# Program Information

## Xamine™ Oil Analysis

# Xamine™ Turbine Oil Analysis

### *Comprehensive Testing Program Protects Assets & Preserves Profits*

The key to efficient turbine maintenance is the regular monitoring of the oil, which ensures that decisions involving the turbine, including scheduling of oil changes and other maintenance, are based on what is actually happening inside the unit, instead of the number of hours, days or years of operation. Routine and in-depth monitoring can provide warning signs early enough to take corrective action.

The Xamine™ Turbine Oil Analysis program offered by Lubrication Engineers, Inc. goes beyond routine industrial oil analysis. LE's comprehensive program – including the 16 tests shown on the next page – provides consistent, accurate monitoring of turbine oil for mechanical, operational and environmental factors that can affect the performance and lifespan of the oil and the turbines.

This valuable insight means less oil to buy, less used oil to dispose of, fewer labor hours, less unscheduled downtime and longer turbine life – all contributing to a healthier bottom line.

Photo courtesy of Siemens AG

*LE's Xamine TOA program includes 16 tests (see next page) to ensure better, earlier detection of problems, including rust, varnish and sludge formation.*

## Benefits

**Maximizes oil life**

- Monitors condition and quality of oil
- Shows that lubricants can remain effective even after an extended length of service
- Monitors system cleanliness
- Identifies foreign debris and other contaminants
- Provides timely indication of degradation or loss of oil's performance properties

**Maximizes equipment life**

- Supports predictive maintenance programs
- Evaluates operating conditions of the lubrication system
- Identifies wear trends
- Detects varnish problems
- May detect early signs of failure

**Enhances profitability**

- Provides data to help with scheduling downtime
- May prevent unscheduled downtime
- May reduce maintenance costs

## Get Started Today

LE provides oil sampling kits and can walk customers through the process. To learn more about LE's Xamine Turbine Oil Analysis program or to set up an account and order kits and sampling equipment, please contact your local LE representative.

## Reliable Reporting

**Fast & accurate**
Customers can rely on rapid turnaround of results from an experienced lab facility operating under an ISO 9001 Quality System.

**Comprehensive**
LE prepares a detailed report that includes results as well as recommendations.

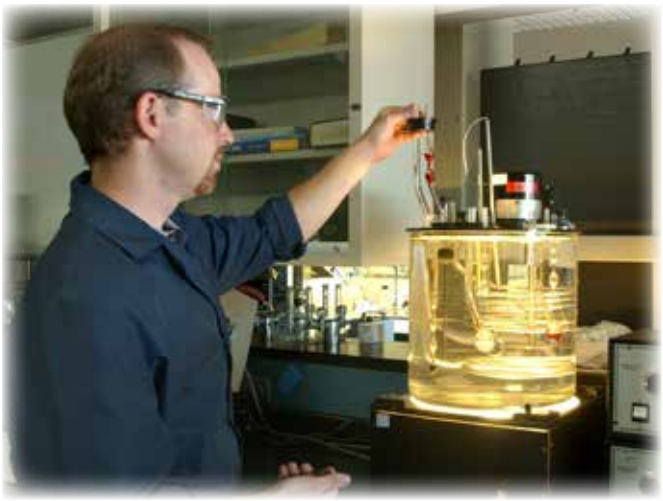
**Reviewed by experts**
Recommendations are made by the LE Technical Services Department and Laboratory personnel, ensuring a high level of expertise from a staff with many years of experience in power generation lubrication.

In addition, your LE representative will hand-deliver the report, if desired, providing an opportunity for one-on-one consultation.

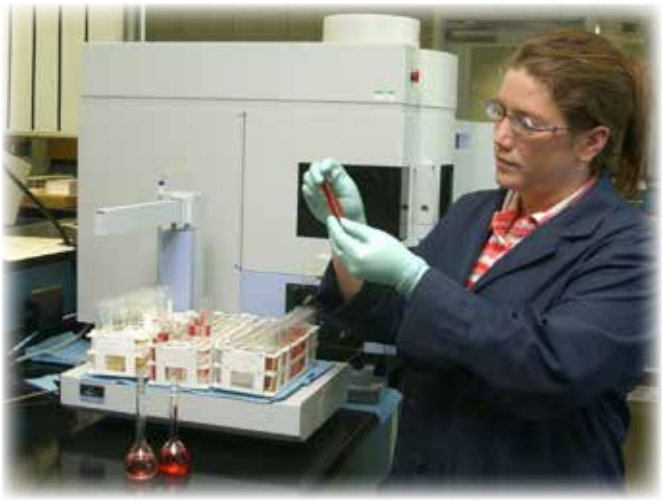
# Test Package

# Xamine™ Turbine Oil Analysis

## *Testing Detects Any Changes in Oil's Performance Over Time*



*The LE Technology Center in Wichita, Kan., is an up-to-date facility featuring a wide variety of specialized equipment, as well as personnel with the technical understanding necessary to perform oil testing based on customized program requirements.*



*Results are available soon after testing is complete. LE prepares a detailed report for the customer, explaining the data and providing recommendations for any follow-up actions that should be taken.*

To properly lubricate and cool the bearings and gears, a turbine oil must resist oxidation, ensure water separability and prevent the formation of varnish, sludge, rust and foam. Any change in these performance properties, or in the oil's other physical parameters, requires attention.

LE's Xamine TOA program monitors turbine oil for all of the factors that can affect the performance and lifespan of the oil and the turbines. In addition to the comprehensive test package shown below, LE can tailor a program with optional tests as needed to meet individual customer requirements.

### Xamine TOA Test Package (standard)

Additional tests are available, if desired.

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|---|
| **Color** Visual & ASTM D1500 |
| **Viscosity** ASTM D445 |
| **Viscosity Index** ASTM D2270 |
| **Oxidation by RPVOT** ASTM D2272 |
| **Acid Number** ASTM D664 |
| **Base Number** ASTM D4739 |
| **Elemental Analysis** ASTM D5185 |
| **Water by Karl Fisher** ASTM D1533 |
| **Particle Count/Cleanliness** ISO 4406 |
| **FTIR** Scan Comparison |
| **Rust Test** ASTM D665 |
| **Emulsion Characteristics** ASTM D1401 |
| **Foaming Characteristics** ASTM D892 |
| **Air Release** ASTM D3427 |
| **Antioxidant Content** (RULER) ASTM D6971 |
| **Membrane Patch Colorimetry** ASTM D7843 |

Testing is performed using ASTM D4378, *Standard Practice for In-Service Monitoring of Mineral Turbine Oils for Steam and Gas Turbines*, as a guideline. Compatibility testing in accordance with ASTM D7155, *Compatibility of Mixtures of Turbine Oils*, is also available.

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LE operates under an ISO 9001 Certified Quality System.

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