## COURSE OVERVIEW LE0087
# Laboratory Operations for Hydrocarbon Storage Tanks

**Course Title**
Laboratory Operations for Hydrocarbon Storage Tanks

**Course Date/Venue**
Session 1: April 21-25, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
Session 2: November 16-21, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

**Course Reference**
LE0087

**Course Duration/Credits**
Five days/3.0 CEUs/30 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***.

This course is designed to provide participants with a detailed and up-to-date overview of Laboratory Operations for Hydrocarbon Storage Tanks. It covers the basics of hydrocarbon storage tanks including laboratory operations; the physical and chemical properties of hydrocarbons and the impact of impurities; the personal protective equipment (PPE), chemical handling and storage, emergency response procedures and laboratory hazard identification; and the importance of quality control (QC) in storage tanks including key QC parameters, tools and instruments for QC.

Further, the course will also discuss the difference between manual and automatic sampling techniques; the sample preservation and transportation; the advanced sampling techniques, laboratory standards and protocols; the density and API gravity testing; the vapor pressure testing , moisture and sediment analysis, viscosity testing and flash point and fire point testing; the sulfur content analysis, distillation testing and contamination testing; and the laboratory automation and technology and troubleshooting laboratory equipment.

During this interactive course, participants will learn the environmental regulations for hydrocarbon storage and quality assurance (QA) practices; the emission testing from storage tanks through fugitive emissions, laboratory methods for emission analysis, regulatory standards for emissions and mitigation measures based on lab findings; assessing tank integrity via lab tests; the corrosion analysis methods and compatibility testing for liners and materials; the data management in laboratory operations, risk assessment and mitigation; developing SOPs for laboratory operations; and the laboratory audits and inspections.

## Course Objectives

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

- Apply and gain an in-depth knowledge on laboratory operations for hydrocarbon storage tanks
- Discuss the basics of hydrocarbon storage tanks including laboratory operations
- Identify the physical and chemical properties of hydrocarbons and the impact of impurities
- Apply personal protective equipment (PPE), chemical handling and storage, emergency response procedures and laboratory hazard identification
- Explain the importance of quality control (QC) in storage tanks including key QC parameters, tools and instruments for QC
- Differentiate manual versus automatic sampling techniques and apply sample preservation and transportation
- Employ advanced sampling techniques, laboratory standards and protocols and density and API gravity testing
- Carryout vapor pressure testing, moisture and sediment analysis, viscosity testing and flash point and fire point testing
- Apply sulfur content analysis, distillation testing and contamination testing
- Discuss laboratory automation and technology and troubleshoot laboratory equipment
- Interpret environmental regulations for hydrocarbon storage and apply quality assurance (QA) practices
- Employ emission testing from storage tanks through fugitive emissions, laboratory methods for emission analysis, regulatory standards for emissions and mitigation measures based on lab findings
- Assess tank integrity via lab tests and apply corrosion analysis methods and compatibility testing for liners and materials
- Apply data management in laboratory operations, risk assessment and mitigation
- Develop SOPs for laboratory operations and implement laboratory audits and inspections

## 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 laboratory operations for hydrocarbon storage tanks for laboratory technicians and analysts, quality control and assurance personnel, storage tank operators and engineers, environmental and safety officers, petroleum and chemical engineers, regulatory and compliance professionals, oil and gas terminal managers and supervisors and other technical staff.

## 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 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.

**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:

**Dr. Tarek Awad**, PhD, MSc, PGDip, BSc, is a **Senior Analytical Chemist** with over **25 years** of experience within the **Oil**, **Gas**, **Refinery** & **Petrochemical** industries. His experience widely covers in the areas of **Mercury Removal & Analysis** Techniques, **Mercury** (Hg) Analyzer, **Mercury Vapor** Analyzers, **Natural Gas & LNG**, **Analytical Laboratory** Management, **Gas Chromatography** (**GC**), **Laboratory Quality** Management, **Lab Management** Systems, **Product & Chemical Analysis**, **QA/QC**, **Analytical** Management Activities/Techniques, **Crude Oil Testing & Equipment**, **IP/ASTM Test Methods**, **Crude Oil Sample Analysis**, Analysis of **Water Quality Specification**, **Water Sampling** Techniques, **Water Analysis & Quality Control**, **Laboratory Environmental** Analysis (Soil, Water, Air), **Health & Safety** and **Laboratory** Operations. Further, he is well-versed in **Six Sigma** Analysis, **Six Sigma** Technology, Tool Landscape, **Lean Six Sigma**, **DMAIC**, **Statistical Process Control**, **Measurement System** Analysis, **Business Analysis**, **Corporate Strategies**, Budget Preparations & Follow-Up, Capital & Resources Planning & Management, Planning Claims Management, **Quality Assurance & Control**, **Total Quality** Management, **Project** Management, **Quality Management** System, Analytical **Problem-Solving & Decision Making** and **Communication & Leadership** Skills. He is a **Certified Data Analyst**, **Lean Six Sigma Black Belt** (**LSSBB**), and **Certified Lead Auditor** in accordance with ISO 9001, ISO14001, OHSAS 18001 and **ISO 17025**.

