COURSE OVERVIEW PE1001
Design & Operation of Desalters/Dehydrators

Course Title
Design & Operation of Desalters/Dehydrators

Course Date/Venue
Session 1: May 19-23, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
Session 2: September 21-25, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Course Reference
PE1001

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

Course Description

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

Oil desalting systems provide protection to capital intensive processing equipment by removing the salt component from crude oil. There are many significant variables to control in the crude oil production process.

This course provides participants with knowledge necessary to understand that desalting operation is one that must constantly be adjusted to maintain optimum performance. The course will move from the fundamentals of the design desalting process, through the various design options and major process variables. Discussion will also include topics on electrical desalting and the types of desalting systems.

As the course progresses, discussion will focus on design considerations, components, operation, performance and troubleshooting faced in desalting operations.

During this interactive course, participants will learn the impact of crude oil quality on desalter performance including the fundamentals of electrical desalting; the types of desalting systems, single-stage dehydrator, single-stage desalter, two-stage desalter, three-stage desalter and typical operating conditions and performance; the desalter components and desalter design considerations; the commercial desalter design for electric AC desalter, electro-dynamic desalter and electrostatic design technology; the factors that affect desalter operation and performance; the types of desalting applications; and the desalter troubleshooting for oily effluent and poor dehydration and/or desalting.

Course Objectives

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

- Apply and gain an in-depth knowledge on the design and operation of desalters/dehydrators
- Discuss the impact of crude oil quality on desalter performance including the fundamentals of electrical desalting
- Identify the types of desalting systems, single-stage dehydrator, single-stage desalter, two-stage desalter, three-stage desalter and typical operating conditions and performance
- List the desalter components comprising of process vessel, distribution system, electrodes and transactors, mud wash and level control devices
- Recognize the desalter design considerations that include the overview of HYSYS computer software
- Discuss vessel size, number of stages, transactor size, power consumption and crude oil properties
- Carryout sizing calculations for dehydration-desalter and technology selection for crude oil dehydration-desalter with merits and demerits
- Apply the technical evaluation of different designs offered by various desalter vendors
- Select different type of chemicals which are required to meet the performance of desalting operation
- Illustrate the commercial desalter design for electric AC desalter, electro-dynamic desalter and electrostatic design technology
- Identify the factors that affect desalter operation and performance as well as types of desalting applications comprising of heavy crude desalting, FCC feed desalting and distillate treating
- Carryout desalter troubleshooting for oily effluent and poor dehydration and/or desalting

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 the design and operation of desalters/dehydrators for engineers, senior operation personnel and technical supervisors involved in the operation, optimization and monitoring of crude oil atmospheric distillation and residue vacuum distillation units.

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.

Accommodation

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

Course Fee

US$ 5,500 per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

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: -

- 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.

- 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.

