

COURSE OVERVIEW PE0210

Process Chemicals Significance and Specifications

Course Title

Process Chemicals Significance and Specifications

Course Date/Venue

Session 1: February 23-27, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Session 2: November 10-14, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE



Course Reference

PE0210

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 Process Chemicals Significance and Specifications. It covers the importance of process chemicals, role of chemicals in upstream, midstream and downstream operations and key categories of process chemicals; the classification of process chemicals in petroleum industry; the chemical composition and properties, chemical safety and hazard management, quality control and regulatory compliance; the role of demulsifiers in crude oil processing, types and selection criteria for demulsifiers and testing and performance evaluation methods; and the corrosion inhibitors and their applications, scale inhibitors and biocides.



During this interactive course, participants will learn the anti-foaming and foam-control agents, drag reducing agents (DRA) in pipeline operations and catalysts in refining processes; the hydrogen sulfide (H₂S) scavengers, anti-fouling and sludge control agents, antioxidants and stabilizers in fuel processing; the oxygen scavengers in water treatment and laboratory testing of process chemicals; the quality control in chemical manufacturing and supply chain, chemical compatibility and stability analysis; the environmental impact of process chemicals, chemical injection system operation and troubleshooting; and the safety drills and emergency response for chemical handling.



Course Objectives

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

- Apply and gain a good working knowledge on process chemicals significance and specifications
- Discuss the importance of process chemicals, role of chemicals in upstream, midstream, and downstream operations and key categories of process chemicals
- Classify process chemicals in petroleum industry and identify chemical composition and properties
- Carryout chemical safety and hazard management, quality control and regulatory compliance
- Define the role of demulsifiers in crude oil processing, identify the types and selection criteria for demulsifiers and apply testing and performance evaluation methods
- Discuss corrosion inhibitors and their applications, scale inhibitors and their efficiency and biocides and their role in oilfield operations
- Recognize anti-foaming and foam-control agents, drag reducing agents (DRA) in pipeline operations and catalysts in refining processes
- Determine hydrogen sulfide (H₂S) scavengers, anti-fouling and sludge control agents as well as antioxidants and stabilizers in fuel processing
- Interpret oxygen scavengers in water treatment and apply laboratory testing of process chemicals
- Apply quality control in chemical manufacturing and supply chain including chemical compatibility and stability analysis
- Discuss the environmental impact of process chemicals and digitalization and AI in chemical monitoring
- Carryout chemical injection system operation and troubleshooting as well as safety drills and emergency response for chemical handling

Exclusive Smart Training Kit - H-STK[®]



Participants of this course will receive the exclusive “Howard 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 a basic overview of all significant aspects and considerations of process chemicals significance and specifications for chemical engineers, process engineers, quality control and quality assurance specialists, environmental engineers, production managers, R&D professionals, safety officers, purchasing and procurement teams, regulatory affairs professionals and other technical staff.

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: -

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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.

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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 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 Instructor

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 **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, Project Engineering Manager, Construction Manager, Site Manager, Area Manager, Procurement Manager, Factory Manager, Technical Services Manager, Senior Project 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 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 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

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| 0730 – 0800 | Registration & Coffee |
| 0800 – 0815 | Welcome & Introduction |
| 0815 – 0830 | PRE-TEST |
| 0830 – 0930 | Introduction to Process Chemicals Definition & Importance of Process Chemicals • Role of Chemicals in Upstream, Midstream, & Downstream Operations • Key Categories of Process Chemicals • Approach to Chemical Management |
| 0930 – 0945 | Break |
| 0945 – 1040 | Classification of Process Chemicals in Petroleum Industry Production Chemicals (Demulsifiers, Corrosion Inhibitors, Scale Inhibitors) • Refinery Chemicals (Catalysts, Cracking Agents, Anti-Fouling Agents) • Water Treatment Chemicals (Biocides, Oxygen Scavengers, Flocculants) • Specialty Chemicals (Drag-Reducing Agents, Foam Control Agents) |
| 1040 – 1135 | Chemical Composition & Properties Physical Properties (Density, Viscosity, Solubility) • Chemical Properties (Reactivity, Thermal Stability, Ph) • Compatibility with Hydrocarbons & Water • Chemical Selection Criteria |
| 1135 - 1230 | Chemical Safety & Hazard Management Identifying Hazardous Chemicals in Petroleum Operations • Safe Handling & Storage Guidelines • Material Safety Data Sheets (MSDS) & Chemical Labeling • HSE Regulations for Process Chemicals |
| 1230 - 1245 | Break |
| 1245 – 1335 | Quality Control & Regulatory Compliance International Chemical Standards (ISO, ASTM, API) • Specifications for Process Chemicals • Testing & Certification Requirements • Impact of Non-Compliance on Operations & Safety |

