



Field Lubricant Analysis

Level 1, 2 & 3

Learn How To Unlock The Full Potential Of An Oil Analysis Program

Expand Your Oil Analysis Skills And Get Better Results ... A Whole Lot Faster!

You Will Learn How To:

- Easily interpret oil analysis reports
- Squeeze maximum life from lubricants
- Pull oil samples for optimum results
- Reduce oil consumption for quick savings
- Optimize oil analysis limits

If yours is like many companies, you may already be winging your way around oil analysis, perhaps trying to predict failures or just basing oil drains on your oil analysis report recommendations. Either way, you probably know there's a lot about oil analysis you haven't mastered ... and you might be wondering what you are missing. Wouldn't you like to know ALL about what oil analysis can do for you? Now you can!

You'll Learn More Than Just Oil Analysis

Extending oil and machine life are two of the primary goals of oil analysis, but analysing the oil won't make the oil or machine last any longer. That's why Noria's proven strategy for extending machine and lubricant life by up to 10X is the cornerstone of these courses. You will learn how making small adjustments to lubricant properties can result in huge savings and take your return-on-investment from oil analysis to new levels.

Get Answers to These and All Your Questions About Oil Analysis!

How often should I use oil analysis?

Where is the best place to pull an oil sample?

What are all these numbers I see on my oil analysis report?

How clean should I keep my oil and what kind of filter should I use?

What are the best cost-reducing strategies using oil analysis?

What steps can I take to ensure that I get a good oil sample each time?

How do I know if I should occasionally "sweeten" my oil with additives?

What are the secrets to catching bearing faults with wear debris analysis?

Are there any good field tests for oil that don't involve expensive instruments?

How do I determine the remaining useful life of my oil?

What are the 5 most important things I should look for on my oil analysis report?

An Arsenal of Knowledge for Your Oil Analysis Program

Who Should Attend?

- All Maintenance Professionals
- Laboratory Analysts
- Vibration Instrument Specialists
- Craftsmen or Millwrights
- Manufacturing and Industrial Engineers
- Lubrication Technicians and Engineers
- Maintenance Managers
- Maintenance Supervisors
- Equipment Operators
- Operations Managers
- Reliability Engineers
- Predictive Maintenance Technicians

Develop Rapid-Fire Troubleshooting Skills!

Oil analysis provides critical early warning information to impending machine failure. Those trained in the language can “crack the code” of even the most complex problems. Knowing how to interpret changing lubricant properties involves a specific sequence of steps that can be easily learned. Get the answers.

Squeeze Maximum Life From Lubricants!

Lubricants and hydraulic fluids can have infinite life when specific operating conditions are stabilized. The rising costs of new lubricants and the disposal costs of used fluids are a directive for change. A proven action plan for extending fluid life is key. Get the answers.

Champion A Company-Wide “Clean Oil” Campaign!

High fluid cleanliness is the lynchpin of a successful proactive maintenance program. But how clean? Which filters? How much life extension can be achieved? Get the answers.

Take Aim On Reactive Maintenance!

On a global scale, maintenance organizations are undergoing a renaissance of change. Gone are the days when maintenance functions centred around corrective repairs and damage control. Today’s battle cry of “condition-based maintenance” has transformed common mechanics and repairmen into high-tech instrument operators and machine diagnosticians. Discover how oil analysis and proactive maintenance are leading the charge.

What is different about this training?

Plenty. For starters, you won’t be listening to someone lecture on textbook theories. Instead, you’ll get a lot of straight-shooting advice from a seasoned professional, an authority on oil analysis and a dynamic speaker with years of experience.

These courses throw useless trivia out the window and get right to the meat of what you need to know. You’ll get the most important, up-to-date information that will be invaluable to your oil analysis program.

Created by Noria

Founded in 1997 with the single focus of helping industry improve machine reliability through best practice lubrication and oil analysis. Over the past 15 years, Noria’s approach has changed how organizations manage and monitor lubricants for maintaining optimum

reliability and safety. They are the trusted advisor to the world’s leading organizations.

Noria’s practices are disseminated through world-leading training courses, consulting services, publications, videos and books.

Field Lubricant Analysis Level 1

Course Outline

This course provides foundational training in industrial lubricants, machinery lubrication and oil sampling. It lays the groundwork for establishing a lubrication and oil analysis program, and is designed to help you prepare for the ICML Level I Machine Lubrication Technician (MLT I) or Level I Machine Lubricant Analyst (MLA I) certification.

