COURSE OVERVIEW RE0627

Certified Machine Lubricant Analyst (MLA) Level-III

ISO 18436-4/ICML Certification

Course Title

Certified Machine Lubricant Analyst (MLA) Level–III
ISO 18436-4/ICML Certification

Course Date/Venue

June 22-26, 2025/Slaysel 02 Meeting Room,
Movenpick Hotel & Resort Al Bida'a Kuwait

Course Reference

RE0627

Course Duration/Credits

Five days/3.5 CEUs/35 PDHs

Exam Duration

Half day

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 Certified Machine Lubricant Analyst (MLA) Level-III. It covers the fundamentals of lubrication covering lubrication regimes, base oils, API and other base oil classifications and basic lubricant additive functions; the machine wear fundamentals comprising of common machine wear mechanisms and common machine-specific wear modes; the wear debris analysis; the analytical ferrography and atomic emission elemental spectroscopy; the lubricant degradation and oxidative base oil failure; and the thermal failure of base oil, additive depletion or degradation and detecting the wrong lubricant addition.

During this interactive course, participants will learn the oil analysis program development and program management; the machine-specific test slate selection, optimizing frequency analysis, setting alarms; limiting and managing oil analysis information; creating and managing oil analysis procedures and scope oil analysis training for reliability technician, trades people and management; and the cost/benefit analysis for oil analysis and contamination control programs and quality assurance.

Course Objectives

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

- Get certified as a *"Certified Level III Machinery Lubricant Analyst ISO Equivalency: ISO 18436-4, Category III"* from the International Council for Machinery Lubrication (ICML) in accordance with the ISO 18436-4 standard
- Discuss the fundamentals of lubrication covering lubrication regimes, base oils, API and other base oil classifications and basic lubricant additive functions
- Enumerate machine wear fundamentals comprising of common machine wear mechanisms and common machine-specific wear modes
- Carryout wear debris analysis as well as describe analytical ferrography and atomic emission elemental spectroscopy
- Analyze lubricant degradation and identify oxidative base oil failure, thermal failure of base oil, additive depletion or degradation and detecting wrong lubricant addition
- Implement oil analysis program development and program management
- Apply machine-specific test slate selection, optimize frequency analysis, set alarms and limits and manage oil analysis information
- Create and manage oil analysis procedures as well scope oil analysis training for reliability technician, trades people and management
- Perform cost/benefit analysis for oil analysis and contamination control programs as well as quality assurance

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 a wide understanding and deeper appreciation of machine lubrication analysis in accordance with the international standards. This includes all maintenance and reliability professionals who are seeking ICML certification. Further, reliability engineers, lubrication engineers, manufacturing and industrial engineers, laboratory analysts, all maintenance professionals, lubricant industry professionals, maintenance managers, operations managers, maintenance supervisors, craftsmen and millwrights, equipment operators, lubrication maintenance technical staff and predictive maintenance technical staff will also benefit from this course.

Exam Eligibility & Structure

Exam Candidates shall have the following minimum prerequisites:-

- **Education and/or Experience** - Candidates must have 36 months experience in the field of lubricant-analysis-based machinery condition monitoring (based on 16 hours minimum per month of experience).
- **Hold Level II Machine Lubricant Analyst (MLA) certification.**
- **Training** - Candidate must have received 32 hours of documented formal training as outlined in the Body of Knowledge of the MLA III. For online or recorded training, exercises, lab tasks, practice exams, and review exercises may be included in the training time total but shall not exceed five hours of the required course time. These 32 hours are in addition to the previous 48 hours of training required for MLA I and MLA II, for a total cumulative training of 80 hours. Candidate shall be able to provide a record of this training to ICML that shall include the candidate's name, the name and signature of the instructor, the dates of the training, and the number of hours spent in the training.
- **Examination** - Each candidate must successfully pass a 100 question multiple choice examination that tests the candidate's mastery of the body of knowledge. Candidates have three hours to complete the closed-book examination. A score of 70% is required to pass the examination and achieve certification.

