COURSE OVERVIEW PE0225-4D
Molecular Sieves Dryer-Adsorption

Course Title
Molecular Sieves Dryer-Adsorption

Course Date/Venue
December 09-12, 2024/Fujairah Meeting Room,
Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
PE0225-4D

Course Duration/Credits
Four days/2.4 CEUs/24 PDHs

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 (SiO_4) and aluminum oxide (AlO_4) 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; H_20 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, H_2O 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.

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. 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 Fee

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 Program

The following program is planned for this course. However, the course instructors(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: ***Monday, 09th of December 2024***

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: ***Tuesday, 10th of December 2024***

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:	***Wednesday, 11th of December 2024***
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:	***Thursday, 12th of December 2024***
0730 – 0930	***H_2O 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

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