Dr. Tarek gained his expertise through his long-term dedication as a **Senior Laboratory Analyst** in **SEGAS LNG**. He was in-charge of plant optimization, Quality, Environmental & OHSAS Standards. Prior to this, he was the **Laboratory Manager**, an **Advisor** for a reputable oil, gas and LNG company in the Middle East and was the **Senior Corrosion & QC Chemist** of **WEPCO** wherein his duties involved quality control, corrosion control and chemical optimization for oilfield. He has built-up a formidable reputation with his professionalism and practical problem-solving abilities and has performed significant contribution to his fields.

Dr. Tarek has **PhD** in **Analytical Chemistry**, a **Post Graduate Diploma** and **Master's** degree in **Material Science** (**Corrosion**) and **Bachelor's** degree in **Chemistry**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**), a **Certified CLSSBB Lean Six Sigma**, a **Certified ISO Auditor/Lead Auditor** (**QMS**), a **Certified IEMA Auditor** (**EMS**) and an active member of International Register of Certificated Auditors (I**RCA**), American Center Library, Egyptian Accreditation Council (**EGAC**), Technical Assistance Center (**TAC**), Egyptian Corrosion Society, Egyptian Arab Society of Material Science, Egyptian Syndicate of Scientific Profession and Egyptian Petroleum Association. He has further published various scientific papers, technical journals as well as delivered numerous trainings, courses, seminars and workshops worldwide.

## 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***

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| *0730 – 0800* | *Registration & Coffee* |
| *0800 – 0815* | *Welcome & Introduction* |
| *0815 – 0830* | ***PRE-TEST*** |
| *0830 – 0930* | ***Basics of Hydrocarbon Storage Tanks***<br>*Types of Storage Tanks (Fixed Roof, Floating Roof, etc.) • Key Components of Storage Tanks • Common Uses of Hydrocarbon Tanks • Safety Considerations in Tank Design* |
| *0930 – 0945* | *Break* |
| *0945 – 1030* | ***Laboratory Operations Overview***<br>*Role of Laboratories in Hydrocarbon Storage • Overview of Testing Requirements • Regulatory and Environmental Compliance • Documentation and Reporting* |
| *1030 – 1130* | ***Properties of Hydrocarbons***<br>*Physical Properties (Density, Viscosity, etc.) • Chemical Properties (Flammability, Stability, etc.) • Importance of API Gravity • Impact of Impurities* |
| *1130 – 1215* | ***Safety in Laboratory Operations***<br>*Personal Protective Equipment (PPE) • Chemical Handling and Storage • Emergency Response Procedures • Laboratory Hazard Identification* |
| *1215 – 1230* | *Break* |
| *1230 – 1330* | ***Quality Control (QC)***<br>*Defining Quality Control for Hydrocarbons • Importance of QC in Storage Tanks • Key QC Parameters (e.g., Purity, Moisture Content) • Tools and Instruments for QC* |
| *1330 – 1420* | ***Sampling Basics***<br>*Importance of Representative Sampling • Different Sampling Techniques (Manual versus Automatic) • Sample Preservation and Transportation • Common Sampling Errors* |
| *1420 – 1430* | ***Recap***<br>*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* | ***Advanced Sampling Techniques***<br>*Open vs. Closed Sampling Systems • Spot, Composite, and Continuous Sampling • Sampling from Floating Roofs and Fixed Roofs • Maintenance of Sampling Equipment* |
| *0830 – 0930* | ***Laboratory Standards & Protocols***<br>*International Standards (ASTM, ISO, etc.) • Calibration of Lab Equipment • Standard Operating Procedures (SOPs) • Documentation and Traceability* |
| *0930 – 0945* | *Break* |