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$ 7,000 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Exam Fee

US$ 320 per Delegate + **VAT**.

Course Certificate(s)

(1) ICML certificates will be issued to participants who have successfully completed the course and passed the exam. Successful candidate will be certified as a *"Certified Level III Machinery Lubricant Analyst ISO Equivalency: ISO 18436-4, Category III*".


International Council for Machinery Lubrication

Martin Williamson

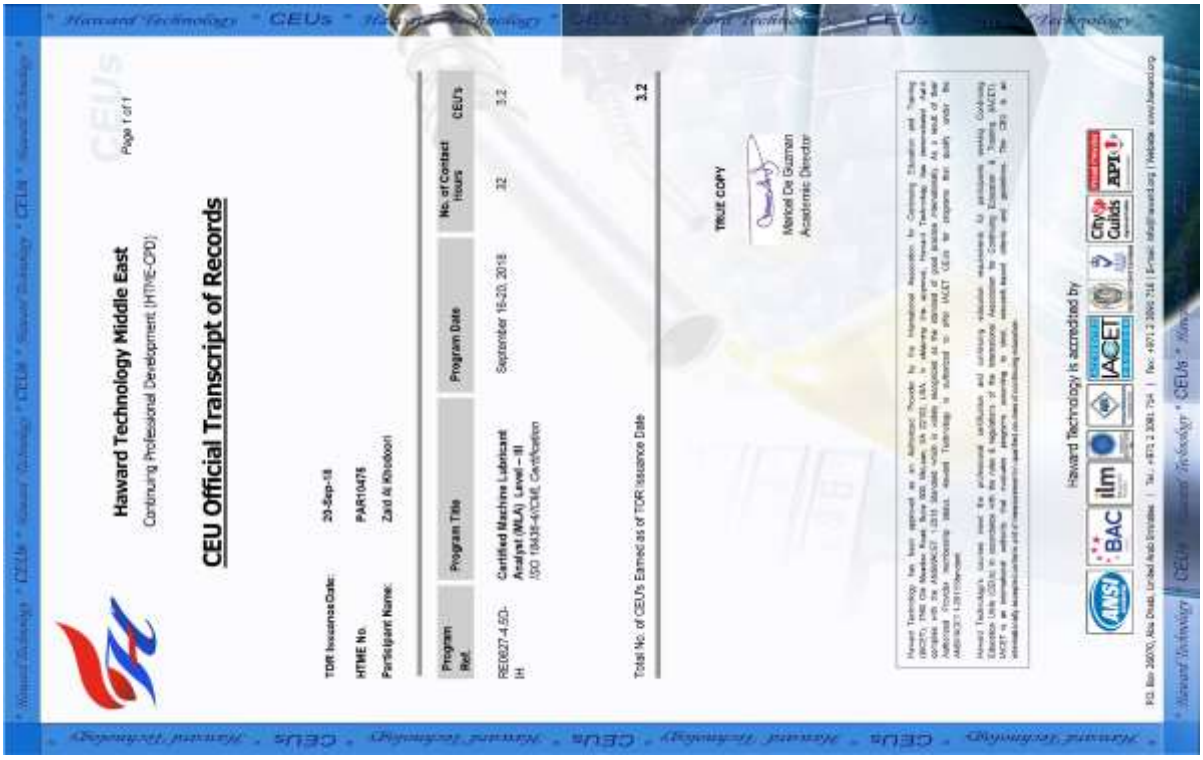
has satisfactorily fulfilled the requirements established by the Council for professional attainment in

Machinery Lubricant Analysis

and, is therefore designated by the Council as a:

Certified Level III Machinery Lubricant Analyst
ISO Equivalency: ISO 18436-4, Category III

(2) Official Transcript of Records will be provided to the successful delegates with the equivalent number of ANSI/IACET accredited Continuing Education Units (CEUs) earned during the course.


