



TOTAL LABORATORY SOLUTIONS

Condition Monitoring Services for Today's Demands

ISO 9001:2008 Certified • ISO 17025:2005 Accredited

OVERVIEW



Unscheduled downtime is an organization's number one enemy. In an environment where equipment is expected to run 24 hours-a-day, 7 days-a-week under extreme operating conditions, equipment failure can quickly bring production to a halt. This can turn your normal workday run into an excruciating marathon.

What if you could prevent downtime?

Imagine being able to see exactly what's happening inside your equipment. You could prevent failure, enhance machine performance and gain a competitive edge. That's where Trico can help.

Trico's Total Laboratory Solutions can help you see the condition of your oil and equipment without shutting you down. Trico's analysts can detect failures in progress and point you straight to the root cause, providing you with sufficient lead time to schedule corrective maintenance before catastrophic failure, with minimal disruption of your operations.

WHEN IT COMES TO YOUR MACHINERY'S LIFE – **DON'T GUESS.**

THE COST OF GUESSING:

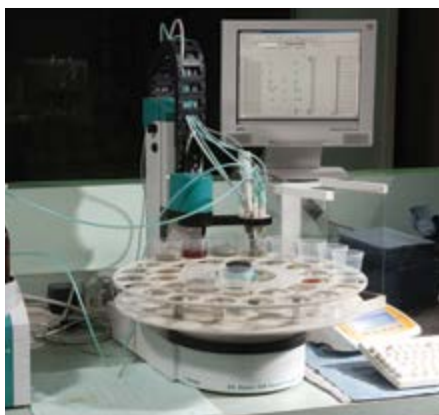
- Unplanned downtime
- Poor utilization of personnel
- Costly repairs
- Increased part replacement costs
- Increased maintenance costs
- Decreased equipment reliability
- Unnecessary oil changes
- Increased overtime



THE VALUE OF TRICO'S TOTAL LABORATORY SOLUTIONS:

- Detailed result interpretation and recommendations by experienced analysts
- Service and parts support to assist in Lubrication Program implementation
- Downtime can be organized and planned rather than reactive
- Troubleshoot problems with more precision, less guesswork
- Experienced laboratory and analytical staff ensuring high quality and timely information
- State-of-the-art laboratory instrumentation utilizing applicable ASTM and ISO standards for producing reliable test data
- Quick turnaround reporting capabilities that are sent by email or can be accessed from password protected website
- High-quality supplies and hardware for consistent, repeatable sample collection
- Professional customer support making individual service programs efficient and easy to use

OIL ANALYSIS



USED OIL ANALYSIS

Our used oil analysis provides a variety of physical and chemical tests to assess lubricant condition and its ability to perform, as required by the machine's application. We provide a variety of test packages to determine contamination levels and the health of your lubricant so you can take the necessary actions when needed. Tests offered:

- Viscosity
- Elemental Analysis
- Total Acid Number and Base Number
- Crackle Test
- Water by Karl Fischer
- Particle Count
- Fourier Transform Infrared (FTIR)
- Soot Concentrations
- Fuel Contamination
- Many More

FUEL TESTING

Fuel quality is essential to proper and cost-efficient engine operation. Long-term storage and transfer of fuels can result in water, sludge, or organic contamination. Chemical and physical properties may also deteriorate. Fuel contamination and degradation are often the cause of diesel engine failures. Trico's fuel analysis service provides information to help you maintain the highest engine performance. These tests allow you to screen out poor quality stocks and ensure that your fuel meets regional and seasonal operating requirements. Tests offered:

- Water and Sediment
- Distillation
- Cloud and Pour Point
- API Gravity
- Flash Point
- Thermal Stability
- Biological Growth
- Many more

COOLANT TESTING

Controlling equipment temperature is necessary for optimum operating performance. Trico's coolant analysis alerts you to coolant breakdowns that may contribute to engine failures. Our trained technicians measure your coolant's freezing point, boiling point, and contamination levels in order to help you make seasonal change-out decisions.