1. How Lubrication Affects Machine Reliability
 - The causes of machine failure
 - Understanding the importance of choosing the right maintenance strategy
 - How to identify which strategy is currently being used in your plant
 - Recognize how your current maintenance strategy impacts profitability
 - Effective lubrication strategies that prevent failure
 - Differentiate when to apply preventive, proactive and predictive maintenance
 - Understand the value of predictive technologies
2. The Fundamentals of Tribology
 - The six components of a tribological system and their importance to reliability
 - Six important functions of lubricants
 - The fundamental relationship between speed, load and viscosity
 - How friction is generated and the impact of wear in lubricated machinery
3. Lubricant Fundamentals
 - The three lubricant film types and the importance of film thickness and critical clearances
 - How kinematic and absolute viscosity are measured
 - The impact of temperature when determining viscosity selection for your machine
 - What causes oil viscosity to change
 - Viscosity index and more than 10 characteristics that impact lubricant selection
 - How oils and greases are formulated and why it is important
 - Understand the difference between mineral, synthetic and vegetable base oils and when to use each
 - Seven important physical properties of a base oil
 - The importance of the API's five base oil categories
 - When to select one of the six most commonly used synthetic lubricants and how they differ from mineral bases
4. Key Lubricant Additives
 - The three important roles of an additive and how they work to increase lubricant effectiveness
 - Eight key additives that enhance lubricant performance and when to choose the right one for your machine's needs
5. Grease Lubricants
 - How to select grease thickeners for your application
 - How to avoid potential compatibility and performance challenges with More than 13 different types of thickeners
 - Understand the advantages and disadvantages with grease lubrication
 - Using the NLGI to choose the right grease
 - What causes grease to dry out and 18 ways to prevent it
6. Food-grade and Environment-friendly Lubricants
 - Important requirements and government regulations for food-grade lubricants
 - What you need to know about foodgrade additives, base oils and grease thickeners
 - Guidelines for food-grade lubricants
7. Lubricant Application
 - A basic overview of lubrication considerations based on machine type
 - How environmental and operational influences affect the lubricant selection process
8. Journal and Bearing Application
 - The eight most common journal bearing lubrication problems

Field Lubricant Analysis
Level 1
Course Outline
Continues

- How to select journal bearing viscosity based on speed and load factors
 - Rolling-element Bearing Lubricants
 - The nine critical factors affecting rolling-element bearing lubricant selection
 - How to convert required operating temperature viscosity to ISO viscosity grades
9. Gear Lubricants
- Five key requirements for gear oil
 - How to select the best viscosity for a gear lubricant
 - 0 conditions that may require synthetic gear lubricants
 - Lubrication best-practices checklist for enclosed and open gears
10. Compressor Lubricants
- Steps you can take right now to combat compressor lubricant failure
 - The most common compressor lubricant stressors
 - When to use synthetic compressor lubricants and why
11. Steam and Gas Turbine Lubricants
- Comparing steam and gas turbine oils – how they differ
 - Checklist for best-practice steam turbine lubrication
12. Hydraulic Fluids
- How to select the ideal hydraulic fluid viscosity for gear, vane and piston pumps
 - Nine key hydraulic fluid requirements and why they matter
 - Specific conditions that may require a synthetic hydraulic fluid
 - Fire-resistant hydraulic fluids – what you need to know
 - Hydraulic system maintenance best practices – 21-point checklist
13. Lubricating Oil Application Methods
- Overview of oil lubrication methods and devices
 - How to use oil mist and other automatic lubrication methods
 - Using pressure spray methods for gearboxes
 - How to protect against problems caused by constant-level oilers
 - Overview of single-point direct lubrication systems
14. Lubricating Grease Application Methods
- Advantages and disadvantages of centralized lubrication systems
 - Best practices for greasing motor bearings
 - How to control pressure when greasing bearings
 - The unique problems caused by over-greasing – specific steps to eliminate
 - Three critical instructions to give your electric motor rebuild shop
 - Comparing single- and multi-point lubrication options
 - How to calculate greasing intervals and quantity
 - Best practices for ultrasonic/sonic-based greasing
15. Contamination Control
- Strategies for building reliability through contamination control
 - The seven most destructive contaminants and how to control them
 - Know the factors that contribute to lubricant failure
 - Understand the thermal and oxidation process, its effects on lubricants and additives
 - Recognize what causes lubricant degradation
 - Recognize the byproducts of lubricant failure and wear debris
 - Distinguish the specific test that measures the forms of lubricant degradation and wear debris monitoring
 - Interpret data to set alarms and limits based upon test results
 - The ISO Solid Contaminant Code – understand it, track it
 - 10 ways to get more mileage out of portable filter carts
 - How dirt, metal particles and soot mechanically destroy machine surfaces
 - Guidelines for controlling machine surface fatigue and extending machine life

