COURSE OVERVIEW PE0765

MEG (Monoethylene Glycol) Manufacturing & Process Technology

Course Title

MEG (Monoethylene Glycol) Manufacturing & Process Technology

Course Date/Venue

Please see page 3

Course Reference

PE0765

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs

Course Description

This practical and 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.

This course is designed to provide participants with a detailed and up-to-date overview of MEG (Monoethylene Glycol) Manufacturing and Process Technology. It covers the physical and chemical properties of MEG and feedstock and raw materials for MEG production; the oxidation of ethylene to ethylene oxide (EO), hydrolysis of ethylene oxide to MEG, reaction mechanism and kinetics; the silver-based catalysts in EO production, acid and base catalysts in hydrolysis, reaction optimization techniques and impact of catalyst poisons; the process flow diagram (PFD) of a typical MEG plant; the role of heat exchangers and pumps in the process; and the process safety and layout considerations.

Further, the course will also discuss the safety and environmental considerations in MEG production, ethylene oxide production process and ethylene oxide recovery and purification; the hydrolysis of EO to MEG and side reactions and byproduct formation; the material balance across key process units, heat integration, energy recovery and efficiency improvement through process optimization; the common process issues in EO and MEG production; the separation and purification of MEG; the advanced distillation and evaporation techniques and quality control in MEG production; and the storage, handling and transportation of MEG.

During this interactive course, participants will learn the instrumentation and control in MEG manufacturing, process safety and risk management; troubleshooting MEG reactor issues; the distillation column and separation troubleshooting; the causes of corrosion in piping and equipment, scaling due to impurities, water content and heat exchanger fouling; the cleaning strategies, preventive maintenance and material selection; the wastewater treatment, byproduct management and process optimization strategies; the emerging technologies in MEG production, circular economy and sustainability in MEG manufacturing; the digital transformation in MEG manufacturing; and the regulatory and market trends in MEG industry.

Course Objectives

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

- Apply and gain an in-depth knowledge on MEG (monoethylene glycol) manufacturing and process technology
- Discuss the physical and chemical properties of MEG and feedstock and raw materials for MEG production
- Explain oxidation of ethylene to ethylene oxide (EO), hydrolysis of ethylene oxide to MEG, reaction mechanism and kinetics
- Describe silver-based catalysts in EO production, acid and base catalysts in hydrolysis, reaction optimization techniques and impact of catalyst poisons
- Identify process flow diagram (PFD) of a typical MEG plant as well as the role of heat exchangers and pumps in the process and process safety and layout considerations
- Apply safety and environmental considerations in MEG production, ethylene oxide production process and ethylene oxide recovery and purification
- Discuss hydrolysis of EO to MEG and side reactions and byproduct formation
- Identify material balance across key process units, heat integration, energy recovery and efficiency improvement through process optimization
- Recognize the common process issues in EO and MEG production and illustrate separation and purification of MEG
- Carryout advanced distillation and evaporation techniques, quality control in MEG production and storage, handling and transportation of MEG
- Apply instrumentation and control in MEG manufacturing, process safety and risk management
- Troubleshoot MEG reactor issues and apply distillation column and separation troubleshooting
- Identify the causes of corrosion in piping and equipment, scaling due to impurities, water content and heat exchanger fouling as well as apply cleaning strategies, preventive maintenance and material selection
- Employ wastewater treatment and byproduct management and process optimization strategies

- Discuss the emerging technologies in MEG production, circular economy and sustainability in MEG manufacturing
- Explain the digital transformation in MEG manufacturing and regulatory and market trends in MEG industry

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 MEG (monoethylene glycol) manufacturing and process technology for process, chemical, operation, design and production engineers and other technical staff. Further, the course is suitable for environmental, laboratory, R&D and R&T staff including chemists, scientists, analysts, technologist, technicians and environmental professionals.

Course Date/Venue

Session(s)	Date	Venue
1	April 05-09, 2026	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
2	June 21-25, 2026	Meeting Plus 9, City Centre Rotana, Doha Qatar
3	August 16-20, 2026	Crowne Meeting Room, Crowne Plaza Al Khobar, an IHG Hotel, Al Khobar, KSA
4	October 26-30, 2026	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

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.

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

Haward's 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**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). 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.