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| 1335 - 1420 | Case Studies on Chemical Use in Operations Examples of Effective Chemical Applications in Oil & Gas • Lessons Learned from Chemical-Related Operational Challenges • Best Practices for Chemical Management • Future Trends in Process Chemical Applications |
| 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

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|-------------|--|
| 0730 - 0830 | Demulsifiers & their Importance Role of Demulsifiers in Crude Oil Processing • Types & Selection Criteria for Demulsifiers • Testing & Performance Evaluation Methods • Demulsifier Specifications |
| 0830 - 0930 | Corrosion Inhibitors & their Applications Mechanism of Corrosion in Oilfield Environments • Types of Corrosion Inhibitors (Film-Forming, Oxygen Scavengers) • Performance Assessment & Dosage Optimization • Corrosion Inhibitor Standards |
| 0930 - 0945 | Break |
| 0945 - 1040 | Scale Inhibitors & their Efficiency Common Oilfield Scales (Carbonate, Sulfate, Silicate) • Chemical & Physical Scale Inhibition Mechanisms • Compatibility with Produced Water & Process Fluids • Specifications for Scale Inhibitors |
| 1040 - 1135 | Biocides & their Role in Oilfield Operations Importance of Biocides in Microbial Control • Types of Biocides (Oxidizing, Non-Oxidizing) • Testing & Effectiveness Validation • Standards for Biocide Selection |
| 1135 - 1230 | Anti-Foaming & Foam-Control Agents Causes & Impact of Foam in Production Systems • Mechanisms of Foam Formation & Prevention • Selection of Suitable Anti-Foam Agents • Specifications for Foam Control Chemicals |
| 1230 - 1245 | Break |
| 1245 - 1420 | Drag Reducing Agents (DRA) in Pipeline Operations Role of DRA in Crude & Product Pipelines • Mechanism of Action & Performance Improvement • Application Techniques & Dosage Optimization • Standards for DRA Formulations |
| 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

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| 0730 - 0830 | Catalysts in Refining Processes Role of Catalysts in Petroleum Refining • Types of Catalysts (Hydroprocessing, FCC, Reforming) • Catalyst Activity & Deactivation Mechanisms • Specifications for Refining Catalysts |
| 0830 - 0930 | Hydrogen Sulfide (H₂S) Scavengers Impact of H ₂ S in Crude Oil & Gas Processing • Chemical & Non-Chemical Scavenging Techniques • Efficiency Testing & Compatibility Analysis • Specifications for H ₂ S Scavengers |



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| 0930 – 0945 | Break |
| 0945 – 1040 | Anti-Fouling & Sludge Control Agents Impact of Fouling on Refinery Heat Exchangers & Process Units • Chemical Solutions for Deposit Control • Performance Evaluation of Anti-Fouling Agents • Specifications for Sludge Dispersants |
| 1040 – 1135 | Antioxidants & Stabilizers in Fuel Processing Role of Antioxidants in Fuel Stability • Mechanisms of Oxidative Degradation • Testing & Specification Compliance • Requirements for Fuel Stabilizers |
| 1135 - 1230 | Oxygen Scavengers in Water Treatment Importance of Oxygen Control in Boilers & Water Systems • Types of Oxygen Scavengers & their Application • Performance Testing & Monitoring Strategies • Water Treatment Chemical Specifications |
| 1230 - 1245 | Break |
| 1245 - 1420 | Case Studies on Refinery Chemical Applications Chemical Optimization Case Studies • Challenges Faced in Refinery Chemical Applications • Lessons Learned from Past Refinery Chemical Failures • Future Innovations in Refinery Process Chemicals |
| 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

