COURSE OVERVIEW PE1046
Gas Separation and Stabilization Operation & Troubleshooting

Course Title
Gas Separation and Stabilization Operation & Troubleshooting

Course Reference
PE1046

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

Course Date/Venue

Session(s)	Date	Venue
1	June 30-July 04, 2025	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
2	August 31-September 04, 2025	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
3	October 06-10, 2025	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
4	December 07-11, 2025	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, 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.

This course is designed to provide participants with a detailed and up-to-date overview of Gas Separation and Stabilization Operation & troubleshooting. It covers the gas processing and the principles of gas-liquid separation; the separator types and configurations and primary stabilization techniques; the process flow diagrams and P&IDs, key process parameters and operating conditions; the three-phase separator design and operation, stabilizer columns, reboilers, gas compressors and suction scrubbers; and the cooling and heating systems, level, pressure and flow control systems and startup and shutdown procedures.

During this interactive course, participants will learn the abnormal operating conditions and troubleshooting separation issues and stabilization columns; the process data analysis and optimization, emergency scenarios and response and mechanical integrity and inspection; the instrumentation and control system maintenance, preventive and predictive maintenance strategies and process safety management; the hazards in gas processing plants and environmental and regulatory compliance; the integration with upstream and downstream units, control system optimization and upgrades, energy efficiency and heat recovery; and the performance benchmarking and KPIs.

Course Objectives

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

- Apply and gain an in-depth knowledge on gas separation and stabilization operation and troubleshooting
- Discuss gas processing and the principles of gas-liquid separation
- Recognize separator types and configurations and apply primary stabilization techniques
- Identify process flow diagrams and P&IDs, key process parameters and operating conditions
- Describe three-phase separator design and operation, stabilizer columns, reboilers, gas compressors and suction scrubbers
- Recognize cooling and heating systems, level, pressure and flow control systems and startup and shutdown procedures
- Identify abnormal operating conditions and troubleshoot separation issues and stabilization columns
- Carryout process data analysis and optimization, emergency scenarios and response and mechanical integrity and inspection
- Apply instrumentation and control system maintenance, preventive and predictive maintenance strategies and process safety management
- Identify hazards in gas processing plants and environmental and regulatory compliance
- Apply integration with upstream and downstream units, control system optimization and upgrades, energy efficiency and heat recovery
- Employ performance benchmarking and KPIs covering separator and column efficiency, specific energy consumption and troubleshooting frequency index

Exclusive Smart Training Kit - H-STK®

*Participants of this course will receive the exclusive "Haward Smart Trainin g 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 gas separation and stabilization operation and troubleshooting for process engineers, operation supervisors and field operators, production engineers and technologists, maintenance engineers, instrument and control engineers and those who involved in upstream oil and gas production, especially those working with gas processing, separation units, and stabilization systems.

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 Certificate(s)

Internationally recognized certificates will be issued to all participants of the course 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.