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:

Dr. Pete Ludovice, PhD, BSc, is a **Senior Chemical Engineer** with over **25 years** of extensive experience in **Plastics/Rubber Additives**, **Thermoplastics Processing**, **Plastic Materials**, **Polymer Science** and **Polyolefin** (**Polyethylene & Polypropylene**) **Engineering**. Further, he is also well-versed in **Chemical & Biomolecular Engineering**, **Bioengineering**, **Water Distribution System**, **Water Injection Treatment** and **Water Treatment Technology**. He is currently the **Senior Professor** of **Chemical & Biomolecular Engineering** in **Georgia Institute of Technology**, **USA** wherein he has designed numerous courses on various aspects of **polymer science** and **chemical engineering** that include **Applied Molecular Modelling**, **Numerical Modelling** of **Process Engineering**, and **Chemical Processes** using **Molecular Modelling** to characterize **Polymer Behaviour** and **Methods** for **Technical Innovation.**

Dr. Ludovice's research interests include **structure-property relationships** in **polymer materials** including a variety of polymers from basic vinyl polymers to high performance polymer and biological polymers. His researches have been funded by various industries and the **United States National Science Foundation**, the **Department of Energy**, the **Whitaker Foundation** and the **Office of Naval Research**. Further, he has gained his extensive experience through his prior challenging positions such as a **Polymer Product Manager** of **Molecular Simulations Inc**., a **Senior Scientist** for **NASA – Ames Research Center** (**USA**) and the **IBM – Almaden Research Center** (**USA**), a **Research Associate** for the **Institut für Polymere** at the **Eidgenössische Technische Hochschule** in **Zürich**, **Switzerland** and a **Principal Investigator** for 40 diverse international agencies.

Dr. Ludovice holds **PhD** and **Bachelor** degrees in **Chemical Engineering** from the **Massachusetts Institute of Technology**, **USA** and the **University of Illinois**, **USA** respectively. Further, he is a **Certified Instructor/Trainer** and an active member of the American Institute of Chemical Engineers (**AIChE**), Society of Plastics Engineers (**SPE**), Materials Research Society and the American Chemical Society. Moreover, he has published **numerous books** and **papers** circulated **internationally** and **delivered technical presentations** and **seminars** in several **international conferences**. He was also one of the inventors of the "**Self-Expanding Intraluminal Composite Prosthesis**" and the "**Pore-Forming Agents to Enhance Transdermal Delivery of Biological Agents**". Amongst all these achievements, he was **honoured** with **various awards** such as the "**Outstanding PhD Thesis Award**" by Georgia Institute of Technology, the "**Outstanding Professor of the Year**" by AIChE and the "**Sherwin Williams Award in Polymer Science**" by the American Chemical Society.

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.
Doha	**US$ 6,000** per Delegate. This rate includes H-STK® (Haward Smart Training Kit), 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.

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	***Introduction to Monoethylene Glycol (MEG)*** *Overview of Glycols: MEG, DEG, TEG • Industrial Applications of MEG • Physical & Chemical Properties of MEG • Market Demand & Global Production Trends*
0930 – 0945	*Break*
0945 – 1030	***Feedstock & Raw Materials for MEG Production*** *Ethylene as the Primary Feedstock • Steam Cracking Process for Ethylene Production • Oxygen & Catalyst Requirements • Purity Requirements for Feedstock*
1030 – 1130	***MEG Production Process Overview*** *Oxidation of Ethylene to Ethylene Oxide (EO) • Hydrolysis of Ethylene Oxide to MEG • Reaction Mechanism & Kinetics • Overview of Byproducts: DEG, TEG*
1130 – 1215	***Catalysts & Reaction Mechanisms in MEG Production*** *Silver-Based Catalysts in EO Production • Acid & Base Catalysts in Hydrolysis • Reaction Optimization Techniques • Impact of Catalyst Poisons*
1215 – 1230	*Break*
1230 – 1330	***Process Flow Diagram (PFD) & Equipment Overview*** *Process Flow Diagram of a Typical MEG Plant • Key Equipment: Reactors, Distillation Columns, Evaporators • Role of Heat Exchangers & Pumps in the Process • Process Safety & Layout Considerations*

1330 – 1420	***Safety & Environmental Considerations in MEG Production*** *Toxicity & Handling of Ethylene Oxide & MEG • Fire & Explosion Hazards in MEG Plants • Wastewater Treatment & Environmental Regulations • Occupational Safety Measures & PPE Requirements*
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	***Ethylene Oxide Production Process*** *Oxidation of Ethylene: Process Parameters • Reactor Design & Reaction Conditions • Heat Management in EO Reactors • EO Yield & Selectivity Optimization*
0830 – 0930	***Ethylene Oxide Recovery & Purification*** *EO Absorption in Water Scrubbers • Distillation & Stripping Processes • Removal of Byproducts & Impurities • Energy Optimization in EO Recovery*
0930 – 0945	*Break*
0945 – 1100	***Hydrolysis of EO to MEG*** *Hydrolysis Reaction Mechanism • Impact of Reaction Temperature & Pressure • Controlling the Ratio of MEG to DEG/TEG • Process Control & Optimization*
1100 – 1215	***Side Reactions & Byproduct Formation*** *Formation of Diethylene Glycol (DEG) & Triethylene Glycol (TEG) • Role of Reaction Conditions in Byproduct Formation • Mitigation Strategies to Minimize Byproducts • Recycling & Reuse of Byproducts*
1215 – 1230	*Break*
1230 – 1330	***Mass & Energy Balances in MEG Production*** *Material Balance Across Key Process Units • Heat Integration & Energy Recovery • Efficiency Improvement Through Process Optimization • Case Studies of Energy Savings in MEG Plants*
1330 – 1420	***Common Process Issues in EO & MEG Production*** *EO Reactor Fouling & Deactivation • Hydrolysis Reactor Inefficiencies • Contaminants Impacting Yield & Purity • Troubleshooting MEG Quality Issues*
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	***Separation & Purification of MEG*** *Role of Distillation in MEG Separation • Vacuum Distillation vs Atmospheric Distillation • Removal of Water & Impurities • Yield Maximization in Separation*
0830 – 0930	***Advanced Distillation & Evaporation Techniques*** *Multi-Effect Evaporation in MEG Purification • Fractional Distillation for Glycol Separation • Energy Savings in Distillation Units • Impact of Pressure & Temperature on Separation Efficiency*