Field Lubricant Analysis
Level 1
Course Outline
Continues

- The No.1 cause of machine wear and how to manage it
 - Best practices for excluding and removing contaminants for extending machine life
 - The right way to control contamination in tanks and sumps
 - How oil filters are rated
 - Calculating the clean-up rate for portable filters
 - Best practices for removing water contamination from oil
16. Storing, Handling and Managing Lubricants
- How to set up a world-class lube room
 - How to know when to reject a new oil delivery
 - How to optimize your lubricant selection and procurement process
 - Used lubricant storage, handling and disposal best practices
 - Bulk lubricant storage do's and don'ts
 - Best practices for the maintenance of grease guns and fittings
 - Guidelines for storing and handling drums
 - Lubricant dispensing options and what you must avoid
 - Lubricant coding and identification systems – what works and what doesn't
 - Portable oil transfer and filter cart selection advice
 - How and where to store oil transfer and filter carts
 - Understanding and managing lubricant storage life-oil and grease stock rotation principles
17. Used Oil Sampling and Analysis Fundamentals
- What oil analysis can tell you
 - Application, types and categories of oil analysis that assure lubrication effectiveness
 - Learn industry best practices for oil sampling, including valve and hardware recommendations
 - Develop a sampling procedure that identifies machines to sample, sample locations and frequency
 - How clean should your sample bottles be?
 - Quick methods for optimizing sampling intervals
 - Advice for sampling hard-to-reach machines
 - How to properly sample circulating systems
 - Safe, effective high-pressure sampling from hydraulic systems
 - Select from more than 15 different oil analysis tests to find the right data
 - Learn which oil sampling methods can ruin your trending data
18. Essential Field Inspections
- 12 questions your oil filter will answer about
 - Visual inspections you can get big results right
 - Quick tips for using all your senses to inspect lubricants
19. Design and Inspect for Lube Excellence
- World-class strategies for accessorizing equipment excellence
 - Seven critical accessories for lubricant inspection
 - The right machine accessories for effective contamination control

Field Lubricant Analysis Level 2

Course Outline

This course is designed to help you prepare for the ICML Level II Machine Lubricant Analyst (MLA) certification. It covers foundational oil analysis information including oil sampling, lubricant health monitoring, contamination measurement and control, and wear debris monitoring.

1. World-class Maintenance Philosophies
 - Five prevailing features of world-class maintenance programs
 - The 80:20 rule for maintenance
 - Three successful elements of a CBM program
2. Introduction to Machinery Lubrication
 - Oil formulation and its importance in effective machinery lubrication
 - Six key functions of lubricating oils
 - Three primary lubrication regimes
 - Introduction to base oils and additives
 - Choosing the correct base stock
 - Conditions that dictate the use of synthetic oils
 - Antioxidant additives and their role in oil life
 - Dispersants and detergents—the key to controlling soot
 - Controlling wear with additive chemistry
3. Oil Analysis Fundamentals
 - Interpreting the language your oil is speaking
 - Prevailing myths about oil analysis
 - Common applications for sampling and analysis
 - Three categories of oil analysis
4. Oil Sampling – The Very Best Practices
 - 11 elements of a successful oil analysis program
 - How clean should sample bottles be?
 - How to find the best sampling locations
 - Sampling valves and hardware recommendations
 - A quick method for optimizing sampling intervals
 - The importance of primary and secondary sampling points
 - How to properly sample circulating systems
 - Safe, effective high-pressure sampling from hydraulic systems
 - Best practices for sampling splash-, collar—and ring-lubricated systems
5. Fluid Properties Analysis
 - Four common root causes of oil degradation
 - Recognizing and controlling oil oxidation
 - Monitoring lubricant degradation using acid number
 - Monitoring lubricant health using FTIR
 - Determining oil life using RPVOT
 - Recognizing and controlling thermal failure
 - How to recognize additive depletion or degradation

Field Lubricant Analysis Level 3

Course Outline

This course is designed to help you prepare for the ICML Level III Machine Lubricant Analyst (MLA) certification.