Haward Technology Middle East
Continuing Professional Development (HTME-CPD)

CEU Official Transcript of Records

TOR Issuance Date: 20-Sep-18
HTME No. PAR10475
Participant Name: Zaid Al Khodoori

Program Ref.	Program Title	Program Date	No. of Contact Hours	CEU's
RE0627-4-ISO-H	Certified Machine Lubricant Analyst (MLA) Level – III ISO 18436-4/ICML Certification	September 16-20, 2018	32	3.2

Total No. of CEU's Earned as of TOR Issuance Date: 3.2

TRUE COPY

Manuel De Guzman
Academic Director

Haward Technology is accredited by

Certificate Accreditations

Haward Technology is accredited by the following international accreditation organizations:-

- International Council for Machinery Lubrication (ICML)

  This Machine Lubricant Analyst Certification course complies with the **ICML** (**International Council for Machinery Lubrication**) regulation and is designed to certify successful participant as a Machine Lubricant Analyst (MLA).

- 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 **3.5 CEUs** (Continuing Education Units) or **35 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. Martin Williamson, PE, BSc, CMRP, MLE, MLA III, MLT II, is an **International Authority** in **Machinery Lubrication**, **ICML Certification** and **ISO 18436 Standards** with over **30 years** of practical experience. He is an **ICML Authorized Instructor & Consultant**. His wide expertise covers **Machinery Lubrication**, **ICML Certification**, **ISO 18436-4**, **ISO Standards Development**, **Condition Monitoring**, **Vibration & Oil Analysis**, **Contamination Monitoring, Tribology**, **Reliability Engineering** and **Scheduling Design**. He is currently the **Managing Director** of **KEW Engineering Ltd**. and a **Co-Director** of **Uptime 101 Pte Ltd**. that provides reliability and maintenance best practices engineering consulting and training services to the **petrochemical**, **oil**, **gas** and allied industries in **Europe**, **Australia**, **North America**, the **Middle East**, **Asia** and **South African** regions.

For the last 20 years, Mr. Williamson has been presenting training classes and undertaking consulting projects on an international level on behalf of **Noria Corporation** and other key clients such as **BP**, **Dow Corning**, **Marathon Oil** and **Cargill**. Since he attained his **CMRP** (Certified Maintenance & Reliability Professional) status, he has been involved with **ICML** (International Council for Machinery Lubrication) as an **ICML Authorized Instructor & Consultant** and is working on various related **ISO** working groups. Prior to this, he gained his remarkable experience for being the **General Manager** in Noria UK Limited (UK), **Oil Analysis Product Manager** in Rockwell Automation Entek (UK), **Senior Technical Support Engineer** in Pall Europe Limited (UK) and **Mechanical Engineer** in ISCOR Ltd.

Mr. Williamson is a **Professional Engineer** and has a **Bachelor's** degree in **Mechanical Engineering**. Further, he is a **Member** of the **Board** of the **ICML**, a **Certified CMRP** (Maintenance & Reliability Professional) from the Society of Maintenance & Reliability Professionals (**SMRP**) and a **Certified MLA III** (Machinery Lubricant Analyst), a **Certified MLT II** (Machinery Lubricant Technician) and a **Certified MLE I** (Machine Lubricant Expert) from the International Council for Machinery Lubrication (**ICML**). He is also a **Certified Instructor/Trainer** and a **Certified Trainer** for **BOSIET** (Basic Off-Shore Safety Induction and Emergency Training) and **HUET** (Helicopter Underwater Evacuation Training). He has further delivered numerous trainings, courses, seminars, workshops and conference internationally.

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	***Lubrication Fundamentals*** *Lubrication Regimes (Hydrodynamic, Elasto-hydrodynamic, Boundary)*
0930 – 0945	*Break*
0945 - 1230	***Lubrication Fundamentals (cont'd)*** *Base Oils: Common Mineral Oil Characteristics (Paraffinic, Naphthenic)*
1230 - 1330	*Lunch*
1330 - 1500	***Lubrication Fundamentals (cont'd)*** *Common Synthetic Oil Characteristics, Advantages & Disadvantages (Synthesized Hydrocarbons, Phosphate Esters, Dibastic Acid Esters, Polyglycols)*
1500 - 1515	*Break*
1515 - 1600	***Lubrication Fundamentals (cont'd)*** *API & Other Base Oil Classifications*
1600	*End of Day One*