OIL ANALYSIS BENEFITS:

- Evaluate the chemical contamination of the oil
- Determine the usability of the oil
- Determine the dissolved elements and concentration of additives
- Estimate the usable life of the oil
- Identify trends that could contribute to harmful performance
- Determine optimum oil change intervals

WEAR DEBRIS ANALYSIS (FERROGRAPHY)

Trico's Wear Debris Analysis provides accurate insight into the condition of a machine's lubricated components by examining wear particles and contaminants suspended in the fluid – including grease and water-based fluids. These particles can reveal abnormal wear, components involved, and the cause. Our predictive analysis will identify wear-related conditions at an early stage, preventing catastrophic equipment failure. Trico reduces repair costs by diagnosing maintenance requirements before extensive equipment damage and unscheduled shutdown occur.

Trico provides two types of wear debris analysis:

DIRECT READING FERROGRAPHY

Direct Reading Ferrography magnetically separates wear particles and optically measures the quantity of large and small particles present in the oil sample. Results from direct reading ferrography indicate the rate, intensity and severity of wear. With these measurements, machine wear baselines can be established and trends in wear conditions can be monitored. If there is a significant increase in the wear trend levels, a detailed analytical ferrography should be performed.

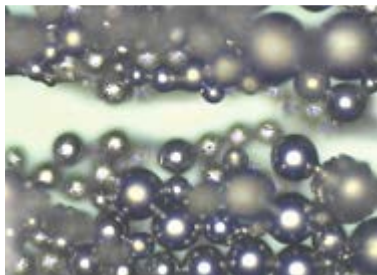
ANALYTICAL FERROGRAPHY

When Direct Reading Ferrographs and/or other analysis indicate abnormal wear, Trico's Analytical Ferrography can further pinpoint its source and the specific type of wear. Our skilled analysts will extract, classify and visually analyze wear particles and solid contaminants. Particles are examined under a powerful optical microscope to determine the size, concentration, color, shape and particle composition. Results received from Trico's analytical ferrography provide for the application of timely, corrective maintenance, based on a machine's actual condition.



WEAR DEBRIS ANALYSIS BENEFITS:

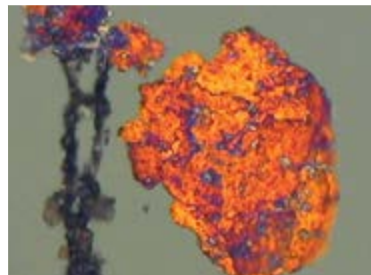
- Determine start of abnormal wear
- Assess the severity, origin, and development mechanism of particles
- Evaluate particles contaminating the lubricant sample
- Predict equipment wear condition and failure potential
- Qualitatively determine the size, shape, composition, and concentration of particles
- Identify source of wear
- Determine lubricant life
- Particle analysis 0-300 microns



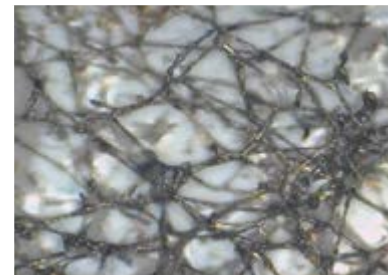
Spheres
Bearing fatigue prior to spalling