1. Base Oil Fundamentals
 - How mineral base oil groups compare on nine criteria
 - How synthetic oils compare to mineral oils
 - Advantages and disadvantages of common synthetic lubricants
 - How wear and friction control additives work
 - The role of fatty acids, AW and EP lubrication films
2. Understanding and Analyzing Machine Wear
 - 16 factors that cause changes in wear debris concentrations
 - Effects of water on bearings
 - 31 factors leading to abnormal engine wear
 - How to enhance the detection of abnormal wear particle trends
 - One simple technique to help you detect faults earlier
 - Review of technologies used to analyze wear debris
 - Particle size sensitivities of wear particle technologies
 - Comparison of laboratory emission spectrometers
 - How wear particle size influences spectrometric analysis
 - How to determine the severity of a wear problem
 - How to evaluate lock-step trends
 - How to normalize for makeup oil
 - Potential sources of metals in oil
 - Best applications for elemental analysis of wear metals
 - Advantages and disadvantages of analytical ferrography
 - How filtergrams compare to ferrograms
 - How to characterize particle composition by visual inspection
 - Shape features of common wear particles
 - Common machine wear mechanisms and how to identify them
 - 11 sources of spherical wear particles and how to identify them
3. Integrating Oil Analysis with Vibration Analysis
 - Failure detection zones of oil vs. vibration analysis
 - Where oil and vibration analysis overlap
 - Strengths and weaknesses of oil and vibration analysis on detecting 13 machine problems
 - Combining vibration with wear debris analysis for bearing failure analysis
4. Fluid Properties Analysis
 - How viscosity index impacts an oil's ability to lubricate
 - Best practices for onsite viscosity analysis
 - Four root causes of oxidation and why they are important
 - The role of antioxidants and how they work
 - Five indicators of oil oxidation
 - How to measure oxidation stability
 - How acid numbers trend with different types of oils
 - Machine diagnostics using neutralization numbers
 - Detecting base oil oxidation with FTIR
 - Strengths and weaknesses of FTIR
 - How sludge and varnish are formed and how to detect them
 - Recommendations for a new lubricant testing plan
5. Additive Depletion
 - 14 ways additives are depleted from oil
 - How to detect depletion of 10 common additives
 - How to find the additive date on an oil analysis report

Field Lubricant Analysis
Level 3
Course Outline
Continues

6. Contamination Analysis
 - Five ways to count and size particles
 - Monitoring dust and dirt contamination by elemental analysis
 - Tests for high soot load and fuel contamination
 - How defoamants work and how they are depleted
 - 16 water ingress sources
 - Six additives that are attacked by water contamination and results of each
 - Machine effects of water-related problems
 - Review of water detection technologies
 - How to detect glycol in crankcase oil
7. Grease Analysis
 - Methods for sampling grease
 - Common used grease tests and what they measure
 - 7 grease performance concerns and how to test
 - How grease properties change due to incompatible mixtures
8. Onsite Oil Analysis Options
 - How to integrate onsite with offsite oil analysis
 - How to prepare a filter patch for particle contamination assessment
 - Review of onsite viscometry, FTIR and particle counter options
9. Designing an Oil Analysis Program
 - Small, medium and large budgets for an onsite lab: what to buy
 - Tips for designing an onsite lab space
 - How to select candidate machines for oil analysis
 - Four steps to optimizing interval-based oil changes
 - Considerations for condition-based oil changes
 - Factors influencing oil sampling frequencies
 - Tips on working with an offsite lab
 - Five applications for goal-based limits
 - How aging limits signal the approaching end of useful oil life
 - Four applications for rate-of-change limits
 - Interpreting elemental trends using level limits
10. Cost—Benefit Analysis
 - Seven cost-saving areas for quantifying benefits
 - Estimating the value of a predictive maintenance “save”
 - Estimating annual savings per machine
 - Three project evaluation decision tools
 - How to track your program: lubrication KPIs

Certification

The International Council for Machinery Lubrication (ICML) is a vendor-neutral, not-for-profit organization founded to facilitate growth and development of machine lubrication as a technical field of endeavour.



Among its various activities, ICML offers skill certification testing for individuals in the fields of machine condition monitoring, lubrication and oil analysis.

Tribology Courses Breakdown

Technology	Noria Course	ICML Examination
Field Lubricant Analysis Level 1	Fundamentals of Machinery Lubrication	Level I Machine Lubricant Analyst (MLA I)
Field Lubricant Analysis Level 2	Practical Oil Analysis	Level II Machine Lubricant Analyst (MLA II)
Field Lubricant Analysis Level 3	Advanced Oil Analysis	Level III Machine Lubricant Analyst (MLA III)
Machinery Lubrication Level 1	Fundamentals of Machinery Lubrication	Level I Machine Lubricant Technician (MLT I)
Machinery Lubrication Level 2	Advanced Machinery Lubrication	Level II Machine Lubricant Technician (MLT II)

Noria Publications

Available at
<http://store.noria.com/>

Along with being the publishers of Machinery Lubrication magazine and Reliable Plant magazine, Noria Corporation provides a range of educational (consulting and training) publications related to advanced machine reliability and maintenance technologies.

