



ICML Certification Level II Machinery Lubrication Technician, MLT II

EXCELLENCE IN LUBRICATION THROUGH WORLD-CLASS LUBE TECHNOLOGY

International Council for Machinery Lubrication



Course Period : 4 Consecutive Days



ICML Exam : 4th Day

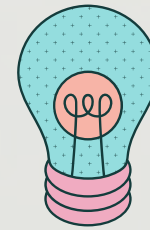
CERTIFICATION



HRDC CLAIMABLE COURSE



LUBETRAIN RESOURCES SDN BHD
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INTRODUCTION



Excellence in Lubrication Through World-Class Lube Technology is an intensive course **aligned with** the **Body of Knowledge** for ICML Level II Machinery Lubrication Technician **(MLT) certification**. It builds on foundational lubrication expertise to advance skills in maintenance strategies, lubrication theory, lubricant formulation and selection—including additives, oil types (mineral, synthetic, vegetable, biolubes), food-grade classification, and application compatibility. Participants will also master grease application and performance, lubricant testing and analysis, preventative and predictive maintenance, contamination control, and effective storage and handling practices. The course ensures professionals are technically proficient, aligned with ICML's public-domain standards, and fully **prepared for the MLT II exam**.

Through real-world examples and best-practice methods, attendees will develop the capability to manage lubrication programs at a professional level—from contamination control and lubricant storage to advanced grease application, oil analysis, and relubrication route management. Whether the goal is to improve plant performance, extend equipment life, or achieve ICML certification, this program equips participants with the expertise to deliver true lubrication excellence.





TRAINING OBJECTIVES

By the end of the training program, participants will be able to:

- **Select the right lubricant for specific machinery applications.**
- **Determine when to use grease or oil as the preferred lubricant.**
- **Develop reliable equipment lubrication procedures.**
- **Optimize lubricant storage and handling practices.**
- **Correctly manage lubricants in reservoirs and sumps.**
- **Identify lubrication methods that can increase mean time between failures (MTBF)**



**1**

Maintenance Strategy

- The impact of lubrication on machine reliability
- The impact of lubrication on lubricant life and consumption
- Maintenance program strategies for achieving lubrication excellence

2

Lubrication Theory

- Friction & Tribology
 1. Types of friction and wear
 - a) Wear modes and influencing factors
 - b) Machine frictional surfaces most at risk for specific wear modes (e.g., abrasion)
 2. Mechanisms of Lubrication regimes
 - a) Boundary
 - b) Mixed film
 - c) Hydrodynamic
 - d) Elastohydrodynamic
- Lubricant categories
 1. Gaseous
 2. Liquid
 3. Cohesive
 4. Solid

3

Lubricant Formulation

- Base-oil Refining Methods and API categories
 1. Solvent-refined
 2. Hydro-treated
 3. Severely Hydro-treated
 4. Hydrocracked
- Mineral Base Oils
 1. Naphthenic
 2. Paraffinic
 3. Aromatic
- Vegetable Base Oils & Biolubes
- Synthetic lubricant characteristics/applications/compatibility
 1. Synthesized hydrocarbons (e.g., Polyalphaolifins)
 2. Dibasic acid esters
 3. Polyol esters
 4. Phosphate esters
 5. Polyalkylene glycol
 6. Silicones
 7. Fluorocarbons
 8. Polyphenyl Ethers
- Food Grade lubricant Classification
- Types and Functions of additives
- Types and Functions of solid additives
- Modes of additive depletion

4

Grease Application and Performance

- Grease applications requiring high consistency
- Grease applications requiring low consistency
- Causes of grease separation
- Multipurpose greases
- Performance and application of specific grease thickeners
- High temperature greases
- Coupling greases

COURSE OUTLINE 1





5 Lubricant Selection

- Viscosity selection/ adjustments according to machinery condition/environmental conditions
- When to use synthetic lubricants
- When to use biodegradable lubricants
- Lubricant consolidation
- Select lubricating oils for:
 1. Fire-resistant applications
 2. Hydraulics – Mobile/industrial
 3. Turbines
 4. Compressors
 5. Bearings
 6. Chains/conveyors
 7. Mist applications
 8. Gears – Automotive/ industrial
- 9. Engines – Diesel/Gas/ Gasoline
- 10. Pneumatic tools
- 11. Spindles
- 12. Ways/slides
- Selecting greases for:
 1. Chassis
 2. Couplings
 3. Anti friction bearings
 4. Journal bearings
 5. Automotive bearings
 6. Automatic Lubrication Systems
- Lubricant Selection standards development
- Procedures for testing and quality assurance of incoming lubricants
- Procedures for approval of candidate lubricants

6

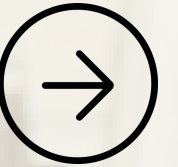
Lubricant Testing and Performance Analysis

- Viscosity
- Flash/Fire point
- Pour ASTM D97/Cloud point ASTM D2500
- Foam ASTM D892
- Air release properties ASTM D3427
- Neutralization number
 1. Acid Number ASTM D 664/D974
 2. Base Number ASTM D 974/D2896
- Filterability ISO 13357
- Oxidation stability
 1. Turbine Oil Oxidation Stability Test ASTM D943
 2. Rotary Pressure Vessel Oxidation Test ASTM D2272
- Rust and Corrosion tests
 1. Turbine Oil Rust Test ASTM D665
 2. Copper strip corrosion ASTM D130
- Anti-wear tests
 1. Four ball wear test ASTM D2266
 2. Vickers wear pump test ASTM D2882
 3. SRV Test
- Extreme Pressure
 1. Four ball EP test ASTM D2596
 2. Timken Extreme Pressure Test ASTMD2509

