COURSE OVERVIEW PE0420
Amine Gas Treating

Course Title
Amine Gas Treating

Course Date/Venue
Session 1: January 26-30, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
Session 2: July 28-August 01, 2025/ Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
PE0420

Course Duration
Five days/3.0 CEUs/30 PDHs

Course Description

This hands-on, 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.

Hydrogen sulfide, carbon dioxide, mercaptans and other contaminants are often found in natural gas streams. H_2S is a highly toxic gas that is corrosive to carbon steels. CO_2 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.

The dramatic increase in the use of selective amines for gas sweetening has resulted from the inherent economic benefits including smaller equipment sizes, lower circulation rates, and higher overall amine concentration. Selective amines absorb H_2S in the presence of CO_2, either from thermodynamic solubility or kinetic effects. Mixtures containing selective amines can be formulated to allow a certain amount of CO_2 to remain in the processed gas. Units designed with selective amines often have little margin for error with respect to plant capacity. Unfortunately, increases in the acid gas concentration or increases in throughput exceeding design can result in sweet gas which does not meet the CO_2 specification.

Since adding additional equipment can be very expensive, variables such as increasing the amine concentration, using mixtures of amines, and varying the lean amine temperature affect amine sweetening were studied. These variables require little or no additional capital expenditure relative to other alternatives such as adding reboiler area or pumping capacity.

There are many methods that may be employed to remove acidic components (primarily H_2S and CO_2) from hydrocarbon streams. The available methods may be broadly categorized as those depending on chemical reaction, absorption, or adsorption. Many of the processes result in acid gas streams that contain H_2S that may be flared, incinerated, injected or fed to a Sulphur Recovery Unit.

This course presents a complete and up-to-date overview of the Amine Gas Sweetening, and Sulphur Recovery. 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.

Course Objectives

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

- Apply and gain a good working knowledge on amine gas sweetening and sulphur recovery
- Discuss the terminology, safety precautions and the various types of contaminants including the process selection, chemical reaction processes and general considerations
- Identify aqueous amine processes as well as the caustic wash, physical processes, combination and batch processes
- Recognize Hg removal, molecular sieves and iron chelate and explain membranes, sour water stripper and liquid HC sweetening
- Analyze modified clause plants, process considerations, mechanical consideration and tail gas clean-up
- Employ amine plant process and troubleshooting covering amine plant operation, control and automations
- Perform amine plant safety and emergency response procedures as well as review amine plant cost optimization and new technologies

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 acid gas removal for those who are directly involved in supervising amine gas processing operations and for managers who are involved in the planning and development of new gas processing facilities or modifying existing facilities. Engineers and other technical staff in the amine gas processing industry will find the course particularly relevant.

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 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.

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.

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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 ontinuing 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. Attalla Ersan, PEng, MSc, BSc, is a **Senior Process Engineer** with over **35 years** of extensive experience within the **Oil & Gas**, **Hydrocarbon** and **Petrochemical** industries. His expertise widely covers the areas of **Process Simulation Using Aspen Hysys & UniSim**, **Process Modelling**, **Process Design**, **Process Plant** Operations, **Process Plant Startup & Operating Procedure**, **Ethylene & Vinyl Chloride**, **Ethane Cracking Furnaces** Operations, **Ethylene & Polyethylene** Operation, **Acid Gas Treatment**, **Sulphur Recovery**, **EDC & VCM**, Caustic Soda Storage, Debottle-necking, **Process Operation**, **Safety Audits**, **Process Engineering**, **Root Cause Investigations**, **Pyrolysis Cracking**, **Gas Plant Commissioning**, **Loss Prevention Techniques**, **Occupational Hazards**, Hot Tapping & Tie-Ins, Pre-Start-Up Safety Review (**PSSR**), Standard Operating Procedure (**SOP**), Emergency Operating Procedure (**EOP**), Permit to Work Systems (**PTW**), **Steam Cracking**, **Steam Generation**, **Binary Fractionators** Operations, **Tanks Farm & Metering Station Techniques**, **Gas Treatment**, **Sulphur Recovery Process Unit Operation**, **Permit to Work System**, **Emergency Response Planning**, **Boiler & Steam System** Management, **Waste Heat Recovery**, **Boiler Plant Safety**, **Boiler Controls**, **Steam Distribution** Systems, **Steam Traps**, Pollution Control, Cracked **Gas Compressor**, **Reboilers**, **Sulphur Unit Air Blower**, **Steam Turbine**, **Distillation Columns**, **Gas Treatment**, **Waste & Water Treatment Units**, **Pumps**, **Compressors**, **Turbines**, **Motors**, **Turbo-expanders**, **Gears**, **Heat Exchanger**, Hazard and Operability (**HAZOP**) Study, Process Hazards Analysis (**PHA**), **HAZOP** Facilitation, **Loss Prevention**, Consequence Analysis Application, **Gas Detectors** Operation, **Accident/Incident Investigation (Why Tree Method)**, **Occupational Exposure Assessment**, **Fire Fighting & First Aid**, **Environmental Management** and **Basic Safety** Awareness. Further, he is also well-versed in Project Management, Human Resources Consultancy, Manpower Planning, Job Design & Evaluation, Recruitment, Training & Development and Leadership, Creative Problem Solving Skills, Work Ethic, Job Analysis Evaluation, Training & Development Needs, Bidding & Tendering, Technical Report Writing, Supervisory Leadership, Effective Communication Skills and Total Quality Management (TQM). He is currently the **CEO** of **Ersan Petrokimya Teknoloji Company Limited** wherein he is responsible for the design and operation of Biogas Process Plants.

