



**COURSE OVERVIEW TE0145-4D**

**Water Treatment for Plant Utilities, Offsites & Cogeneration**

**Course Title**

Water Treatment for Plant Utilities, Offsites & Cogeneration

**Course Date/Venue**

Session 1: September 09-12, 2024/Oryx Meeting Room, Double Tree by Hilton Al Saad, Doha, Qatar

Session 2: December 16-19, 2024/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE



**Course Reference**

TE0145-4D



**Course Duration/Credits**

Four days/2.4 CEUs/24 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 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:-


- 

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 **2.4 CEUs** (Continuing Education Units) or **24 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 Fee**

Doha	<b>US\$ 5,000</b> per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Dubai	<b>US\$ 4,500</b> per Delegate + <b>VAT</b> . This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.



### 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. Adel Abdallah** is a **Senior Water Engineer** with almost **25 years** of extensive experience within the **Power & Water Utilities** and **other Energy** sectors. His expertise widely covers in the areas of **Municipal Wastewater Treatment Facility Operation, Water Network Design & Hydraulic Modelling, Water Utility Industry, Sewage & Industrial Waste Water Treatment, Water Reservoir, Water Storage Reservoir, Water Reservoirs & Pumping Stations, Water Pumping Station, , Water Distribution Systems & Pumping Stations, Reservoirs & Pumping Stations Design & Operation, Pumping Systems, Interconnecting Pipelines, Pump Houses & Booster Pumping Stations, Water Pipes & Fittings, Water Hydraulic Modelling, Water Network Hydraulic Simulation Modelling, Water Balance Modelling, Water Pipelines Materials & Fittings, Water Distribution System, Water Distribution Network, Water Network System Design, Water Network System Analysis, Water Network System Extension, Water Network System Replacement & Upgrade, Water Networks Optimization, Water Tanks, Water Forecasts Demand, Waste Water Effluent Treating Facilities, Effluent Treatment & Slurry Handling, Oily Water Treatment Technology, Water Equipment Selection & Inspection, Water Testing & Commissioning Techniques, Wastewater Treatment, Water Supply Design, Potable Water Transmission, Districts Meters Areas (DMAs), Water Supply & Desalination Plants Rehabilitation, Water Supply & Distribution Systems Efficiency & Effectiveness, Water Treatment Technology, Reverse Osmosis, MSF Plants, Extended Activated Sludge Treatment, MBBR, Water Quality Analysis, Steam Boiler, Hydro-Treating Technology and Water Storage Tanks.**

During Mr. Abdallah's career life, he has handled challenging positions wherein he has acquired his wide technical and practical experience such as the **Water Engineer, Project Site Engineer, Water & Wastewater Treatment System Plant Engineer, Senior Water & Wastewater Plant Engineer, Production Supervisor, Process Engineer, Technical Engineer, Chemical Engineer and Senior Instructor/Consultant** for various companies such as the Water Authority of Jordan, Metito Overseas, Al-Hassan Industrial Estate, UIP-FCEC JV Design and Build Company, Degussa MBT, Al-Mas Resin Factory, Jordanian Tunisian Chemicals Co. and National Chlorine Company.

Mr. Abdallah has a **Bachelor's degree in Chemical Engineering**. Further, he is a **Certified Instructor/Trainer** and delivered numerous courses, trainings, conferences, seminars and workshops internationally.

### Accommodation

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





**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	<i>Registration &amp; Coffee</i>
0800 - 0815	<i>Welcome &amp; Introduction</i>
0815 - 0830	<b>PRE-TEST</b>
0830 - 0930	<b>Introduction to Water Chemistry &amp; Technology</b> <i>Hydrological Cycle • Water Demand • Resources (Types) • Physical Properties • Chemical Properties • Biological Properties • Water Treatment • Separation • Oxidation • Biodegradation • Disinfection • Water Distribution</i>
0930 - 0945	<i>Break</i>
0945 - 1100	<b>Boiler Design &amp; the Role of Water Treatment</b> <i>Three Critical Points to Consider in the Operation of Any Boiler Plant • The Various Classes of Boilers &amp; their Special Needs • The Boiler as a Concentrating Mechanism • Guidelines &amp; Needs for Different Pressures</i>
1100 - 1230	<b>Alkalinity</b> <i>Why do we Need Alkalinity Control &amp; How do we Apply it? • Coping with the Mixed Metallurgy that Minimized the Original Capital Cost</i>
1230 - 1245	<i>Break</i>
1245 - 1420	<b>Dissolved Oxygen</b> <i>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?</i>
1420 - 1430	<b>Recap</b>
1430	<i>Lunch &amp; End of Day One</i>

**Day 2**

0730 - 0930	<b>External Treatment</b> <i>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?</i>
0930 - 0945	<i>Break</i>





0945 - 1100	<p><b>Reverse Osmosis (RO) Membrane Desalination</b>  <i>Basic Principles of MF &amp; UF • Fouling of UF &amp; MF Systems • Cleaning of MF &amp; UF Systems • Basic Principles of Reverse Osmosis Technology • Design Basis of Reverse Osmosis Systems • Overview RO &amp; NF Membranes • Fouling in RO &amp; NF Systems • Pretreatment for RO &amp; NF Systems • Posttreatment for RO &amp; NF Systems • Concentrate Disposal in Brackish &amp; SWRO • Comparison of Membrane &amp; Distillation</i></p>
1100 - 1230	<p><b>Internal Treatment</b>  <i>Once the Water is in the Boiler, How is it Maintained in the Best State to Keep the Boiler Operating Reliably &amp; Efficiently During Steady-State Operation? • What can Happen During Start-Up, Shutdown &amp; Transient Conditions? • What Happens when Contamination is Carried over with the Steam or Brought Back From the Process? • Monitoring the Operation</i></p>
1230 - 1245	Break
1245 - 1420	<p><b>Workshop on External Vs. Internal Treatment</b>  <i>What is the Best Choice for Different Applications, E.G., Cogeneration, SAGD Recovery of Heavy Oils or Heating a Distillation Column</i></p>
1420 - 1430	<b>Recap</b>
1430	Lunch & End of Day Two