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. Mervyn Frampton is a **Senior Process Engineer** with over **30 years** of industrial experience within the **Oil & Gas**, **Refinery**, **Petrochemical** and **Utilities** industries. His expertise lies extensively in the areas of **Distillation Column** Operation & Control, **Oil Movement** Storage & Troubleshooting, **Process Equipment** Design, Applied **Process Engineering** Elements, **Process Plant** Optimization, **Revamping & Debottlenecking**, **Process Plant** Troubleshooting & Engineering Problem Solving, **Process Plant** Monitoring, **Catalyst** Selection & Production Optimization, Operations Abnormalities & Plant Upset, **Process Plant** Start-up & Commissioning, **Clean Fuel** Technology & Standards, Flare, Blowdown & Pressure Relief Systems, **Oil & Gas Field Commissioning** Techniques, **Pressure Vessel** Operation, **Gas Processing**, **Chemical** Engineering, **Process Reactors** Start-Up & Shutdown, **Gasoline Blending** for Refineries, **Urea Manufacturing** Process Technology, Continuous Catalytic Reformer (**CCR**), **De-Sulfurization** Technology, Advanced Operational & Troubleshooting Skills, Principles of Operations Planning, **Rotating Equipment** Maintenance & Troubleshooting, **Hazardous Waste Management & Pollution Prevention**, **Heat Exchangers & Fired Heaters** Operation & Troubleshooting, **Energy Conservation** Skills, **Catalyst Technology**, **Refinery & Process Industry**, **Chemical Analysis**, **Process Plant**, **Commissioning & Start-Up**, **Alkylation**, **Hydrogenation**, **Dehydrogenation**, **Isomerization**, **Hydrocracking & De-Alkylation**, **Fluidized Catalytic Cracking**, **Catalytic Hydrodesulphuriser**, **Kerosene Hydrotreater**, **Thermal Cracker**, **Catalytic Reforming**, **Polymerization**, **Polyethylene**, **Polypropylene**, Pilot Water Treatment Plant, **Gas Cooling**, **Cooling Water Systems**, Effluent Systems, Material Handling Systems, **Gasifier**, **Gasification**, Coal Feeder System, **Sulphur Extraction Plant**, **Crude Distillation Unit**, **Acid Plant Revamp** and **Crude Pumping**. Further, he is also well-versed in HSE Leadership, Project and Programme Management, Project Coordination, Project Cost & Schedule Monitoring, Control & Analysis, Team Building, Relationship Management, Quality Management, Performance Reporting, Project Change Control, Commercial Awareness and Risk Management.

During his career life, Mr. Frampton held significant positions as the **Site Engineering Manager**, **Senior Project Manager**, **Project Engineering Manager**, **Construction Manager**, **Site Manager**, **Area Manager**, **Procurement Manager**, **Factory Manager**, **Technical Services Manager**, **Senior Project Engineer**, **Project Engineer**, **Assistant Project Manager**, **Handover Coordinator** and **Engineering Coordinator** from various international companies such as the **Fluor Daniel**, **KBR** South Africa, **ESKOM**, MEGAWATT PARK, CHEMEPIC, PDPS, CAKASA, **Worley Parsons**, Lurgi South Africa, **Sasol**, **Foster Wheeler**, **Bosch** & **Associates**, **BCG** Engineering Contractors, Fina Refinery, Sapref Refinery, Secunda Engine Refinery just to name a few.

Mr. Frampton has a **Bachelor degree** in **Industrial Chemistry** from **The City University** in **London**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Trainer/Assessor** by the **Institute of Leadership & Management** (**ILM**) and has delivered numerous trainings, courses, workshops, conferences and seminars internationally.

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	***Impact of Crude Oil Quality on Desalter Performance*** *Introduction to Desalter • Crude Oil Impurities: Water, Salt & Solids • Impact of Organic Acids Asphaltenes*
0930 – 0945	*Break*
0945 – 1030	***Impact of Crude Oil Quality on Desalter Performance (cont'd)*** *Desalting Heavy & Opportunity Crudes • Tank Dehydration*
1030 – 1230	***Fundamentals of Electrical Desalting*** *Wash Water Addition • Rate & Wash Water Quality • Mixing/Contact: Mix Valves & Static Valves*
1230 -1245	*Break*
1245 – 1420	***Fundamentals of Electrical Desalting*** *Coalescence: Stoke's Law & Electrical Voltage • Performance Control Variables • Dehydration Efficiency vs. Salt Removal Efficiency*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0930	***Types of Desalting Systems (cont'd)*** *Single-Stage Dehydrator • Single-Stage Desalter*
0930 – 0945	*Break*
0945 – 1100	***Types of Desalting Systems (cont'd)*** *Two-Stage Desalter • Three-Stage Desalter • Typical Operating Conditions and Performance*
1100 – 1230	***Desalter Components*** *Process Vessel • Distribution System • Electrodes & Transactors*
1230 – 1245	*Break*
1245 – 1420	***Desalter Components (cont'd)*** *Mud Wash • Level Control Device*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0930	***Desalter Design Considerations*** *Overview of HYSYS Computer Software in this Concern • Vessel Size • Number of Stages • Transactor Size & Power Consumption • Crude Oil Properties*
0930 – 0945	*Break*
0945 – 1100	***Desalter Design Considerations (cont'd)*** *Transactor Size & Power Consumption • Crude Oil Properties*
1100 – 1230	***Desalter Design Considerations (cont'd)*** *Sizing Calculations for Dehydration-Desalter • Technology Selection for Crude Oil Dehydration-Desalter with Merits & Demerits*