0930 – 0945	*Break*
0945 – 1100	***Quality Control in MEG Production*** *Key Quality Parameters: Purity, Color, Water Content • Analytical Techniques: GC, HPLC, FTIR • Contaminant Identification & Control • Regulatory Standards & Certifications*
1100 – 1215	***Storage, Handling & Transportation of MEG*** *Best Practices for MEG Storage • Corrosion Issues in MEG Tanks & Pipelines • MEG Degradation & Prevention Strategies • Transportation & Logistics Challenges*
1215 – 1230	*Break*
1230 – 1330	***Instrumentation & Control in MEG Manufacturing*** *Process Automation & Control Strategies • Sensors & Analyzers in MEG Plants • Distributed Control System (DCS) & SCADA • Real-Time Monitoring for Process Optimization*
1330 – 1420	***Process Safety & Risk Management*** *Hazard Identification in MEG Plants • Safety Protocols for EO Handling • Emergency Response & Spill Control • Case Studies of Past Incidents & Lessons Learned*
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	***Troubleshooting MEG Reactor Issues*** *Low Conversion & Yield Problems • Catalyst Deactivation & Fouling • Temperature & Pressure Control Issues • Case Studies on Reactor Failures*
0830 – 0930	***Distillation Column & Separation Troubleshooting*** *Column Flooding & Foaming Issues • Poor Separation Efficiency & Impurity Carryover • Pressure & Temperature Fluctuations • Solutions for Energy Optimization*
0930 – 0945	*Break*
0945 – 1100	***Corrosion, Scaling & Fouling in MEG Process*** *Causes of Corrosion in Piping & Equipment • Scaling Due to Impurities & Water Content • Heat Exchanger Fouling & Cleaning Strategies • Preventive Maintenance & Material Selection*
1100 – 1215	***Wastewater Treatment & Byproduct Management*** *Sources of Wastewater in MEG Plants • Treatment Techniques for MEG Wastewater • Handling & Disposal of DEG & TEG • Regulatory Compliance for Effluent Discharge*
1215 – 1230	*Break*
1230 – 1330	***Process Optimization Strategies*** *Debottlenecking & Capacity Enhancement • Energy Efficiency Improvement Techniques • Advanced Process Control (APC) for Yield Improvement • Digital Twin & AI Applications in MEG Plants*

1330 – 1420	***Case Studies & Real-World Troubleshooting Scenarios*** *Common Failures & Their Root Causes • Best Practices from Leading MEG Producers • Impact of Process Changes on Yield & Quality • Lessons Learned from Industry Incidents*
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	***Emerging Technologies in MEG Production*** *Bio-Based MEG Production & Sustainability • CO2-Based MEG Production Technologies • Membrane Separation in MEG Purification • Hydrogenation Techniques for Byproduct Reduction*
0830 – 0930	***Circular Economy & Sustainability in MEG Manufacturing*** *Recycling & Reuse of MEG in Industries • Reducing Carbon Footprint in MEG Production • Green Chemistry Approaches • Life Cycle Assessment of MEG Manufacturing*
0930 – 0945	*Break*
0945 – 1100	***Digital Transformation in MEG Manufacturing*** *Industry 4.0 & Smart MEG Plants • AI & Machine Learning for Process Optimization • IoT Sensors for Real-Time Monitoring • Predictive Maintenance Using Data Analytics*
1100 – 1230	***Regulatory & Market Trends in MEG Industry*** *Global Environmental Regulations Impacting MEG • Market Trends & Future Demand Forecasts • Impact of Geopolitical Changes on Feedstock Supply • Strategies for Competitive Advantage in MEG Business*
1230 – 1245	*Break*
1245 – 1345	***Hands-On Troubleshooting Workshop*** *Live Case Study Discussions • Root Cause Analysis & Problem-Solving Exercises • Group Discussions on Best Practices • Interactive Q&A Session*
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*

Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-

Course Coordinator

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