



COURSE OVERVIEW PE0987 De-Sulfurization Technology

Course Title

De-Sulfurization Technology

Course Date/Venue

August 17-21, 2025/TBA Meeting Room, The H Dubai Hotel, Sheikh Zayed Rd - Trade Centre, Dubai, UAE

Course Reference

PE0987

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.



Atmospheric residue desulfurization (ARDS) process is extensively used in upgrading of heavy petroleum oils and residues to more valuable clean environmentally friendly transportation fuels and to partially convert the residues to produce low-sulfur fuel oil and hydrotreated feedstocks. Graded catalyst systems in multiple reactors are used in the process in order to achieve hydrodesulfurization (HDS), hydrodemetallization (HDM), hydrodenitrogenation (HDN), and conversion of residues to distillates at desired levels. The characteristics of the feedstocks processed in different reactors are significantly different. The quality of the feed entering the second reactor is strongly dependent on the operating severity in the first reactor and can have an important impact on the performance of the catalysts in the following reactor with regard to various conversions and deactivation rate.



Atmospheric Residue Desulfurization (ARDS) is a well-established hydro treating process, operated primarily to desulfurize atmospheric residues from Crude units and to prepare feed stocks for downstream conversion units like Hydrocrackers and Delayed Coker units. The product, desulfurized residue, is not only low in sulfur but has improved pour points and lower viscosities as well.



This course is designed to provide participants with a detailed and up-to-date overview of atmospheric residue desulfurization unit. It covers the hydrotreating chemistry, thermodynamics, hydrodesulfurization, hydrodenitrogenation and hydrodeasphalting; the aromatic hydrogenation, the effects of feedstock and non-catalytic residue upgrading processes; the solvent deasphalting and correlations for solvent deasphalting; the thermal process, catalysis, catalysts supports, catalytic processes and residue-fluidized catalytic cracking; the hydroprocessing, fixed bed process, moving bed process, ebullated bed process and slurry bed process; and the aquaconversion, HDM catalysis and catalysts deactivation.

During this interactive course, participants will learn to employ catalyst regeneration, metals recovery and the transportation fuels from the bottom of the barrel of Chevron lummus global RDS/VRDS hydrotreating; apply selective hydrogen processes, UOP unionfining technology, UOP RCD unionfining process and catalytic dewaxing processes; identify the UOP unisar process for saturation of aromatics; apply start-up and shutdown, isocracking-hydrocracking for superior fuels and lubes and UOP unicracking process for hydrocracking; recycle H₂ purification process and hydrocracking consumption; and carryout H₂S removal, reactor internals and FCC FEED hydrotreating.

Course Objectives

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

- Apply and gain an in-depth knowledge on de-sulfurization technology
- Discuss hydrotreating chemistry, thermodynamics, hydrodesulfurization, hydrodenitrogenation and hydrodeasphalting
- Identify aromatic hydrogenation, the effects of feedstock and non-catalytic residue upgrading processes
- Recognize solvent deasphalting and correlations for solvent deasphalting
- Illustrate thermal process, catalysis, catalysts supports, catalytic processes and residue-fluidized catalytic cracking
- Carryout hydroprocessing, fixed bed process, moving bed process, ebullated bed process and slurry bed process
- Apply aquaconversion, HDM catalysis and catalysts deactivation
- Employ catalyst regeneration, metals recovery and the transportation fuels from the bottom of the barrel of Chevron lummus global RDS/VRDS hydrotreating
- Apply selective hydrogen processes, UOP unionfining technology, UOP RCD unionfining process and catalytic dewaxing processes
- Identify UOP unisar process for saturation of aromatics
- Describe Chervon lummus global ebullated bed bottom -of-the barrel hydroconversion (LC-fining) process
- Employ start-up and shutdown, isocracking-hydrocracking for superior fuels and lubes and UOP unicracking process for hydrocracking
- Recycle H₂ purification process and hydrocracking consumption
- Carryout H₂S removal, reactor internals and FCC FEED hydrotreating

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 desulfurization technology for engineers.

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:

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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.

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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:



Dr. Hesham Abdou, PhD, MSc, PgDip, BSc, is a **Senior Process & Petroleum Engineer** with over **30 years** of integrated experience within the **Oil & Gas** industries. His specialization widely covers in the areas of **Desulfurization, Thermodynamics, Hydrodenitrogenation, Solvent Deasphalting, Hydroprocessing, HDM Catalysis, UOP Unionfining Technology, Recycle H₂ Purification Processes, Artificial Lift System, Artificial Lift Methods, Petroleum Economics, Petroleum Refinery Processing, Refinery Material**