COURSE OUTLINE 2

3. Falex EP/Wear Test ASTM D2670
 4. FZG Four Square Gear Test Rig ASTM D5182.97
- Demulsibility ASTM D 1401
 - Grease consistency ASTM D217
 - Dropping point of grease ASTM D2265
 - Mechanical Stability of greases ASTM D217A
 - Rolling Stability if Greases ASTM D1831
 - Water washout test for greases ASTM D1264
 - Water spray test for greases ASTM D4049
 - Rolling bearing rust test ASTM D1743
 - Koppers Centrifugal Stability Test
 - Oil separation in grease storage ASTM D1742
 - Oxidation Stability – Greases ASTM D942





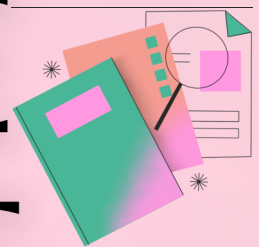
7 Lubricant Application

- Procedures for:
 1. Oil drain
 2. Reservoir/system flushing
 3. Disassembling/cleaning reservoirs and sumps
 4. Filling
 5. Top-up
 6. Grease packing
 7. Re-greasing
 8. Grease changeout
- Determine/calculate correct amount for re-greasing
- Determine/calculate correct frequency interval for re-greasing
- Select and manage optimum equipment/systems for lubricant application according to machinery requirements
- Safety/health requirements for lubricant application
- Manage proper maintenance of lubrication equipment
- Manage proper maintenance of automatic lubrication systems
- Create/update lube survey
- Record execution of lube program
- Proactive management and detection of leaks
- Waste oil/filters management/disposal
- Writing a lubrication PM

8 Preventive and Predictive Maintenance

- Creating and managing lube PMs and routes
- Creating and manage lubrication inspection check list
- Used oil analysis to determine optimum condition based oil changes
- Used oil analysis to troubleshoot abnormal lubricant degradation conditions
- Used oil analysis to troubleshoot abnormal wear related to lubricant degradation/contamination
- Procedures and methods for identifying root cause of lubricant failure
- Use of technology aids to determine optimum re-grease frequency/quantity (ultrasonic, temperature monitoring, shock impulse, etc.)

COURSE OUTLINE ₃





9 Lubricant Condition Control

- Proper sampling procedures
- Proper sampling locations
- Proper selection of breathers/vents
- Proper selection of filters according to cleanliness objectives
- Filter rating – Beta Ratio
- Sump/Tank Management to reduce:
 1. Air entrainment/foam
 2. Particles
 3. Water
 4. Sediments
 5. Heat
 6. Silt/sediments
 7. Unnecessary lubricant volume
- Proper selection of reconditioning systems for:
 1. Water
 2. Air/gas
 3. Particles
 4. Oxidation products
 5. Additive depletion
- Lube reclamation
 1. Requirements
 2. Feasibility
 3. Procedures for reclaiming/reconditioning
 4. Use of oil analysis to approve reclaimed/reconditioned lubricants

COURSE OUTLINE 4

10 Lube Storage and Management

- Design optimum storage room
- Defining maximum storage time according to environmental conditions/lubricant type
- Safety/Health requirements
- Proper sampling procedures/locations for sampling stored lubricants
- Procedures for reconditioning/filtering stored lubricants

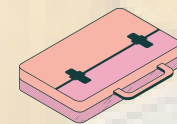




MACHINERY LUBRICATION TECHNICIAN, LEVEL II



Requirements:



Education/Work Experience

- Candidates need at least **3 years** of post-secondary education or work experience in lubrication, engineering, or maintenance.



Training

- 16 hours formal MLT II training (in addition to 16 hours from MLT I = **32 hours** total)
- Max 3 hours online/recorded exercises allowed
- Must provide training record with name, instructor signature, dates, and hours



Prerequisite Certification

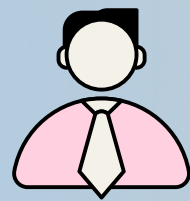
- **Hold** Level I Machinery Lubrication Technician (**MLT I**) certification



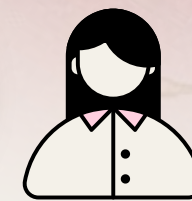
Examination

- 100-questions multiple-choice exam
- 3 hours, **closed-book**
- **70% minimum** score to **pass**
- Other languages available (contact ICML)





WHO SHOULD ATTEND



This course is ideal for individuals involved in lubrication, maintenance, and machinery condition monitoring, including but not limited to:



Maintenance professionals

seeking to improve equipment reliability through better lubrication practices



Reliability engineers/practitioners

responsible for condition-based monitoring and asset care



Lubrication technicians

advancing from MLT I to a higher technical competency level



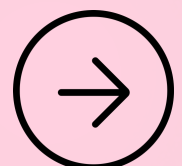
Mechanical engineers

involved in equipment design, operation, or maintenance support



Supervisors/managers

overseeing lubrication programs and maintenance teams





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CERTIFICATION



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