

COURSE OVERVIEW PE0987
De-Sulfurization Technology

Course Title

De-Sulfurization Technology

Course Date/Venue

Please see page 3

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 uncracking 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 uncracking 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 de-sulfurization technology for engineers.

Course Date/Venue

Session(s)	Date	Venue
1	June 15-19, 2025	Meeting Plus 9, City Centre Rotana, Doha Qatar
2	August 17-21, 2025	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
3	October 12-16, 2025	Safir Meeting Room, Divan Istanbul, Turkey
4	November 24-28, 2026	Hampstead Meeting Room, Marriott London Regents Park, London, United Kingdom
5	January 11-15, 2026	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
6	February 08-12, 2026	Olivine Meeting Room, Fairmont Nile City, Cairo, Egypt

Course Fee

Doha	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.
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.
London	US\$ 8,800 per Delegate + VAT . This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Cairo	US\$ 8,800 per Delegate + VAT . This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Accommodation


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

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: -

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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**. 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:



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 **Process Troubleshooting, Distillation Towers, Fundamentals of Distillation** for Engineers, **Distillation** Operation and Troubleshooting, **Advanced Distillation** Troubleshooting, **Distillation** Technology, Vacuum **Distillation, 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, Process Engineering Manager, Project Engineering Manager, Construction Manager, Site Manager, Area Manager, Procurement Manager, Factory Manager, Technical Services Manager, Senior Project Engineer, Process 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's 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.

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

Day 2

0730 – 0830	<i>Non-Catalytic Residue Upgrading Processes</i>
0830 – 0930	<i>Solvent Deasphalting</i>
0930 – 0945	<i>Break</i>
0945 – 1030	<i>Correlations for Solvent Deasphalting</i>
1030 – 1100	<i>Thermal Processes</i>
1100 – 1130	<i>Catalysis</i>
1130 – 1215	<i>Catalyst Supports</i>
1215 – 1230	<i>Break</i>
1230 – 1330	<i>Catalytic Processes</i>
1330 – 1420	<i>Residue-Fluidized Catalytic Cracking</i>
1420 – 1430	<i>Recap</i>
1430	<i>Lunch & End of Day Two</i>



Day 3

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

Day 4

0730 – 0800	Catalyst Regeneration & Metals Recovery
0800 - 0900	Chevron Lummus Global RDS/VRDS Hydrotreating - Transportation Fuels from the Bottom of the Barrel
0900 – 0915	<i>Break</i>
0915 – 1000	Selective Hydrogen Processes
1000 - 1030	UOP Unionfining Technology
1030 – 1115	UOP RCD Unionfining Process
1115 - 1200	UOP Catalytic Dewaxing Process
1200 – 1215	<i>Break</i>
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	<i>Lunch & End of Day Four</i>

Day 5

0730 – 0830	Start-up & Shutdown
0830 - 0930	Isocracking-Hydrocracking for Superior Fuels & Lubes
0930 – 0945	<i>Break</i>
0945 – 1015	UOP Unicracking Process for Hydrocracking
1015 - 1045	Recycle H₂ Purification Processes
1045 - 1115	Hydrogen Consumption
1115 – 1200	H₂s Removal
1200 – 1215	<i>Break</i>
1215 – 1300	Reactor Internals
1300 - 1330	FCC FEED Hydrotreating
1330 – 1400	Course Conclusion
1400 – 1415	POST-TEST
1415 – 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch & End of Course</i>

Practical Sessions

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



Course Coordinator

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