Balance Calculation, Refinery Gas Treating, Asset Operational Integrity, Drilling Operations, Drilling Rig, Bits & BHA, Mud Pumps, Mud logging Services, Wireline & LWD Sensors, Casing & Cementing Operation, Completion & Workover Operations, Petroleum Engineering, Production Optimization, Well Completion, Rig & Rigless Workover, Advanced PVT & EOS Characterization, PVT/Fluid Characterization/EOS, Advanced Phase Behaviour & EOS Fluid Characterization, PVT Properties of Reservoir Fluids, Directional Drilling Fundamentals, Application & Limitation, Horizontal & Multilateral Wells (Analysis & Design), Directional, Horizontal & Multilateral Drilling, Root Cause Analysis (RCA), Root Cause Failure Analysis (RCFA), Root Cause Analysis Study, Root Cause Analysis Techniques & Methodologies, Process Hazard Analysis (PHA), Crude Oil Testing & Water Analysis, Crude Oil & Water Sampling Procedures, Equipment Handling Procedures, Crude & Vacuum Process Technology, Gas Conditioning & Processing, Cooling Towers Operation & Troubleshooting, Sucker Rod Pumping, ESP & Gas Lift, PCP & Jet Pump, Pigging Operations, Electric Submersible Pumps (ESP), Progressive Cavity Pumps (PCP), Natural & Artificial Flow Well Completion, Well Testing Procedures & Evaluation, Well Performance, Coiled Tubing Technology, Oil Recovery Methods Enhancement, Well Integrity Management, Well Casing & Cementing, Acid Gas Removal, Heavy Oil Production & Treatment Techniques, Water Flooding, Water Lift Pumps Troubleshooting, Water System Design & Installation, Water Networks Design Procedures, Water Pumping Process, Pipelines, Pumps, Turbines, Heat Exchangers, Separators, Heaters, Compressors, Storage Tanks, Valves Selection, Compressors, Tank & Tank Farms Operations & Performance, Oil & Gas Transportation, Oil & Gas Production Strategies, Artificial Lift Methods, Piping & Pumping Operations, Oil & Water Source Wells Restoration, Pump Performance Monitoring, Rotor Bearing Modelling, Hydraulic Repairs & Cylinders, Root Cause Analysis, Vibration & Condition Monitoring, Piping Stress Analysis, Amine Gas Sweetening & Sulfur Recovery, Heat & Mass Transfer and Fluid Mechanics.

During his career life, Dr. Hesham held significant positions and dedication as the **General Manager, Petroleum Engineering Assistant General Manager, Workover Assistant General Manager, Workover Department Manager, Artificial Section Head, Oil & Gas Production Engineer** from Agiba Petroleum Company and **Engineering Consultant/Instructor** for various Oil & Gas companies as well as a **Senior Instructor/Lecturer** for **PhD, Master & BSc degree students** from **various universities** such as the Cairo University, Helwan University, British University in Egypt, Banha University.

Dr. Hesham has **PhD** and **Master** degrees as well as **Post Graduate Diploma in Mechanical Power Engineering** and a **Bachelor** degree in **Petroleum Engineering**. Further, he is a **Certified Instructor/Trainer** and a **Peer Reviewer**. Dr. Hesham is an active member of Egyptian Engineering Syndicate and the Society of Petroleum Engineering. Moreover, he has published technical papers and journals and has delivered numerous trainings, workshops, courses, seminars and conferences internationally.



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 booking.

Course Fee

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: Sunday, 17th of August 2025

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	PRE-TEST
0830 – 0900	Introduction to Atmospheric Residue Desulfurization Unit (ARDS)
0900 – 0930	Hydrotreating Chemistry
0930 – 0945	Break
0945 – 1045	Thermodynamics
1045 – 1130	Hydrodesulfurization
1130 – 1200	Hydrodenitrogenation
1200 – 1245	Hydrodeasphalting
1245 – 1300	Break
1300 – 1330	Aromatic Hydrogenation
1330 – 1420	Feedstock Effects
1420 – 1430	Recap
1430	Lunch & End of Day One

Day 2: Monday, 18th of August 2025

0730 – 0830	Non-Catalytic Residue Upgrading Processes
0830 – 0930	Solvent Deasphalting
0930 – 0945	Break
0945 – 1030	Correlations for Solvent Deasphalting
1030 – 1100	Thermal Processes
1100 – 1130	Catalysis



1130 - 1215	Catalyst Supports
1215 - 1230	Break
1230 - 1330	Catalytic Processes
1330 - 1420	Residue-Fluidized Catalytic Cracking
1420 - 1430	Recap
1430	Lunch & End of Day Two

Day 3: Tuesday, 19th of August 2025

0730 - 0830	Hydroprocessing
0830 - 0930	Fixed Bed Process
0930 - 0945	Break
0945 - 1030	Moving Bed Process
1030 - 1100	Ebullated Bed Process
1100 - 1130	Slurry Bed Process
1130 - 1215	Aquaconversion
1215 - 1230	Break
1230 - 1315	HDM Catalysis
1315 - 1420	Catalysts Deactivation
1420 - 1430	Recap
1430	Lunch & End of Day Three

Day 4: Wednesday, 20th of August 2025

0730 - 0800	Catalyst Regeneration & Metals Recovery
0800 - 0900	Chevron Lummus Global RDS/VRDS Hydrotreating - Transportation Fuels from the Bottom of the Barrel
0900 - 0915	Break
0915 - 1000	Selective Hydrogen Processes
1000 - 1030	UOP Unionfining Technology
1030 - 1115	UOP RCD Unionfining Process
1115 - 1200	UOP Catalytic Dewaxing Process
1200 - 1215	Break
1215 - 1315	UOP Unisar Process for Saturation of Aromatics
1315 - 1420	Chervon Lummus Global Ebullated Bed Bottom-of-the-Barrel Hydroconversion (LC-Fining) Process
1420 - 1430	Recap
1430	Lunch & End of Day Four

Day 5: Thursday, 21st of August 2025

0730 - 0830	Start-up & Shutdown
0830 - 0930	Isocracking-Hydrocracking for Superior Fuels & Lubes
0930 - 0945	Break
0945 - 1015	UOP Unicracking Process for Hydrocracking
1015 - 1045	Recycle H₂ Purification Processes
1045 - 1115	Hydrogen Consumption
1115 - 1200	H₂s Removal
1200 - 1215	Break
1215 - 1300	Reactor Internals
1300 - 1330	FCC FEED Hydrotreating
1330 - 1400	Course Conclusion
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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