

COURSE OVERVIEW PE0225-4D
Molecular Sieves Dryer-Adsorption

Course Title

Molecular Sieves Dryer-Adsorption

Course Reference

PE0225-4D

Course Duration/Credits

Four days/2.4 CEUs/24 PDHs



Course Date/Venue

Session(s)	Date	Venue
1	February 19-22, 2024	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
2	June 10-13, 2024	Al Aziziya Hall, The Proud Hotel Al Khobar, KSA
3	October 07-10, 2024	Boardroom, Warwick Hotel Doha, Doha, Qatar
4	December 19-12, 2024	Ajman Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Description



This practical and highly-interactive course includes real-life case studies where participants will be engaged in a series of interactive small groups and class workshops.



A molecular sieve is a material with pores of uniform size. These pore diameters are of the dimensions of small molecules, thus large molecules cannot be absorbed, while smaller molecules can. Many molecular sieves are used as desiccants. Some examples include activated charcoal and silica gel.



Molecular sieves are synthetically produced zeolites (naturally occurring aluminosilicate minerals), and are characterized by pores and internal cavities of extremely uniform dimensions. These crystalline materials have three-dimensional structures based on silicon oxide (SiO₄) and aluminum oxide (AlO₄) polyhedra. The polyhedra are linked by their corners to produce an open structure with internal cavities in which molecules can be trapped. These materials are engineered so that access to the internal cavities is through specific and uniform sized pores.

This course is designed to provide delegates with a detailed and up-to-date overview of molecular sieves dryer-adsorption. It covers the processes and functions of molecular sieves including thermal swing drying and different types and sizes available.

The course will also cover the different types used in natural gas drying and how is molecular sieve drier designed.

At the completion of the course, participants will be able to identify the potential problems and implement its preventive measures; employ safety during removal of used molecular sieves from the adsorption vessel; apply 3A type acid resistant; H₂O removal; regeneration curves; as well as identify liquid carryover problems in dryers and piping of dryers.

Course Objectives

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

- Apply and gain an in-depth knowledge on molecular sieves dryer-adsorption
- Explain the background of molecular sieves
- Determine molecular sieves and their procedure
- Explain how does the molecular sieves work
- Describe thermal swing drying including its sizes and types available
- Handle wireline equipment properly and with care
- List the various types used in natural gas drying and discuss how the molecular sieve drier designed
- Identify the potential problems and how to avoid them
- Carryout safety practices during removal of used molecular sieves from the adsorption vessel
- Recognize 3A type/acid resistant, H₂O removal and regeneration curves typical
- Determine liquid carryover problems in dryers and pipping of dryers

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 molecular sieves dryer-adsorption for those who are directly involved in supervising gas processing operations such as managers and process engineers who are mainly in charge of planning and development of new gas processing facilities or modifying existing facilities. Other technical and operational staff will indeed find this 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

Dubai	US\$ 4,500 per Delegate + VAT . This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Al Khobar	US\$ 4,500 per Delegate + VAT . This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Doha	US\$ 5,500 per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Abu Dhabi	US\$ 4,500 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:-

- 
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 **2.4 CEUs** (Continuing Education Units) or **24 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.

- 
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. Robert Harvey, MSc (Cum Laude), BSc is a **Senior Chemical Engineer** with over **45 years** of in-depth industrial experience within the **Oil & Gas, Refinery, Petrochemical, Mining** and **Power** industries. His expertise widely covers in the areas of **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, **Revamping & Debottlenecking**, **Pressure Vessel** Operation, **Heat Mass Balance**, **Distillation-Column** Operation, & Troubleshooting, **Production Process** Optimization, **Debottlenecking**, **Unit Performance** Optimization, **Process Analyzers**, Real Time Online Optimization, **Operations Planning** Optimization, **Engineering Problem Solving**, **Bag Filters** Operation & Maintenance, **Process Equipment** Design, Chemical Reaction Engineering Application, **Phosphatic Industry**, **Diammonium Phosphate**, **Monoammonium Phosphate**, **NPK**, Troubleshooting Improvement, **Production** Management, **Distillation-Column** Operation & Troubleshooting, Vinyl Chloride Monomer (**VCM**) Manufacturing & Process Troubleshooting, **Monomer** Handling Safety, **Cement** Manufacturing Process Technology & Standards, Complex Operational Troubleshooting, Incident **Root Cause Analysis** & Corrective Action, **Process Equipment & Piping** System, **Fertilizer** Manufacturing, **Process Plant** Optimization & Continuous Improvement, **Process Plant** Performance & Efficiency, Continuous Improvement & Benchmarking, **Energy Efficiency** for Process Plants, **Pressure Vessel** Operation, **Reactors & Storage Tanks**, Dehydrating Columns, Heat & Material Balance, **Troubleshooting Process Operations**, Modern **Aluminium Production Processes**, **Cement Kiln Process**, **Process Engineer Calculations**, Steel Making Process, **P&ID** Reading & Interpretation, **Detailed Engineering Design**, **Process Diagrams** Review, Process Hazard Analysis (**PHA**), **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, Process Mapping, Change Management Skills, Change Management Strategy, Strategic Process Control in Process Industry, 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.

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	Background on Molecular Sieves
0930 – 0945	Break
0945 – 1100	What are They?
1100 – 1230	How are They Made?
1230 – 1245	Break
1245 – 1420	How do Molecular Sieves Work?
1420 – 1430	Recap
1430	Lunch & End of Day One

Day 2

0730 – 0930	Thermal Swing Dry
0930 – 0945	Break
0945 – 1100	What are the Different Types & Sizes Available?
1100 – 1230	What are the Different Types & Sizes Available? (cont'd) Care and Handling of Wireline Equipment
1230 – 1245	Break
1245 – 1420	What Types are Used in Natural Gas Drying?
1420 – 1430	Recap
1430	Lunch & End of Day Two

Day 3

0730 – 0930	How is a Molecular Sieve Drier Designed?
0930 – 0945	Break
0945 – 1100	What are the Potential Problems?
1100 – 1230	How can those Problems be Avoided?
1230 – 1245	Break
1245 – 1320	Safety During Removal of Used Molecular Sieves from the Adsorption Vessel
1320 – 1420	3A Type/Acid Resistant
1420 – 1430	Recap
1430	Lunch & End of Day Three

Day 4

0730 – 0930	H₂O Removal
0930 – 1100	Regeneration Curves Typical
1100 – 1115	Break
1115 – 1230	Liquid Carryover Problems in Dryers
1230 – 1245	Break
1245 – 1345	Piping of Dryers
1345 – 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 the following real-life case studies:-



Course Coordinator

Kamel Ghanem, Tel: +971 2 30 91 714, Email: kamel@haward.org