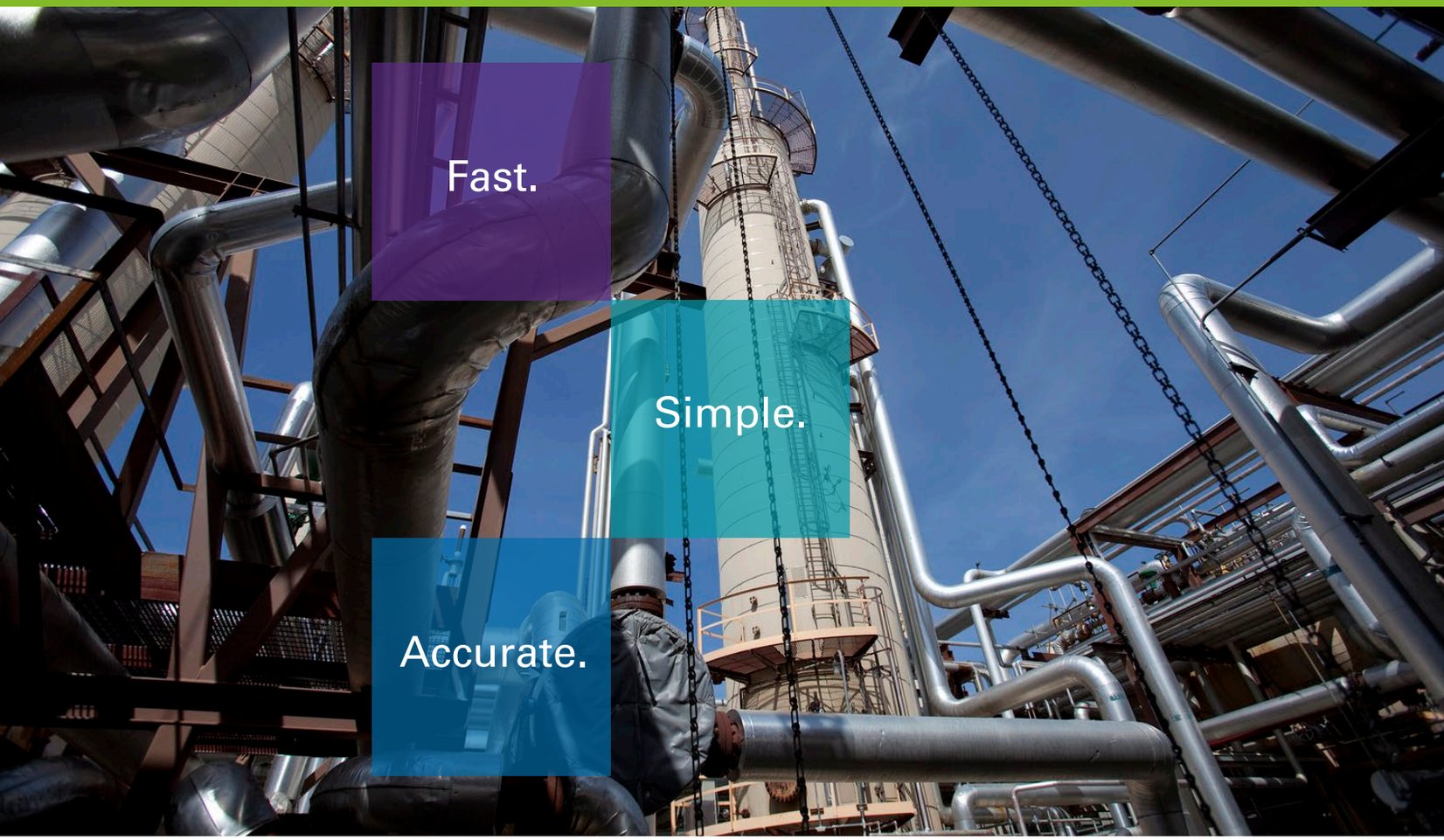
Spectro Scientific

Confidence in knowing

The Science of Fluid Analysis



Industrial Solutions

On-site Oil Analysis for Machine Condition Monitoring

In-service oil analysis is a key machine condition monitoring technique. In the time it takes external laboratories to return oil sample results, machinery condition can significantly change. On-site oil analysis eliminates the wait and enables immediate decision making.