Find books, certification preparation resources, video training, posters and much more in Noria's online store.

Categories include:

- Lubrication & Lubricants
- Oil Analysis
- Maintenance & Reliability
- Certification Study
- Aids
- Digital Downloads
- Training DVD's
- Posters
- Books
- Technical Papers



Training Opportunities

Yellotec offers a full complement of training courses in Condition Monitoring disciplines as well product and Reliability Engineering specific courses. Courses offered are either presented under license from International Certification Bodies or are in accordance with ISO requirements.

Online Training

Online training is your fast track to implementing Noria's proven strategies for extending machine and lubricant life. This course provides more than 24 hours of foundational training on best practices for machinery lubrication and oil sampling. It lays the groundwork for establishing a world-class lubrication program, and is a Level I certification prep course.

This flexible online training format provides convenience for companies around the world, allowing students to learn at their own pace and schedule. Students can repeat a course as many times as desired during the subscription period and receive a printable certificate upon completion.

- **Affordable:** Reduce training costs while improving productivity. Cost-effective online training can affect your bottom line.
- **Flexible:** Anytime, anywhere. Online training allows your team to learn at their own pace when it is convenient for them.
- **Easy To Use:** No computer knowledge required! Noria's simple click-and-watch training method is easy for anyone to use.

Private Courses

All our public training courses can also be conducted as an in-house private courses. If you have 12 or more people attending, consider the benefits of an in-house session conducted in the privacy and conveniences of your facilities or a meeting site of your choice. Please contact us so that we can understand your requirements, explore the benefits and make it happen.

All Courses Offered By Yellotec

Infrared Thermography (IRT)
IRT Basics, Level 1, Level 2 and Level 3

Vibration Analysis (Mobius)
Category 1, 2 and 3

Field Lubricant Analysis
Noria Level 1, 2 and 3

Machinery Lubrication
Noria Level 1 and 2

Oil Analysis Series
Level 1, 2 and 3

Shaft Alignment
Level 1

Ultrasound
Level 1 and 2

Gearbox Maintenance

Failure Analysis

Condition Monitoring for Engineers

Plant Management – Dr. Mike Vorster

Registration Form

Please register each delegate by completing the details below and return by fax to 011 656 9112, or e-mail to training@yellotec.com. The company details are intended for accounting purposes and must reflect the details required for the completion and delivery of tax invoice.

Invoice Details

Company _____
VAT Number _____
Postal Address _____

Postal Code _____
Person Responsible for Payment _____
Contact Number _____
E-Mail Address _____
Fax Number _____
Payment Method Purchase Order Number _____
Cheque Number _____
Electronic Transfer Ref Number _____

Delegate Details

Delegate Name _____
Contact Number _____
Fax Number _____
E-mail Address _____
Do you have Halaal requirements? Yes ☐ No ☐

Course Details

Course _____
Dates _____
Cost (Excl. VAT) _____

Terms and Conditions

1. All course fees are payable upon confirmation of booking and an invoice will be sent as per the details indicated above. Bookings cannot be secured until payment of invoice or valid purchase order is received.
2. Only cancellations received in writing 10 days before the start of the course will be refunded in full.
3. There will be no charge if a substitute person wishes to replace the original delegate.
4. Yellotec reserves the right to cancel any course at any time without liability. In these circumstances, delegates will be offered an alternative date, or a full refund.
5. All Halaal requirements will be charged at an extra cost.
6. Delegate no shows, partial attendance or late cancellations will be liable for full cost.



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Yellotec is a products, service and training provider in the following specialist fields:

1. Complete solutions for the implementation and management of Condition Based Maintenance.
2. Remote Diagnosis of Vibration Analysis.
3. Full on-site CBM services, ranging from single individuals to complete department.
4. Oil Analysis Laboratory Services.
5. Vibration Analysis Services.
6. Thermographic Analysis Services.
7. Laser Alignment & Balancing Services.
8. Training in all specialist areas of Condition Based Maintenance
9. Direct agents for Flir Systems (Sweden) and Prüftechnik(Germany).