumps**, **Pipelines & Pumping**, **Water Reservoirs**, **Water Storage Tanks**, Extended Activated **Sludge** Treatment, **Sewage & Industrial Wastewater** Treatment & Environmental Protection, Supervising & Monitoring **Sewage Works**, **Water Desalination** Technologies, **Water Distribution & Pump** Station, Best **Water Equipment** Selection & Inspection, **Hydraulic Modelling** for Water Network Design, **Water Utility** Industry, **Water Desalination** Technologies & New Development, **Water Hydrology**, **Water Conveyors**, **Water Networks** Rehabilitation. He is currently the **Part Owner & Manager** of Extreme Water SA wherein he manages, re-designed and commissioned a water and wastewater treatment plants.

During his career life, Mr. Bester has gained his practical and field experience through his various significant positions and dedication as the **Project Manager**, **Asset Manager**, **Manager**, **Water Engineer**, **Supervisor**, **Team Leader**, **Analyst**, **Process Technician**, **Landscape Designer** and **Senior Instructor/Trainer** for various international companies, infrastructures, water and wastewater treatment plants from New Zealand, UK, Samoa, Zimbabwe and South Africa, just to name a few.

Mr. Bester holds a **Diploma** in **Wastewater Treatment** and a **National Certificate** in **Wastewater & Water Treatment**. Further, he is a **Certified Instructor/Trainer**, an **Approved Chemical Handler** and has delivered numerous courses, trainings, conferences, seminars and workshops internationally.

Course Fee

Abu Dhabi/Al Khobar/ Dubai	**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.
Istanbul	**US$ 6,000** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

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 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	***Introduction to Water Chemistry and Technology*** *Hydrological Cycle • Water Demand • Resources (Types) • Well Sources & Ground Water • Physical Properties • Chemical Properties • Biological Properties • Water Treatment • Separation • Oxidation • Biodegradation • Disinfection • Water Distribution • Water Analysis, Water Biology & Chemistry • Water Suspended Solids, Turbidity & SDI Use • Standardization & Normalization*
0930 - 0945	*Break*
0945 - 1100	***Boiler Design and the Role of Water Treatment*** *Three Critical Points to Consider in the Operation of Any Boiler Plant • The Various Classes of Boilers and their Special Needs • The Boiler as a Concentrating Mechanism • Guidelines and Needs for Different Pressures • Components of the Water Treatment System*
1100 - 1230	***Alkalinity*** *Why do we Need Alkalinity Control and How do we Apply it? • Coping with the Mixed Metallurgy that Minimized the Original Capital Cost*
1230 - 1245	*Break*

1245 - 1420	***Dissolved Oxygen*** *Oxygen is the Food for Corroding Carbon Steel • Mechanical Versus Chemical Methods for Removing Dissolved Oxygen • Oxygenating Chemistry: Is it a Contradiction or a Better Way?*
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	***External Treatment*** *How to Make it Suitable for Boiler Applications • How is the Choice of Equipment Related to the Overall Plant Design • Do the Attendees' Plants Have any Special Problems? • Understand the Importance of Providing Safe, Treated Water for Domestic Use*
0930 – 0945	*Break*
0945 – 1100	***Basic Fundamentals of Water Reuse & Desalination*** *Basic Elements of Risks, Epidemiology & Sustainability as they Related to Water • Basics of Water, Hydrological Cycle & Water Quality*
1100 - 1230	***Reverse Osmosis (RO) Membrane Desalination*** *Basic Principles of MF and UF • Fouling of UF and MF Systems • Cleaning of MF and UF Systems • Reverse Osmosis Water Treatment System • Basic Principles of Reverse Osmosis Technology • Design Basis of Reverse Osmosis Systems • Overview RO and NF Membranes • Fouling in RO and NF Systems*
1230 - 1245	*Break*
1245 - 1420	***Reverse Osmosis (RO) Membrane Desalination (cont'd)*** *Pretreatment for RO and NF Systems • Postreatment for RO and NF Systems • Operation & Maintenance of RO • Concentrate Disposal in Brackish and SWRO • Comparison of Membrane and Distillation*
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	***Internal Treatment*** *Once the Water is in the Boiler, How is it Maintained in the Best State to Keep the Boiler Operating Reliably and Efficiently During Steady-State Operation? • What can Happen During Start-Up, Shutdown and Transient Conditions? • What Happens when Contamination is Carried over with the Steam or Brought Back From the Process? • Monitoring the Operation*
0930 – 0945	*Break*
0945 – 1100	***Workshop on External Vs. Internal Treatment*** *What is the Best Choice for Different Applications, E.G., Cogeneration, SAGD Recovery of Heavy Oils or Heating a Distillation Column*
1145 - 1230	***Workshop on Specific Applications***
1230 - 1245	*Break*

1245 - 1420	***Cooling Water Treatment Program Requirement*** *Three Critical Points to Consider in the Operation of any Cooling System*
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 - 0930	***Cooling System Designs and the Role of Water Treatment*** *Contact and Non-Contact Cleaning • Once-Through Cleaning*
0930 – 0945	*Break*
0945 – 1100	***Cooling System Designs and the Role of Water Treatment (cont'd)*** *Recirculating or Cooling Tower Systems • Closed Loop Recirculating Systems*
1100 - 1230	***Workshop on the Treatment of Cooling System*** *Scaling and Scale Control • Evaluation & Scaling Potential • Microbiological Fouling and Corrosion • How to Calculate Chemical Consumption and Water Usage*
1230 - 1245	*Break*
1245 - 1420	***Selected Cooling Systems*** *HVAC Systems (Optional) • Major Industrial Systems Including High and Low Heat Load Systems, Direct Contact with Process Fluids and Closed Loops for Critical Systems • The Condenser in Electrical Generation Systems, Including Cogeneration*
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	***Performance Analysis & Daily Monitoring*** *Can we Assess the Cleanliness of a Steam Condenser or HVAC Chiller Without Having to Shut Down and Open Them Up?*
0930 – 0945	*Break*
0945 – 1100	***Performance Analysis & Daily Monitoring (cont'd)*** *Can we Assess the Cleanliness of a Steam Condenser or HVAC Chiller Without Having to Shut Down and Open Them Up? (cont'd)*
1100 - 1230	***Workshop on Monitoring Heat-Exchanger Cleanliness*** *The Specific Topics will be Chosen to Match the Needs of those Attending*
1230 - 1245	*Break*
1245 - 1345	***In-Service Cleaning*** *Chemical and Mechanical Methods for Both Off-Line On-Line Cleaning*
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*

Practical Sessions

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

Course Coordinator

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