During his career life, Mr. Ersan has gained his practical and field experience through his various significant positions and dedication as the **Policy**, **Organization & Manpower Development Head**, **Training & Development**, **Head**, **Ethylene Plant – Pyrolysis Furnace Engineer**, **Production Engineer**, Process Training Coordinator, Ethylene Plant Shift Supervisor, Ethylene Plant Panel & Fit Operator, Process Training & Development Coordinator, **Technical Consultant**, and **Instructor/Trainer** for Qatar Vinyl Company Limited and Qatar Petroleum Company (QAPCO).

Mr. Ersan is a **Registered Professional Engineer** and has a **Master's degree** of **Education** in **Educational Training & Leadership** and a **Bachelor's degree** of **Petrochemical Engineering**. Further, he is a **Certified Instructor/Trainer** 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	***Terminology***
0930 – 0945	*Break*
0945 – 1030	***Safety Precautions***
1030 – 1130	***Types of Contaminants***
1130 – 1230	***Process Selection***
1230 – 1245	*Break*
1245 – 1320	***Chemical Reaction***
1320 – 1420	***General Considerations***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0830	***Aqueous Amine Processes & Emergency Cases***
0830 – 0930	***Case Study*** *Amine Processes ● Protection of Stainless Steel Equipment*
0930 – 0945	*Break*
0945 – 1130	***Caustic Wash***
1130 – 1230	***Physical Processes***
1230 – 1245	*Break*
1245 – 1320	***Combination Processes***
1320 – 1420	***Batch Processes***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0830	***Case Study*** *Iron Sponge ● Sour Water Stripper*
0830 – 0930	***Hg Removal***
0930 – 0945	*Break*
0945 – 1100	***Molecular Sieves***
1100 – 1230	***Iron Chelate***
1230 – 1245	*Break*
1245 – 1320	***Membranes***
1320 – 1420	***Sour Water Stripper***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 – 0830	***Liquid HC Sweetening***
0830 – 0930	***Case Study***
0930 – 0945	*Break*
0945 – 1100	***Modified Clause Plants***
1100 – 1230	***Process Considerations***
1230 – 1245	*Break*
1245 – 1320	***Mechanical Considerations***
1320 – 1420	***Tail Gas Clean-up***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

0730 – 0830	***Amine Plant Processes & Troubleshooting***
0830 – 0930	***Amine Plant Processes & Troubleshooting (cont'd)***
0930 – 0945	*Break*
0945 – 1030	***Amine Plant Operation, Control & Automations***
1030 – 1115	***Amine Plant Safety***
1115– 1230	***Amine Plant Cost Optimization***
1230 – 1245	*Break*
1245 – 1345	***New Technologies***
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions

This hands-on, highly-interactive course includes real-life case studies and exercises:-

Course Coordinator

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