Three aspects of in-service lubricant analysis are machine condition, contamination, and lubricant condition. Spectro addresses each of these with a wide range of benchtop and portable instruments.

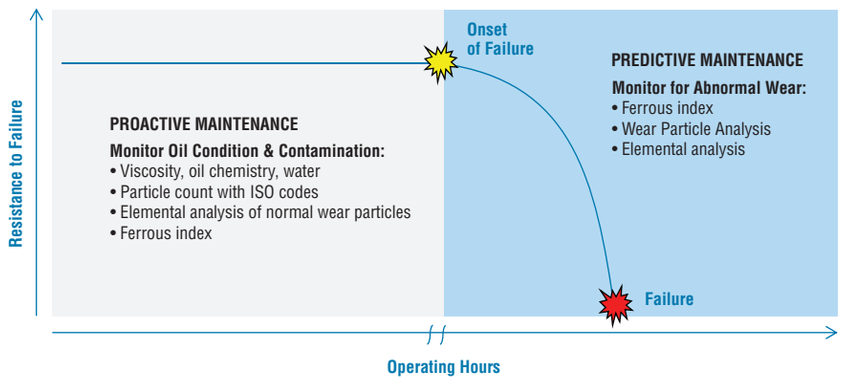
- MACHINE CONDITION
- CONTAMINATION
- LUBRICANT CONDITION



One typical configuration for industrial Machine Condition Monitoring programs is the LNF Q200 series Particle Counter, Wear Particle Classifier and Ferrous Monitor with the Combination Kit for fluid condition monitoring. Together, they cover all three aspects of in service oil analysis.

Corrosion and wear cause surface degradation of the lubricated surfaces in machinery and are the root causes of most mechanically-induced equipment downtime. Oil analysis provides early indications of equipment wear mechanisms and identifies the root causes of corrosion.

By monitoring oil for contamination, changes in chemistry and the presence of abnormal machinery wear particles and debris, operators get the information they need to properly maintain their equipment.



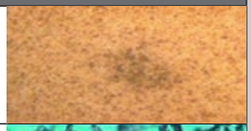
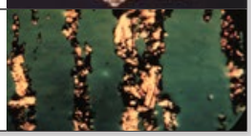
The P-F Curve (Potential-Failure Curve) illustrates how in-service oil analysis provides critical information on machine condition in both Proactive and Predictive Maintenance periods.

In the Proactive period, oil condition and contamination monitoring help prevent the onset of the root causes of machine failure. In the Predictive period, monitoring the increasing severity of wear particles allows maintenance work orders to be executed for component replacement or repair before catastrophic failure.

On-site oil analysis is the best way to develop a proactive maintenance program that:

- Lowers operating costs
- Reduces unscheduled downtime
- Improves OEE by increasing machine availability
- Extends equipment life and reduces total lifecycle equipment costs
- Provides immediate retest capability

The root causes and mechanisms of corrosion and wear are summarized in the table below:

ROOT CAUSES		MECHANISM	CAUSES	
CORROSION		Water or other corrosive fluids chemically attacks and weakens metal surfaces	Water in oil, degraded oil, process contamination, coolant, condensation…	
WEAR	Abrasion	3-Body cutting damage from abrasive particles between two moving surfaces	Abrasive particles in oil, dirt, secondary wear, process contamination	
	Adhesion	Damage from metal surfaces dragging over each other	Inadequate lubrication-low viscosity oil or no oil, high temperature, excess load, slow machine speed…	
	Fatigue	Damage from micro-cracks caused by cyclic loading	Misalignment, imbalance, improper fit or assembly, secondary damage…	

"Oil Analysis effectively detects certain problems within rotating machines before they are evident with vibration analysis – particularly on multistage gearboxes, plain bearings, rotary screw air compressors, roots blowers, and certain rolling elements bearings which might be located at a distance from an accelerometer mounting location."

James E. Berry
Author, "Practicing Oil Analysis"

A comprehensive oil analysis program will answer these five questions:

- *Is it the right oil?* *(Right viscosity and additive package)*
- *Is it dry?* *(Free of water and other liquids)*
- *Is the oil clean?* *(No dirt or dust)*
- *Is it still fit for use?* *(Degradation of viscosity or oil chemistry)*
- *Is the machine in good condition?* *(Free of abnormal wear debris)*

Spectro Scientific's On-Site Oil Analysis Solutions—

We offer a wide range of portable and benchtop tools that provide accurate and rapid results.