**Day 3**

0730 - 0930	<b>Workshop on Specific Applications</b>
0930 - 0945	Break
0945 - 1100	<p><b>Cooling Water Treatment Program Requirement</b>  <i>Three Critical Points to Consider in the Operation of any Cooling System</i></p>
1100 - 1230	<p><b>Cooling System Designs &amp; the Role of Water Treatment</b>  <i>Contact &amp; Non-Contact Cleaning • Once-Through Cleaning • Recirculating or Cooling Tower Systems • Closed Loop Recirculating Systems</i></p>
1230 - 1245	Break
1245 - 1420	<p><b>Workshop on the Treatment of Cooling System</b>  <i>Scaling &amp; Scale Control • Microbiological Fouling &amp; Corrosion • How to Calculate Chemical Consumption &amp; Water Usage</i></p>
1420 - 1430	<b>Recap</b>
1430	Lunch & End of Day Three

**Day 4**

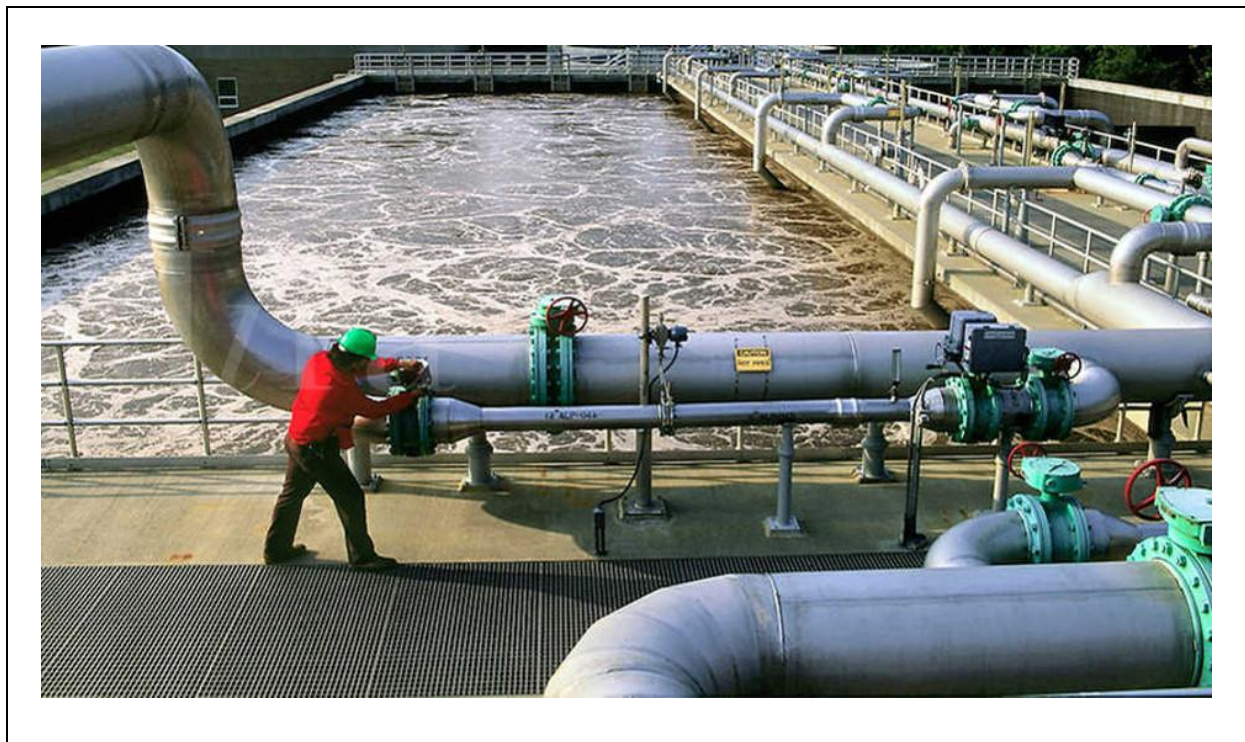
0730 - 0930	<p><b>Selected Cooling Systems</b>  <i>HVAC Systems (Optional) • Major Industrial Systems Including High &amp; Low Heat Load Systems, Direct Contact with Process Fluids &amp; Closed Loops for Critical Systems • The Condenser in Electrical Generation Systems, Including Cogeneration</i></p>
0930 - 0945	Break
0945 - 1100	<p><b>Performance Monitoring</b>  <i>Can we Assess the Cleanliness of a Steam Condenser or HVAC Chiller Without Having to Shut Down &amp; Open Them Up? •</i></p>



1100 - 1230	<b>Workshop on Monitoring Heat-Exchanger Cleanliness</b> <i>The Specific Topics will be Chosen to Match the Needs of those Attending</i>
1230 - 1245	<i>Break</i>
1245 - 1345	<b>In-Service Cleaning</b> <i>Chemical &amp; Mechanical Methods for Both Off-Line On-Line Cleaning</i>
1345 - 1400	<b>Course Conclusion</b>
1400 - 1415	<b>POST-TEST</b>
1415 - 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch &amp; End of Course</i>

**Practical Sessions**

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



**Course Coordinator**

Jaryl Castillo, Tel: +974 4423 1327, Email: [jaryl@haward.org](mailto:jaryl@haward.org)