

COURSE OVERVIEW PE0310
Gas Sweetening & Sulphur Recovery

Course Title

Gas Sweetening & Sulphur Recovery

Course Reference

PE0310

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs

Course Date/Venue

Session(s)	Date	Venue
1	January 21-25, 2024	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
2	March 03-07, 2024	Cheops Meeting Room, Radisson Blu Hotel, Istanbul Sisli, Turkey
3	June 23-27, 2024	Jubail Hall, Signature Al Khobar Hotel, Al Khobar, KSA
4	September 23-27, 2024	Ajman Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE



Course Description



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

Hydrogen sulfide, carbon dioxide, mercaptans and other contaminants are often found in natural gas streams. H₂S is a highly toxic gas that is corrosive to carbon steels. CO₂ is also corrosive to equipment and reduces the Btu value of gas. Gas sweetening processes remove these contaminants so the gas is suitable for transportation and use.

This course presents a complete and up-to-date overview of the Gas Sweetening, Liquid Hydrocarbon Sweetening and Sulphur Recovery with emphasis on gas plant process operations. The process flow sheets of several Sweetening and Sulphur Recovery Processes will be used to illustrate how the various operations differ. The advantages, limitations, and range of applicability of each process will be discussed so that its selection and integration into the overall plant is fully understood and appreciated.

Upon completing this course, you will have a good understanding of Gas Sweetening, Liquid Hydrocarbon Sweetening and Sulphur Recovery. There are many methods that may be employed to remove acidic components (primarily H₂S and CO₂) from hydrocarbon streams. The available methods may be broadly categorized as those depending on chemical reaction, absorption, or adsorption. Processes employing each of these techniques are described. Many of the processes result in acid gas streams that contain H₂S that may be flared, incinerated, injected or fed to a Sulphur Recovery Unit. Various Sulphur Recovery Processes (primarily The Modified Claus Process) are discussed. You will also learn the basic vocabulary unique to the industry.

Course Objectives

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

- Apply and gain an in-depth knowledge on gas sweetening and sulphur recovery and identify the safety precautions and the types of contaminants including their effects
- Discuss the concept of process selection as well as the chemical reaction processes used in gas sweetening and sulphur recovery
- Employ systematic methodology of inlet separation and filtration and distinguish their features and importance
- Identify the concept of flash tank and corrosion as applied in gas sweetening and sulphur recovery and acquire knowledge on foaming and materials
- Describe the principles of batch processes, SWS, amines and reclaimer and introduce the topic of liquid redox as applied in gas sweetening and sulphur recovery
- Explain the various physical and combination processes and gain an in-depth knowledge on caustic wash, alkaline process and liquid HC sweetening
- Discuss the amine plant process and modified claus plant as well as their practical application on gas sweetening and sulphur recovery
- Determine the mechanical consideration and process consideration of gas sweetening and sulphur recovery
- Carryout the procedure on re-heating operation as well as instrumentation and degasification and discover their features and functions

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, sample video clips of the instructor’s actual lectures & practical sessions during the course conveniently saved in a **Tablet PC**.

Who Should Attend

This course provides an overview of all significant aspects and considerations of gas sweetening and sulfur recovery for managers, engineers and other technical staff who are directly involved in gas processing operations.

Training Methodology

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures
- 20% Workshops & Work Presentations
- 30% Case Studies & Practical Exercises
- 20% Software, Simulators & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Course Fee

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 Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Al Khobar	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.
Abu Dhabi	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.

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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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.

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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.

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 **Catalyst Selection & Production Optimization, Continuous Catalytic Reformer (CCR), Catalyst Technology, Fluidized Catalytic Cracking, Catalytic Hydrodesulphuriser, Catalytic Reforming, 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, 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, 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, Refinery & Process Industry, Chemical Analysis, Process Plant, Commissioning & Start-Up, Alkylation, Hydrogenation, Dehydrogenation, Isomerization, Hydrocracking & De-Alkylation, Kerosene Hydrotreater, Thermal Cracker, 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'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.

