COURSE OVERVIEW PE0077(OR1)
Kerosene Treatment Unit (Merox) Operation

Course Title
Kerosene Treatment Unit (Merox) Operation

Course Date/Venue
Session 1: August 31-September 04, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
Session 2: November 03-07, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
PE0077(OR1)

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

Course Description

This practical and highly-interactive course includes various practical sessions and demonstrations where participants carryout proper operations and maintenance of Merox Unit. Theory learnt in the class will be applied using the LPG Merox Unit used in oil refineries and natural gas processing plants.

Mercaptan oxidation (Merox) is a proprietary catalytic chemical process developed by UOP used in oil refineries and natural gas processingplants to remove mercaptans from LPG, propane, butanes, light naphthas, kerosene and jet fuel by converting them to liquid hydrocarbon disulfides.

The Merox process requires an alkaline environment which, in some process versions, is provided by an aqueous solution of sodium hydroxide (NaOH), a strong base, commonly referred to as caustic. In other versions of the process, the alkalinity is provided by ammonia, which is a weak base.

The catalyst in some versions of the process is a water-soluble liquid. In other versions, the catalyst is impregnated onto charcoal granules.

Processes within oil refineries or natural gas processing plants that remove mercaptans and/or hydrogen sulfide (H2S) are commonly referred to as sweeteningprocesses because they results in products which no longer have the sour, foul odors of mercaptans and hydrogen sulfide. The liquid hydrocarbon disulfides may remain in the sweetened products, they may be used as part of the refinery or natural gas processing plant fuel, or they may be processed further.

Especially when dealing with kerosene, the Merox process is usually more economical than using a catalytic hydrodesulfurization process for much the same purpose. Indeed, it is rarely (if ever) required to reduce the sulphur content of a straight-run kerosene to respect the sulphur specification of jet fuel as the specification is 3000 ppm and very few crude oils have a kerosene cut with a higher content of sulphur than this limit.

The course provides participants an up-to-date knowledge and skills with regards to the operations and maintenance of UOP LPG Merox unit. It covers functional competencies improvement for employees working with UOP LPG Merox unit; and proper operations and maintenance of UOP LPG Merox unit.

The course will discuss LPG Merox; LPG Amine Absorber, LPG Coalescer; LPG extractor section and COS solvent and its importance.

At the completion of the course, participants will be able to apply pre-wash caustic section and troubleshooting; caustic regeneration section and troubleshooting; disulfide separator and troubleshooting; disulfide separator level control; LPG Merox normal start-up & shutdown and troubleshooting; cause and effect chart; and ESD logic diagrams.

Course Objectives

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

- Apply and gain a good working knowledge on UOP LPG merox unit
- Improve functional competencies improvement for employees working with UOP LPG merox unit
- Perform UOP LPG Merox unit operations and maintenance at expected level and achieve the desired operational standards
- Discuss LPG Merox and LPG amine absorber troubleshooting
- Recognize LPG coalescer including pre-wash caustic section and troubleshooting
- Describe LPG extractor section and carryout caustic regeneration section and troubleshooting, disulfide separator and troubleshooting and disulfide separator level control
- Explain COS solvent and its importance as well as to employ LPG Merox normal start-up, shutdown and troubleshooting
- Illustrate cause and effect chart and ESD logic diagrams as well as explain caustic draining from extractor, prewash and COS solvent draining from COS settler

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 on UOP LPG merox unit for engineers, shift team leaders, panel operators and operators for Oil & Gas industry.

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$ 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 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: -

- 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.