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| *0945 – 1100* | ***Density & API Gravity Testing***<br>*Principles of Density Testing • Tools: Hydrometers, Digital Density Meters • API Gravity Determination • Impact of Temperature on Readings* |
| *1100 – 1215* | ***Vapor Pressure Testing***<br>*Understanding Vapor Pressure (RVP, TVP) • Significance for Storage and Transportation • Testing Methods (ASTM D323, ASTM D5191) • Analyzing Results and Implications* |
| *1215 – 1230* | *Break* |
| *1230 – 1330* | ***Moisture & Sediment Analysis***<br>*Importance of Detecting Water and Sediments • Laboratory Methods (e.g., Centrifuge, ASTM D95) • Consequences of High Moisture Content • Equipment Maintenance for Accurate Results* |
| *1330 – 1420* | ***Viscosity Testing***<br>*Importance of Viscosity in Hydrocarbon Handling • Tools: Kinematic Viscometers, Rotational Viscometers • Standard Testing Protocols (ASTM D445) • Factors Influencing Viscosity Readings* |
| *1420 – 1430* | ***Recap***<br>*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* | ***Flash Point & Fire Point Testing***<br>*Understanding Flash Point and Fire Point • Testing Equipment and Methods (Pensky-Martens, Cleveland Open Cup) • Significance for Storage Safety • Troubleshooting Common Errors* |
| *0830 – 0930* | ***Sulfur Content Analysis***<br>*Importance of Sulfur Testing in Hydrocarbons • Testing Methods (XRF, ASTM D4294, etc.) • Environmental and Operational Implications • Limitations of Various Methods* |
| *0930 – 0945* | *Break* |
| *0945 – 1100* | ***Distillation Testing***<br>*Principles of Distillation Tests (ASTM D86) • Boiling Range and Hydrocarbon Composition • Significance in Refining and Storage • Challenges in Interpreting Results* |
| *1100 – 1215* | ***Contamination Testing***<br>*Common Contaminants (Particulates, Metals, etc.) • Analytical Methods (ICP, XRF, etc.) • Effects of Contamination on Product Quality • Corrective Actions and Prevention Strategies* |
| *1215 – 1230* | *Break* |
| *1230 – 1330* | ***Laboratory Automation & Technology***<br>*Automated Testing Equipment in Hydrocarbon Labs • Software for Data Collection and Analysis • Benefits of Automation in QC • Challenges and Limitations* |

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| *1330 – 1420* | ***Troubleshooting Laboratory Equipment***<br>*Identifying Common Equipment Failures • Routine Maintenance and Calibration • Repair vs. Replacement Considerations • Case Studies of Lab Equipment Issues* |
| *1420 – 1430* | ***Recap***<br>*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* | ***Environmental Regulations for Hydrocarbon Storage***<br>*Emission Control Standards • Spill Prevention and Control Requirements • Waste Management in Hydrocarbon Labs • Importance of Compliance Audits* |
| *0830 – 0930* | ***Quality Assurance (QA) Practices***<br>*Distinction Between QA and QC • QA Frameworks in Hydrocarbon Labs • Role of Internal and External Audits • Case Studies on QA Failures* |
| *0930 – 0945* | *Break* |
| *0945 – 1100* | ***Emission Testing from Storage Tanks***<br>*Fugitive Emissions and Their Impact • Laboratory Methods for Emission Analysis • Regulatory Standards for Emissions • Mitigation Measures Based on Lab Findings* |
| *1100 – 1215* | ***Storage Tank Integrity & Lab Role***<br>*Assessing Tank Integrity via Lab Tests • Corrosion Analysis Methods • Compatibility Testing for Liners and Materials • Role of Labs in Tank Maintenance Planning* |
| *1215 – 1230* | *Break* |
| *1230 – 1330* | ***Data Management in Laboratory Operations***<br>*Record-Keeping Best Practices • Laboratory Information Management Systems (LIMS) • Data Visualization for Decision-Making • Reporting Standards and Templates* |
| *1330 – 1420* | ***Risk Assessment & Mitigation***<br>*Identifying Risks in Lab Operations • Laboratory Risk Assessment Methods • Mitigation Strategies for Common Risks • Training Programs to Reduce Human Error* |
| *1420 – 1430* | ***Recap***<br>*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 – 0830* | ***Practical Sampling & Testing Session***<br>*Hands-On Sampling from Simulated Storage Tanks • Performing Key Tests: Density, API Gravity, Flash Point • Troubleshooting Common Issues in Sampling/Testing • Analyzing Results and Drawing Conclusions* |
| *0830 – 0930* | ***Case Studies in Laboratory Operations***<br>*Reviewing Historical Cases of Lab-Based Failures • Lessons Learned from Contamination Incidents • Examples of Successful Laboratory Interventions • Discussion on Best Practices* |

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| *0930 – 0945* | *Break* |
| *0945 – 1100* | ***Developing SOPs for Laboratory Operations***<br>*Importance of Clear SOPs • Writing and Reviewing SOPs • Updating SOPs Based on New Standards • Training Staff on SOP Adherence* |
| *1100 – 1215* | ***Laboratory Audits & Inspections***<br>*Preparing for Regulatory Audits • Common Audit Findings and Resolutions • Role of Labs in Supporting Storage Tank Inspections • Creating Corrective Action Plans* |
| *1215 – 1230* | *Break* |
| *1230 – 1345* | ***Emerging Trends in Hydrocarbon Labs***<br>*New Testing Methods and Equipment • Advances in Automation and AI in Labs • Trends in Regulatory Standards • Future Challenges for Laboratory Professionals* |
| *1330 – 1345* | ***Course Conclusion***<br>*Using this Course Overview, the Instructor(s) will Brief Participants about t 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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