Accommodation

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

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. Robert Harvey, MSc (Cum Laude), BSc is a **Senior Process & Chemical Engineer** with over **30 years** of in-depth industrial experience within the **Oil & Gas**, **Refinery**, **Petrochemical**, **Mining** and **Power** industries. His expertise widely covers in the areas of **Operations Abnormalities & Plant Upset**, **Fertilizer Manufacturing** Process Technology, **Fertilizer Storage** Management (Ammonia & Urea), **Petrochemical & Fertilizer** Plants, **Nitrogen Fertilizer** Production, **Petroleum Industry Process** Engineering, **Process Equipment** Design & Troubleshooting, **Process Equipment & Piping Systems**, **Fertilizer** Manufacturing Process Technology, **Production** Management, **Process Plant** Optimization & Continuous Improvement, **Production Process** Optimization, **Process Analyzers**, **Process Equipment** Design, Vinyl Chloride Monomer (**VCM**) Manufacturing & Process Troubleshooting, **Cement** Manufacturing Process Technology & Standards, **Process Equipment & Piping** System, **Process Plant** Optimization & Continuous Improvement, **Process Plant** Performance & Efficiency, **Troubleshooting Process Operations**, Modern **Aluminium Production Processes**, **Cement Kiln Process**, **Process Engineer Calculations**, Steel Making Process, **Process Diagrams** Review, Process Hazard Analysis (**PHA**), Process Mapping, Strategical Process Control in Process Industry, **Revamping & Debottlenecking**, **Pressure Vessel** Operation, **Heat Mass Balance**, **Distillation-Column** Operation, & Troubleshooting, **Debottlenecking**, **Unit Performance** Optimization, Real Time Online Optimization, **Operations Planning** Optimization, **Engineering Problem Solving**, **Bag Filters** Operation & Maintenance, Chemical Reaction Engineering Application, **Phosphatic Industry**, **Diammonium Phosphate**, **Monoammonium Phosphate**, **NPK**, Troubleshooting Improvement, **Production** Management, **Distillation-Column** Operation & Troubleshooting, **Monomer** Handling Safety, Complex Operational Troubleshooting, Incident **Root Cause Analysis** & Corrective Action, **Fertilizer** Manufacturing, Continuous Improvement & Benchmarking, **Energy Efficiency** for Process Plants, **Pressure Vessel** Operation, **Reactors & Storage Tanks**, Dehydrating Columns, Heat & Material Balance, **P&ID** Reading & Interpretation, **Detailed Engineering Design**, **HAZOP** Leadership, Project HSE Review (**PHSER**), Safe Handling of **Propylene Oxide & Ethylene Oxide**, Safety in **Process & Industrial Plants**, Environmental Impact Assessment (**EIA**) and Effective **Risk Assessment & HAZOP** Studies. Further, he is also well versed in Feasibility Studies Analysis & Evaluation, Project Gate System Procedures, Change Management Skills, Change Management Strategy, Developing Commercial Contracts, Project Management Skills, Project Scheduling & Cost Control, FIDIC & Other Model Contracts, EPC & EPCM Contracts, Knowledge Management, Job Evaluation, Creative Problems Solving & Innovation Skills, Problem Solving & Decision Making, Strategic Planning & Creative Thinking and Mind Mapping.

During his career life, Mr. Harvey has gained his practical and field experience through his various significant positions and dedication as the **Commercial Director**, **Manufacturing Director**, **Chief Operating Officer**, **Head Projects Division**, **Project Leader**, **Lead Technical Advisor/Consultant** and **Project Consultant** to various international companies such as the Trade and Industrial Policy Strategies (TIPS), PGBI Johannesburg, IDC Green Industries SBU/Arengo 316 Pty Ltd, Ferrum Crescent Limited, CEF Limited, Rio Tinto Alcan, Industrial Development Corporation of SA (IDC) and AECI Limited.

Mr. Harvey has **Master** (**Cum Laude**) and **Bachelor** degrees in **Chemical Engineering**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**) and has delivered various trainings, seminars, conferences, workshops and courses globally.

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	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Overview of Gas Processing*** *Objectives and Significance • Types of Gas (Associated, Non-Associated) • Raw Gas Composition • Overview of Processing Steps*
0930 – 0945	*Break*
0945 – 1030	***Principles of Gas-Liquid Separation*** *Phase Behavior and Gas-Liquid Equilibrium • Flash Vaporization • Separation Stages • Impact of Pressure and Temperature*
1030 – 1130	***Separator Types & Configurations*** *Two-Phase and Three-Phase Separators • Vertical, Horizontal, Spherical Separators • Internals: Baffles, Mist Extractors, Weirs • Selection Criteria*
1130 – 1230	***Primary Stabilization Techniques*** *Pressure Reduction • Heat Exchange • Use of Stabilizer Columns • Reboilers and Condensers*
1230 – 1245	*Break*
1245 – 1330	***Process Flow Diagrams & P&IDs*** *Interpreting PFDs and P&IDs • Major Equipment Layout • Instrumentation and Control Loops • Safety Systems Overview*
1330 – 1420	***Key Process Parameters & Operating Conditions*** *Pressure and Temperature Profiles • Flow Rate Control • Liquid Level Management • Gas Composition Monitoring*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day One*