Day 2

0730 - 0830	***Lubrication Fundamentals (cont'd)*** *Basic Lubricant Additive Functions (Antioxidants/Oxidation Inhibitors, Rust Inhibitors, Corrosion Inhibitors, Demulsifying Agents, Viscosity Index (VI) Improvers, Detergents, Dispersants, Pour-Point Depressants, Foam Inhibitors, Anti-Wear (AW) Agents, Extreme Pressure (EP) Agents)*
0830 - 0930	***Fundamentals of Machine Wear*** *Common Machine Wear Mechanisms (Abrasive Wear (Two-body Abrasive Wear, Three-body Abrasive Wear)*
0930 – 0945	*Break*
0945 - 1100	***Fundamentals of Machine Wear (cont'd)*** *Common Machine Wear Mechanisms (Adhesive Wear, Surface Fatigue, Corrosive Wear, Fretting Wear, Erosive Wear, Electrical Wear)*
1100 - 1230	***Fundamentals of Machine Wear (cont'd)*** *Common Machine Wear Mechanisms (Cavitation Wear (Gaseous Cavitation, Vaporous Cavitation)*
1230 - 1330	*Lunch*
1330 - 1445	***Fundamentals of Machine Wear (cont'd)*** *Common Machine-Specific Wear Modes (Gearing, Plain Bearings, Rolling Element Bearings, Hydraulics)*
1445 - 1530	***Wear Debris Analysis*** *Analytical Ferrography: Wear Debris Analysis Techniques (Light Effects, Magnetism Effects)*
1530 - 1545	*Break*
1545 - 1600	***Wear Debris Analysis (cont'd)*** *Analytical Ferrography: Wear Debris Analysis Techniques (Heat Treatment, Chemical Treatment, Morphology, Surface Detail)*
1600	*End of Day Two*

Day 3

0730 - 0930	***Wear Debris Analysis (cont'd)*** *Analytical Ferrography: Wear Particle Types, Origins & Probable Causes (Cutting Wear Particles, Spherical Particles, Chunky Particles, Laminar Particles)*
0930 – 0945	*Break*
0945 - 1100	***Wear Debris Analysis (cont'd)*** *Analytical Ferrography: Wear Particle Types, Origins & Probable Causes (Red Oxide Particles, Black Oxide Particles, Corrosion Particles, Non-Ferrous Particles, Friction Polymers)*
1100 - 1230	***Wear Debris Analysis (cont'd)*** *Atomic Emission Elemental Spectroscopy (Basic Determination of Wear Particle Metallurgy from Elemental Composition, Evaluating Sequential Trends, Evaluating Lock-Step Trends, Practical Size Limitations of Common Atomic Emission Spectrometers)*
1230 - 1330	*Lunch*
1330 - 1515	***Wear Debris Analysis (cont'd)*** *Atomic Emission Elemental Spectroscopy (Advanced Techniques (Acid/Microwave Digestion, Rotrode Filter Spectroscopy), X-Ray Fluorescence (XRF) & Other Advanced Elemental Spectroscopy Methods)*
1515 - 1530	*Break*
1530 - 1600	***Analyzing Lubricant Degradation (cont'd)*** *Oxidative Base Oil Failure (Causes of Oxidative Base Oil Failure, Recognizing At-Risk Lubricants & Applications, Strategies for Deterring or Mitigating Base Oil Oxidation)*
1600	*End of Day Three*