Viscosity

SpectroVisc Q3050

Portable kinematic viscometer

High-accuracy, kinematic viscosity measurements for easy detection of viscosity variations caused by contamination, mix-up and oil degradation.

LAB-QUALITY RESULTS WHEN AND WHERE YOU NEED THEM

- Solvent free, portable, and easy to use
- Viscosity range 1-700 cSt @40C
- Accuracy +/- 3% to NIST viscosity standards





Water

TAN
TBN
Oxidation
Nitration
Sulfation
Soot
Additive depletion



FluidScan® Q1100

Handheld infrared oil analyzer

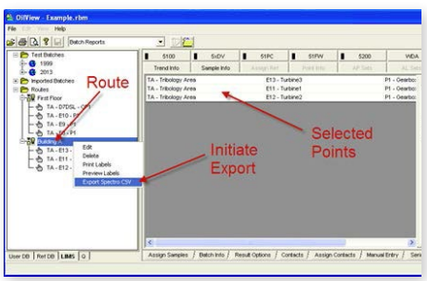
The FluidScan Q1100 determines when in-service oil is no longer fit for use due to oil degradation or the ingress of water or glycol. It's fast and easy to use, with just one drop of oil needed for the sample, and one minute for test results. It comes with an extensive oil library and additional oils can be added by the user.



HIGHLY REPEATABLE AND REPRODUCIBLE

- Compliant to ASTM D7889 "Standard Test Method for Field Determination of In-service Fluid Properties using IR Spectroscopy"
- High correlation to TAN and TBN laboratory tests conducted with ASTM D664 and D4739.

SIMPLIFIES WORK FLOW WITH ROUTE BASED OIL ANALYSIS USING AMS OILVIEW SOFTWARE



Combination kit for oil condition monitoring

The Combination kit consists of the SpectroVisc Q3050 viscometer and the FluidScan Q1100 Infrared spectrometer. Together, they provide a total solution for oil condition monitoring and address the questions:

- *Is it the right oil? Is it dry? Is it still fit for use?*

The Q3050 and Q1100 are easy to operate, require only a few drops of oil to test, and no solvents are needed to clean – just a nonabrasive cleaning pad.



Ferrous content
Wear particle shape

Particle count and codes
Free water



Spectro LNF Q200 Series

Particle Counter, Wear Particle Classifier, Ferrous Monitor

Expand beyond contamination control to machine wear monitoring for predictive maintenance. The Spectro LNF Q200 series provides particle counts and codes, abnormal wear particle classification and ferrous wear monitoring. Wear particle classification identifies the type of machinery wear, wear mode and the potential source. The Ferrous Monitor measures ferrous content in the sample.
The Q200 series addresses the questions:

- *Is the oil clean? Is it dry? Is the machine in good condition?*

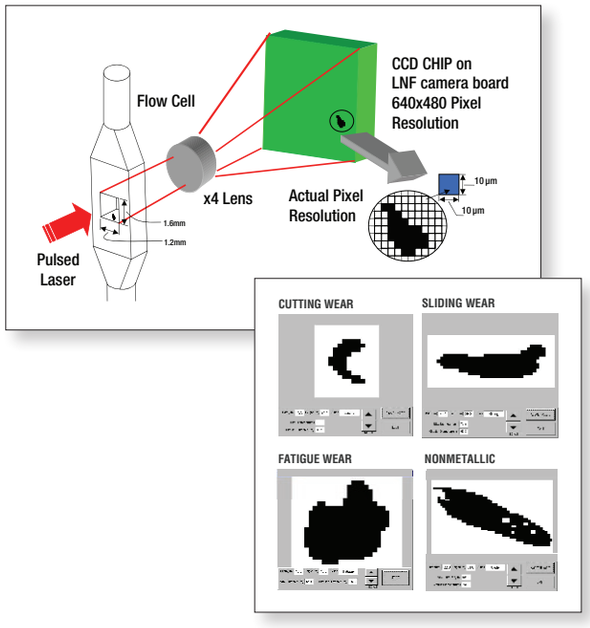
THE LNF (LaserNetFines®) IS THE WORLD'S BEST PARTICLE COUNTING TECHNOLOGY:

- Widest range, up to 5,000,000 particles/ ml
- Error corrections for soot, water, and air bubbles

THE ADVANCED DESIGN MAKES IT SO MUCH MORE THAN A PARTICLE COUNTER:

- Calculates free water
- Measures ferrous content and ferrous particle counts
- Differentiates contaminants (silica) from machine wear (metal)
- Classifies wear particle shape

Options include an AutoSampler for high throughput sample processing and a basic particle counter without ferrous monitor or shape classification.