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. Basem Al-Qarout is a **Senior Process & Chemical Engineer** with **45 years** of extensive experience in the **Power**, **Petrochemical**, **Oil & Gas** industries. His wide expertise covers in the areas of **Compression Systems** Operation, **Process** Operations, **Hydrocarbon Processing**, **Process Plant Start-Up & Commissioning**, **Crude Oil & Refinery Products**, **Sampling & Feed/Product Quality**, **Naphtha & Condensate** in **Petrochemicals**, **Feedstock** Handling & Storage, **Process Troubleshooting & Problem Solving**, **Separation of Oil/Gas/Water**, **Oil Field** Operations, **Gas Field** Operations, **Oil Production**, **Gas Processing**, **Plant & Equipment Integrity**, **Process Equipment Design**, Operation of **Process Equipment**, **Refinery & Process Industry**, **Refinery** Optimization, **Refinery** Operations Troubleshooting, **Refinery** Production Operations, Refinery **Process Safety**, **Process Safety** Design, **Petroleum Refinery** Process, **Asset Operational Integrity**, **Refinery Induction**, **Crude Distillation**, **Crude Oil Properties**, **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 and **Process Plant** Monitoring, **Hydro-Treating**, **Hydro-Forming**, **Hydro-Cracking** and **Catalyst Technology**. Furthermore, he is also well-versed in **P&ID** and **Wiring Schematics Rotating Equipment-Machinery** (**Pumps**, **Compressors**, **Turbines**, **Fans & Blowers**, **Electric Motors**, **Gears & Transmission Equipment**), **Static Equipment-Stationary**, (**Heat Exchangers**, **Distillation Column**, **How Trays Work**, **Process Heaters/Furnaces**, **Reboilers**, **Condensers**, **Piping System**, **Valves**) and **Process Control & Instrumentation** (**Process Control**, **Instrumentation**, **Control Valves**).

During Mr. Al-Qarout's career life, he has handled challenging positions wherein he has acquired his thorough practical and academic experience as the **Technical Instructor**, **Process Engineer**, **Senior Production Foreman**, **Panel Operator** at **Hydro Cracking Plant** and **Plant Foreman** of various companies such as Mellitah Oil & Gas B.V., **KNPC**, Chevron, Jordan Refinery Company and Libya Oil Center.

Mr. Al-Qarout has a **Diploma** in **Chemical Engineering** from the **Polytechnic University**. Further, he is **Certified** by **City & Guilds** as **Level 2 & 3 NVQ Processing Operations: Hydrocarbons Assessor**, a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Trainer/Assessor** by the **Institute of Leadership & Management** (**ILM**), a **Certified Instructor/Trainer** and has delivered numerous trainings, courses, workshops, conferences and seminars internationally.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the workshop for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1

0730 - 0745	*Registration & Coffee*
0745 - 0800	*Welcome & Introduction*
0800 - 0815	***PRE-TEST***
0815 - 0930	***Overall View of LPG Merox***
0930 - 0945	*Break*
0945 - 1030	***Detailed Explanation about LPG Amine Absorber & Troubleshooting***
1030 - 1230	***Detailed Explanation about LPG Amine Absorber & Troubleshooting (cont'd)***
1230 - 1245	*Break*
1245 - 1420	***Detailed Explanation about LPG Coalescer***
1420 - 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 - 0900	***Detailed Explanation about Pre-Wash Caustic Section & Troubleshooting***
0900 - 0930	***Detailed Explanation about LPG Extractor Section***
0930 - 0945	*Break*
0945 - 1230	***Detailed Explanation about LPG Extractor Section (cont'd)***
1230 - 1245	*Break*
1245 - 1420	***Detailed Explanation about Caustic Regeneration Section & Troubleshooting***
1420 - 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 - 0900	***Detailed Explanation about Disulfide Separator & Troubleshooting***
0900 - 0930	***Disulfide Separator Level Control***
0930 - 0945	*Break*
0945 - 1230	***Disulfide Separator Level Control (cont'd)***
1230 - 1245	*Break*
1245 - 1420	***Detailed Explanation about COS Solvent & Its Importance***
1420 - 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 - 0900	***Detailed Explanation about Cause & Effect Chart***
0900 - 0930	***Detailed Explanation about ESD Logic Diagrams***
0930 - 0945	*Break*
0945 - 1230	***Detailed Explanation about ESD Logic Diagrams (cont'd)***
1230 - 1245	*Break*

1245 - 1430	***Detailed Explanation about Caustic Draining from Extractor, Prewash & COS Solvent Draining from COS Settler***
1420 - 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

0730 - 0900	***Practical Sessions*** *LPG Merox Normal Start-Up*
0900 - 0930	***Practical Sessions(cont'd)*** *LPG Merox Normal Shutdown*
0930 - 0945	*Break*
0945 - 1230	***Practical Sessions (cont'd)*** *Merox Unit Troubleshooting*
1230 - 1245	*Break*
1245 - 1345	***Practical Sessions (cont'd)*** *Merox Unit Troubleshooting (cont'd)*
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/Site Visit

Client shall arrange for the site visit or shall provide all the required equipment and technicians for practical sessions, free of charge to Haward Technology.

Course Coordinator

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