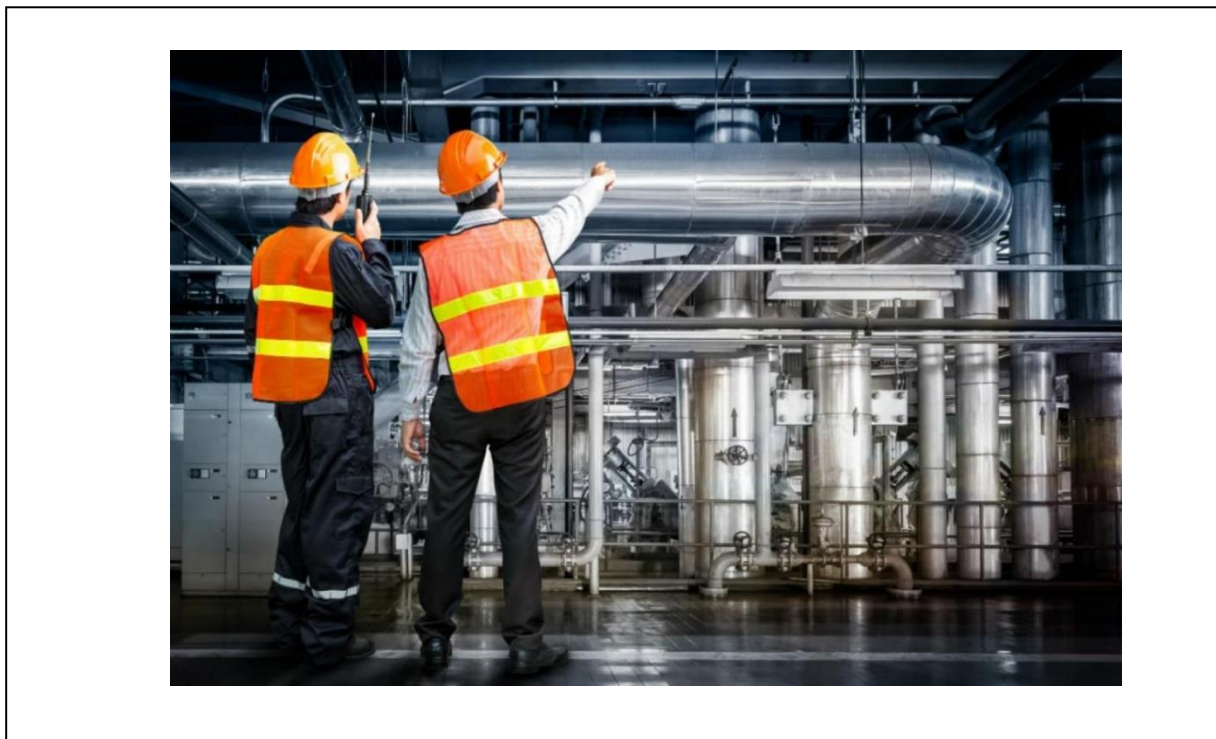
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| 0730 – 0830 | Laboratory Testing of Process Chemicals Testing Parameters for Chemical Performance • Analytical Methods for Chemical Assessment (GC-MS, FTIR, Titration) • Interpretation of Test Results • Chemical Testing Procedures |
| 0830 - 0930 | Quality Control in Chemical Manufacturing & Supply Chain Importance of Supplier Quality Control • Batch Testing & Consistency Verification • Handling Chemical Contamination Risks • Quality Control Guidelines for Chemical Procurement |
| 0930 – 0945 | Break |
| 0945 – 1100 | Chemical Compatibility & Stability Analysis Testing Compatibility with Crude Oil, Gas, & Water • Shelf-Life Determination & Chemical Degradation • Storage & Transportation Best Practices • Specifications for Chemical Stability |
| 1100 -1230 | Environmental Impact of Process Chemicals Regulatory Requirements for Chemical Disposal • Best Practices for Minimizing Chemical Waste • Environmental Sustainability Initiatives • Case Studies on Reducing Environmental Impact of Chemicals |
| 1230 - 1245 | Break |
| 1245 - 1420 | Digitalization & AI in Chemical Monitoring IoT Sensors for Real-Time Chemical Monitoring • AI-Driven Predictive Analytics for Chemical Performance • Remote Monitoring & Automation in Chemical Injection • Adoption of Digitalization in Chemical Management |
| 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

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|-------------|---|
| 0730 – 0930 | Case Studies on Process Chemical Optimization <i>Chemical Cost Reduction Strategies • Success Stories in Improving Chemical Efficiency • Challenges in Implementing New Chemical Technologies • Chemical Performance Evaluation Framework</i> |
| 0930 – 0945 | <i>Break</i> |
| 0945 – 1100 | Chemical Selection & Testing <i>Selecting Chemicals Based on Company Specifications • Testing Chemical Performance in Lab Simulations • Evaluating Compatibility with Process Fluids • Data Interpretation & Troubleshooting</i> |
| 1100 – 1230 | Chemical Injection System Operation & Troubleshooting <i>Best Practices for Chemical Injection in Oil & Gas Fields • Common Issues in Chemical Dosing & Troubleshooting • Preventive Maintenance for Chemical Injection Systems • Operational Procedures for Chemical Injection</i> |
| 1230 – 1245 | <i>Break</i> |
| 1245 – 1345 | Safety Drills & Emergency Response for Chemical Handling <i>Spill Prevention & Containment Exercises • Chemical Leak Response & First-Aid Procedures • Safe Handling of Hazardous Process Chemicals • Emergency Response Protocols</i> |
| 1345 – 1400 | Course Conclusion <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course</i> |
| 1400 – 1415 | POST-TEST |
| 1415 – 1430 | <i>Presentation of Course Certificates</i> |
| 1430 | <i>Lunch & End of Course</i> |

Practical Sessions

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



Course Coordinator

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