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	Terminology
0900 – 0930	Safety Precautions
0930 – 0945	<i>Break</i>
0945 – 1030	Types of Contaminants
1030 – 1115	Process Selection
1115 – 1200	Chemical Reaction Processes
1200 – 1215	<i>Break</i>
1215 – 1300	General Considerations
1300 – 1345	Inlet Separation
1345 – 1420	Filtration
1420 – 1430	Recap
1430	<i>Lunch & End of Day One</i>

Day 2

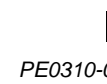
0730 – 0930	Flash Tank
0930 – 0945	<i>Break</i>
0945 – 1045	Corrosion
1045 – 1200	Foaming, Material
1200 – 1215	<i>Break</i>
1215 – 1330	Batch Processes, SWS, Amines & Reclaimer
1330 – 1420	Liquid Redox
1420 – 1430	Recap
1430	<i>Lunch & End of Day Two</i>

Day 3

0730 – 0830	Physical Process
0830 – 0930	Combination Process
0930 – 0945	<i>Break</i>
0945 – 1030	Caustic Wash
1030 – 1115	Alkaline Process
1115 – 1200	Case Study
1200 – 1215	<i>Break</i>
1215 – 1330	Liquid HC Sweetening
1330 – 1420	Case Study – Amine Plant Process
1420 – 1430	Recap
1430	<i>Lunch & End of Day Three</i>

Day 4

0730 – 0930	Amine Plant Process
0930 – 0945	<i>Break</i>
0945 – 1100	Modified Claus Plant



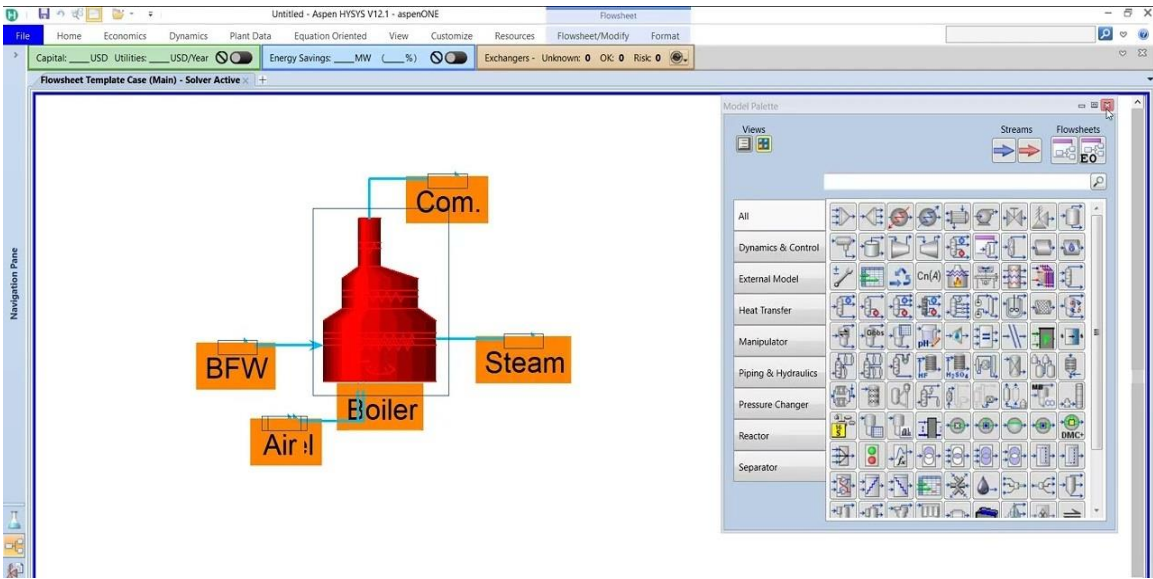
1100 – 1200	Mechanical Consideration
1200 – 1215	Break
1215 – 1420	Process Configuration
1420 – 1430	Recap
1430	Lunch & End of Day Four

Day 5

0730 – 0930	Re-Heating Operation
0930 – 0945	Break
0945 – 1100	Instrumentation, Degassification
1100 – 1200	Instrumentation, Degassification (cont'd)
1200 – 1215	Break
1215 – 1345	Case Study - Tail Gas Clean-up
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 V12.1 Simulator

Course Coordinator

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