



## TRAINING PROGRAM



# Used Oil Monitoring

## Course Description:

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Practical Oil Analysis seminar provides engineers, analysts, technicians and mechanics with a concise overview of the essential information required to understand machinery lubrication, correctly perform oil sampling, understand analysis reports, and manage an oil analysis program. We first focus the basic functions of a lubricant, how wear and contamination affect both machine reliability and oil quality, and how different oil types respond in similar applications. The essential properties of oils and greases are then reviewed, with a focus on understanding the parameters that most reflect changes in machine reliability. We then cover how oil samples should be taken from machinery to obtain representative samples of the fluid system. The oil analysis tests performed on oils, hydraulic fluids, and greases are then reviewed, with an emphasis on understanding the implications of changes in the oil properties relative to machinery wear and reliability. We then integrate this with examples of oil analysis reports from various laboratories to show how to best interpret the report data, and how to assess oil degradation, additive depletion, and how to set and manage alarm limits. The effects of contamination, how to prevent it, and the use of filtration are then reviewed to ensure attendees understand the impact of particulate contamination on machine reliability, and how to deal with it at their plants.

## Course Certificate:

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**BTS** certificate will be issued to all attendees completing all of the total tuition hours of the course.

## Who Should Attend?

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Laboratory managers, analytical chemists, medical scientists, laboratory supervisors, research and development scientists, microbiologists, food technologists and quality assurance/control managers

## Course Objectives:

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**By the end of this course delegates will be able to:**

We conclude with discussions of how to manage an oil analysis program, how to set program goals, perform site assessments, select sampling frequencies, and select oil test packages based on machine type and service criticality. For advanced users, we also cover how to establish oil analysis program metrics to establish machine-class specific parameters that can be used across a fleet to monitor overall program effectiveness, and how to document cost savings.

## Course Outline:

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### Why Sample Used Oil?

- Examples of Oil-Related Machinery Failures
- Oil Change Out & Disposal Costs
- Does My Oil Really Need to be Changed?

### Lubrication Fundamentals

- Wear Mechanisms in Machinery

- Types of Friction
- Modes of Contamination
- Primary Functions of a Lubricant
- Lubricant Failure Modes
- Water & Dirt – Your Worst Enemies

## **Lubricant Formulations**

- Mineral & Synthetic Oils
- Common Additive Packages
- Greases

## **Lube Oil Properties**

- Viscosity & Viscosity Index
- ISO, SAE & NLGI Grades
- Pour Point & Flash Point
- Film Strength
- Adhesion
- Acid & Base Numbers
- Demulsibility

## **Lube Oil Sampling**

- Sample Port Types
- Sampling Techniques
- Selecting Sample Port Locations
- Proper Sample Handling

## **Oil Analysis Testing & Implications**

- Viscosity
- Wear Metals & Particles
- Particulate Contamination
- Additive Depletion
- Oxidation
- Water Content
- Water Separability
- Acidity / Alkalinity
- Filter Debris & Patch Testing

- Analytical Ferrography

## **Interpreting Oil Analysis Reports**

- Wear Metals, Contaminants & Their Sources
- Additive Depletion & Replenishment
- Assessing Oil Degradation
- Setting Alarm Limits

## **Bulk Oil Storage & Handling**

- Lube Room Best Practices
- Oil Dispensing
- Using Filter Carts
- Baseline Oil Testing

## **Controlling Contaminant Ingression**

- How Dirt & Water Affect Oil
- Preventing Dirt Ingression
- Preventing Water Ingression
- Removing Contaminants

## **Oil Filtration**

- How Clean is Clean?
- ISO Cleanliness Codes
- On-line & Off-line Filtration
- Filter Carts & Filter Media
- Differential Filter Pressure

## **Managing an Oil Analysis Program**

- Setting Goals
- Site Assessment Procedures
- Bulk Storage & Handling Assessment
- Equipment Selection
- Sampling Locations, Techniques & Frequency
- Selecting Oil Test Packages

## **Oil Analysis Program Metrics**

- Normal vs. Abnormal Samples
- Establishing Class-Specific Averaged Metrics
- ISO Particle Counts
- Water
- Contaminants
- Wear Data
- Documenting Cost Savings