Chunks
Fatigue, scuffing or scoring of gear teeth



Laminar Wear
Rolling contact failure



Fibers
Paper filter failure

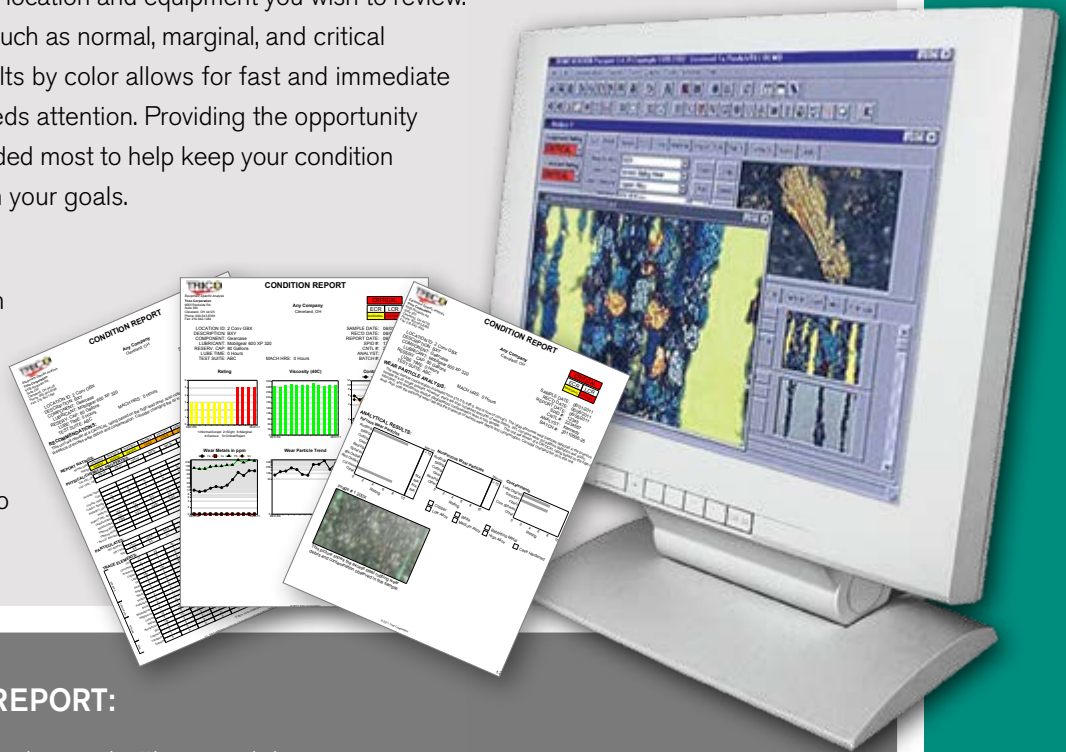
TRENDING AND DIAGNOSTICS

Trico's Total Laboratory Solutions includes online reporting software which shows you how to get the most from your test data.

The Total Laboratory Solutions includes your personal condition monitoring report where you receive test data results immediately after the sampling process is complete. You can manage your data and your condition monitoring program efficiently and effectively. Our reporting capabilities integrate various condition monitoring services into a single, comprehensive report. Reports are emailed immediately following analysis and review. Active links within the email will direct you to the analysis portion of your condition monitoring report.

Total Laboratory Solutions reporting system is an easy to use "point & click" program that allows you to select any test data from any sample point location and equipment you wish to review. You will see sample severity levels such as normal, marginal, and critical indicated by color. Posting the results by color allows for fast and immediate identification of equipment that needs attention. Providing the opportunity to focus your resources where needed most to help keep your condition monitoring program on target within your goals.

Through regular monitoring and trending you will receive information needed to continually maximize asset reliability. Problems can be identified, through condition monitoring report, by comparing an equipment's most recent samples to its historical data.



CONDITION MONITORING REPORT:

- No special software required; can be used with any web browser
- Individual test results are color coded to give more meaning to the report
- Data is presented graphically, with trends clearly tracked by sample dates and machine hours
- Analysis is provided in detail, with interpretations based on trend analysis
- Recommendations are precisely summarized
- Color images depicting actual wear particle conditions are provided
- Customer comments can be posted on the report, prior to internal distribution, in response to action items recommended by the Trico's Machine Condition Analysts
- Customer comments and report are permanently stored
- Sample result summaries are sent via email immediately following analysis and review. Active links within the email direct you to your condition monitoring report
- E-mail notification and 24/7 result availability from the web

TRICO – BUILDING INDUSTRIAL LUBRICATION CUSTOMERS FOR LIFE

If you're looking to prevent machine failure, enhance machine performance and gain a competitive edge, Trico offers the full line of predictive analysis technologies you need. Our Total Laboratory Solutions will analyze the condition of your oil and equipment without shutting you down. **For more information contact Trico at 262.691.9336.**