1230 – 1245	*Break*
1245 – 1420	***Desalter Design Considerations (cont'd)*** *Technical Evaluation of Different Designs Offered by Various Desalter Vendors • Selection of Different Type of Chemicals Which are Required to Meet the Performance of Desalting Operation*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

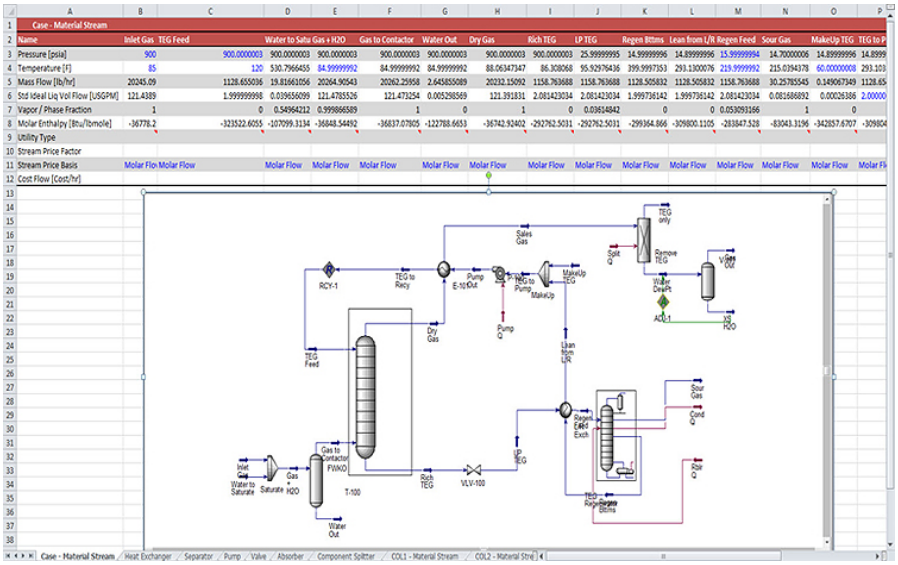
0730 – 0930	***Commercial Desalter Design*** *Electric AC Desalter • Electro-dynamic Desalter • Electrostatic Design Technology*
0930 – 0945	*Break*
0945 – 1100	***Factors that Affect Desalter Operation & Performance*** *Crude Oil Feed Rate & Quality • Temperature/Viscosity/Density Relationships • Electrical Field Intensity • Wash Water Rate, Quality & Flow Configuration*
1100 – 1230	***Factors that Affect Desalter Operation & Performance (cont'd)*** *Emulsion Formation (Pumps, Exchangers, Valves, Mixers) • Control of Water Level and Emulsion Layers*
1230 – 1245	*Break*
1245 – 1420	***Factors that Affect Desalter Operation & Performance (cont'd)*** *Demulsifier Technology & Addition Rate • Mud Washing & Brine Recycle*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

0730 – 0930	***Types of Desalting Applications*** *Heavy Crude Desalting • FCC Feed Desalting*
0930 – 0945	*Break*
0945 - 1100	***Types of Desalting Applications (cont'd)*** *Distillate Treating*
1100 – 1230	***Desalter Troubleshooting*** *Poor Dehydration &/or Desalting*
1230 – 1245	*Break*
1245 – 1345	***Desalter Troubleshooting (cont'd)*** *Oily Effluent*
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulator (Hands-on Practical Sessions)

Practical sessions 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 "ASPEN HYSYS" simulator.



ASPEN HYSYS Simulator

Course Coordinator

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