Day 2

0730 – 0830	***Three-Phase Separator Design & Operation*** *Operating Principle • Design Factors • Troubleshooting Liquid Carryover • Slug Flow Control*
0830 – 0930	***Stabilizer Columns & Reboilers*** *Column Internals (Trays, Packing) • Reboiler Operation and Heat Duty • Condenser Configuration • Reflux Ratio Optimization*
0930 – 0945	*Break*
0945 – 1045	***Gas Compressors & Suction Scrubbers*** *Types of Compressors • Compressor Performance Curves • Function of Suction Scrubbers • Fouling and Liquid Carryover Issues*
1045 – 1200	***Cooling & Heating Systems*** *Heat Exchangers (Shell & Tube, Air-Cooled) • Glycol and Water-Based Systems • Temperature Control Methods • Heat Integration*
1200 – 1215	*Break*
1215 – 1330	***Level, Pressure & Flow Control Systems*** *Control Valve Function and Tuning • Differential Pressure Transmitters • Flow Measurement Devices • Automated Shutdown Systems*
1330 – 1420	***Startup & Shutdown Procedures*** *Pre-Startup Checks • Normal Startup Steps • Safe Shutdown Methods • Emergency Depressurization*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Two*

Day 3

0730 – 0830	***Abnormal Operating Conditions*** *Foaming and Entrainment • Liquid Carryover or Underflow • Overpressure Scenarios • Gas Hydrate Formation*
0830 – 0930	***Troubleshooting Separation Issues*** *Poor Separation Efficiency • Emulsion Formation • Mist Extractor Malfunction • Liquid Interface Level Instability*
0930 - 0945	*Break*
0945 – 1130	***Troubleshooting Stabilization Columns*** *Poor Fractionation • Column Flooding or Weeping • Reboiler Scaling or Fouling • Tray or Packing Damage*
1130 - 1230	***Case Studies & Root Cause Analysis*** *Real-Life Process Upset Examples • Fault Identification Methods • RCA Using Fishbone and 5-Whys • Corrective Action Planning*
1230 - 1245	*Break*
1245 - 1330	***Process Data Analysis & Optimization*** *Data Trending and Diagnostics • Mass and Energy Balance Checks • Simulation Tools (HYSYS/ProMax Overview) • KPI-Based Performance Tuning*
1330 - 1420	***Emergency Scenarios & Response*** *Gas Release and Flare Systems • Compressor Trip and Surge • High-Pressure or High-Temperature Alarm Response • Emergency Isolation Procedures*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Three*