Wear particle by metal type

Contamination ID by source

Oil additive levels



Spectroil Q100

Elemental Analyzer

The Spectroil Q100 analyzes small particulate wear, lubricant additives and contaminants in industrial fluids such as oil, fuel, hydraulic fluid and cooling/washdown water. It helps answer the questions:

- *Is the oil clean and fit for use? Is the machine in good condition?*

- Measures ppm levels of up to 32 elements in less than 30 seconds
- Easy to operate – no sample preparation, gases, coolants, or solvents needed
- Compliant with ASTM D6595 for used oil analysis

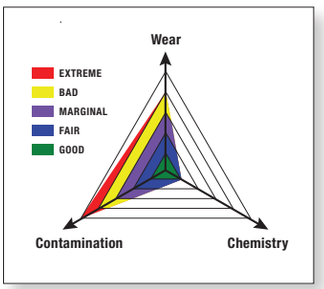


Spectro 5200 Trivector®

Minilab Oil Analyzer with OilView® Software

The Spectro 5200 Trivector Oil Analyzer is a multi-function benchtop oil analyzer that detects lubricant related problems and enables on-site analysis of machinery oils and lubricants for metal wear, lubricant chemistry and contamination per ASTM D7416 and Wear Debris Analysis per ASTM D7684. It helps answer the questions:

- *Is it the right oil? Is the oil clean, dry and fit for use? Is the machine in good condition?*



Other Spectro Inc. Products

Q5800 Expeditionary Fluid Analysis System

The Q5800 is a rugged, portable expeditionary fluid analysis system that provides rapid results for particle count, wear metal analysis for 13 different elements, 40C kinematic viscosity measurement and lubricant chemistry parameters such as TAN/TBN, water content, soot, oxidation, nitration, sulfation and fluid mix up.



Q6000 Fuel Dilution Meter

The Q6000 is a portable fuel dilution meter ("fuel sniffer") that provides rapid and accurate measurements of fuel contamination in engine oil.



Q500 Analytical Ferrography Lab

The Q500 is a complete ferrography system for the interpretation of wear and contaminant particles per ASTM D7690 and D7684.

Application specific InfraCal monitors

- Antioxidant Level in Transformer Oil
- Oil in Water Analysis
- Soot in Diesel Oil



Customer Services

Spectro's Customer Service Team and its partners around the world are committed to providing the highest levels of customer support and satisfaction for applications questions, guidance on basic instrument operation and troubleshooting and parts identification. **support@spectroinc.com** **+1 (978) 431-1130**

Other services include:

On-site Installation & Training of instruments

Product Training for instrument operation and routine maintenance

Support Agreements – Provides Extended Warranty, Preventative Maintenance and any additional service needed.

Field Repair – Certified Customer Service Engineers perform Preventative Maintenance and repair work on site.

In-house Instrument Calibration, Maintenance, Repair, and Upgrades – Performed at our facility near Boston, MA

Resource Library – Web-based Resource Library offers instant downloads of application notes, white papers, case studies and product information.



About Spectro Scientific

Spectro Scientific Inc. is enabling the fast-growing field of predictive equipment maintenance with the most innovative oil analysis tools for lab and field applications. Reliability and maintenance engineers worldwide rely on Spectro Scientific's instruments to monitor in-use oil to keep vital equipment finely tuned and running at peak performance and efficiency.

The benefits include reduced costs, improved safety, maximum equipment effectiveness and uptime along with greener operations. Spectro Scientific Inc. tools are at work in the military, power, mining, marine and many other critical industries.

With more installed units and more experience than any other company in the business, Spectro Scientific Inc. is the choice of laboratories and predictive maintenance programs around the globe.

To learn more about Spectro Scientific products please call 978.431.1120 or visit us online at www.spectrosci.com.

Spectro Scientific
Confidence in knowing

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