Day 4

0730 - 0930	***Analyzing Lubricant Degradation*** *Oxidative Base Oil Failure (Recognizing the Effects of Base Oil Oxidation, Strengths, Limitations & Applicability of Tests Used to Detect & Troubleshoot Base Oil Oxidation: Acid Number, Viscosity, Fourier Transform Infrared (FTIR) Analysis, Rotating Pressure Vessel Oxidation Test, Sensory Inspection)*
0930 – 0945	*Break*
0945 – 1130	***Analyzing Lubricant Degradation (cont'd)*** *Thermal Failure of Base Oil (Causes of Thermal Degradation (Hot Surface Degradation, Adiabatic Compression Induced Degradation) • Strengths, Limitations & Applicability of Tests Used to Detect & Troubleshoot Thermal Failure of the Base Oil (Acid Number, Viscosity, Fourier Transform Infrared (FTIR) Analysis, Thermal Stability Test (ASTM D 2070-91), Ultracentrifuge Detection of Carbon Insolubles, Sensory Inspection)*
1130 - 1230	***Analyzing Lubricant Degradation (cont'd)*** *Additive Depletion/Degradation (Assessing Risk for Common Additive Depletion/Degradation Mechanisms (Neutralization, Shear Down, Hydrolysis, Oxidation, Thermal Degradation, Water Washing)*
1230 - 1330	*Lunch*
1330 - 1500	***Analyzing Lubricant Degradation (cont'd)*** *Additive Depletion/Degradation (Particle Scrubbing, Surface Adsorption, Rubbing Contact, Condensation Settling, Filtration, Aggregate Adsorption, Evaporation, Centrifugation)*

1500 - 1515	*Break*
1515 - 1600	***Analyzing Lubricant Degradation (cont'd)*** *Additive Depletion/Degradation (Strengths, Limitations & Applicability of Methods for Measuring Additive Depletion/Degradation: Atomic Emission Spectroscopy, Fourier Transform Infrared (FTIR) Spectroscopy, Acid Number, Base Number, Viscosity Index (VI), Rotating Pressure Vessel Oxidation Test, Blotter Spot Test*
1600	*End of Day Four*

Day 5

0730 - 0900	***Analyzing Lubricant Degradation (cont'd)*** *Detecting Wrong Lubricant Addition (Viscosity, Neutralization Number (AN/BN), Elemental Spectroscopy, Fourier Transfer Infrared Analysis, Other Tests)*
0900 - 0915	*Break*
0915 - 1100	***Oil Analysis Program Development & Program Management*** *Machine-Specific Test Slate Selection ● Optimizing Frequency of Analysis ● Setting Alarms & Limits (Setting Goal-Based Limits for Contamination, Statistically Derived Level Limits (Editing Data, Calculating Averages, Calculating Standard Deviation, Setting Upper & Lower Limits Using the Mean & Standard Deviation, How Changes in System Operation or Maintenance Influence Statistically Derived Inferences)*
1100 - 1230	***Oil Analysis Program Development & Program Management (cont'd)*** *Rate of Change Limits (Calculating Rate of Change, Slope-Based Alarms, Statistically Derived Rate of Change Limits) ● Setting Aging Limits for Fluid Properties (Physical Properties, Chemical Properties, Additive Properties)*
1230 - 1330	*Lunch*
1330 - 1500	***Oil Analysis Program Development & Program Management (cont'd)*** *Managing Oil Analysis Information ● Creating & Managing Oil Analysis Procedures ● Scoping Oil Analysis Training for Reliability Technician, Trades People & Management ● Performing Cost/Benefit Analysis for Oil Analysis & Contamination Control Programs (Calculating Program Costs, Estimating Program Benefits, Calculating Return on Investment Metrics, Generating an Effective Business Proposal)*
1500 - 1515	*Break*
1515 - 1545	***Oil Analysis Program Development & Program Management (cont'd)*** *Quality Assurance (of Onsite Oil Analysis, of Offsite Oil Analysis Providers)*
1545 - 1600	***Course Conclusion***
1600	*End of Course*

MOCK Exam

Upon the completion of the course, participants have to sit for a MOCK Examination similar to the exam of the Certification Body through Haward's Portal. Each participant will be given a username and password to log in Haward's Portal for the MOCK Exam during the 30 days following the course completion. Each participant has only one trial for the MOCK exam within this 30-day examination window. Hence, you have to prepare yourself very well before starting your MOCK exam as this exam is a simulation to the one of the Certification Body.

Practical Sessions

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

Course Coordinator

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