Day 4

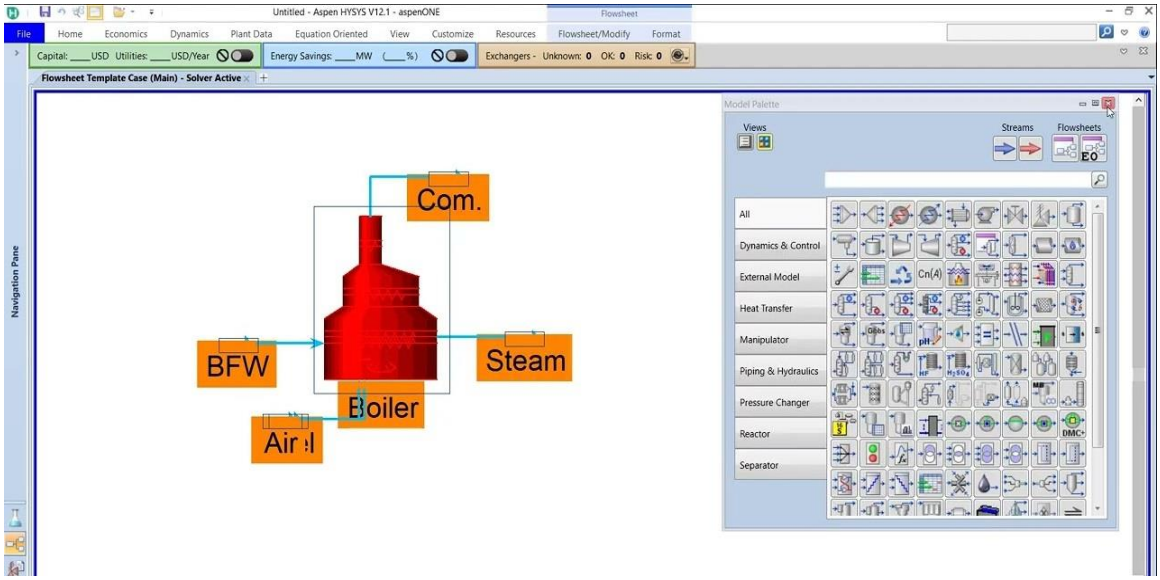
0730 – 0830	***Mechanical Integrity & Inspection*** *Internal Inspection of Vessels • Corrosion and Erosion Control • Wall Thickness and Defect Detection • Maintenance Intervals and Standards*
0830 – 0930	***Instrumentation & Control System Maintenance*** *Calibration of Level and Pressure Instruments • Valve Stroke Testing • SCADA/DCS Interface Checks • Alarm Management*
0930 - 0945	*Break*
0945 – 1130	***Preventive & Predictive Maintenance Strategies*** *Vibration and Thermal Monitoring • Condition-Based Maintenance (CBM) • Lube Oil Analysis for Compressors • Cleaning and Descaling Techniques*
1130 - 1230	***Process Safety Management*** *HAZOP and SIL Concepts • Safety Instrumented Systems (SIS) • Fire and Gas Detection Systems • Relief and Blowdown Systems*
1230 - 1245	*Break*
1245 - 1330	***Hazards in Gas Processing Plants*** *Flammable Gas Leaks • High-Pressure Equipment Failures • Toxic Gas Exposure (H_2S) • Explosive Atmospheres (ATEX)*
1330 - 1420	***Environmental & Regulatory Compliance*** *VOC and Methane Emissions • Flaring and Venting Regulations • Wastewater Handling • Compliance with API, OSHA, and Local Standards*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Four*

Day 5

0730 – 0830	***Integration with Upstream & Downstream Unit*** *Wellhead and Manifold Connections • Export Gas Compression • Gas Sweetening and Dehydration Interfaces • LPG Recovery and NGL Extraction*
0830 – 0930	***Control System Optimization & Upgrades*** *Advanced Process Control (APC) • Model Predictive Control (MPC) • Integration with Plant Historian • Digital Twin Overview*
0930 - 0945	*Break*
0945 – 1030	***Energy Efficiency & Heat Recovery*** *Energy Audit Basics • Pinch Analysis for Heat Exchanger Networks • Minimizing Flaring and Fuel Gas Usage • Improving Column Thermal Efficiency*
1030 – 1200	***Performance Benchmarking & KPIs*** *Separator and Column Efficiency • Specific Energy Consumption • Uptime versus Downtime Ratio • Troubleshooting Frequency Index*
1200 - 1215	*Break*
1215 – 1345	***Simulation Exercises & Scenario Training*** *Simulated Startup/Shutdown • Fault Insertion and Resolution • Hands-On Stabilization Control Adjustment • Separator Upset Management Drills*
1345 – 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
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 V12.1" simulator.



ASPEN HYSYS V12.1 Simulator

Course Coordinator

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