

## SERVICE DESCRIPTION:

# The Analytical Content of the Contamination Monitoring Program

**With increasing costs and tighter deadlines, the need for effective maintenance strategies is greater than ever before. Optimise your maintenance program with Ocean Team Group's Contamination and Fluid Condition Monitoring Program including technical recommendations for optimisations.**

Similar to blood samples, just a small amount of oil can show signs of contamination, degradation and/or wear and tear. In machinery the oil sample will carry small particles of metallic debris, which can give indications of any wear patterns, which may be occurring within the system. By using state of the art instruments we determine the composition and concentration of these metallic particles and indicate which part of the machinery is wearing at abnormal rates.

Information generated from an oil analysis is used for prediction of potential problems with the oil or machinery, before it becomes critical and even long before it becomes evident to the maintenance engineer.

This enables you to plan an efficient and optimal preventive maintenance of your system - saving you for costly downtime and minimising your maintenance and repair costs.



### Analysis for all Applications

All mechanical equipment benefit from a fluid condition monitoring program. Our laboratory has more than 30 years of experience in analysing samples from all types of lubricated systems including:

- Engines - diesel, petrol and gas powered
- Hydraulic systems
- Gearboxes
- Compressors
- Turbines - gas and steam
- Heat transfer systems
- Circulating oils
- Transmissions
- Transformers
- Cooling Waters

### Analytical Services:

- Greases
- Fuels
- Coolants
- Ferrography
- Product formulations

### Chemical and Microscopy Examination:

- Sludge/deposits
- Metal debris
- Filters

### Which Type of Analysis do We Offer?

Our testing ranges from basic contamination checks to full-blown system oil condition analysis, whereby we perform lubricant condition checks to ascertain whether your system oil is fit for further use.

Our routine testing program includes among others analysis of wear metals, ISO 4406 particle count, viscosity, wear metals, and colour.

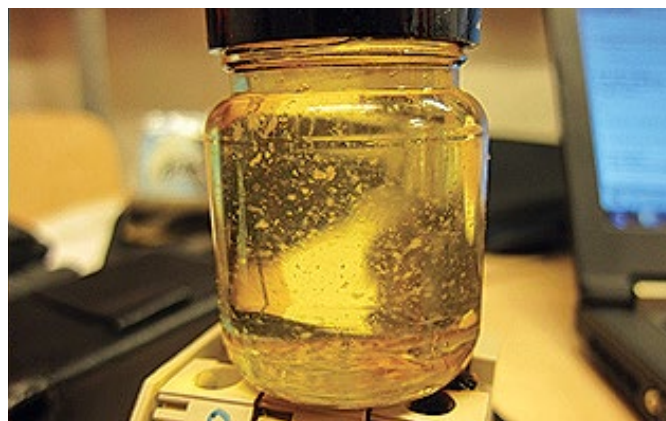
Beside our routine testing program, we offer a range of additional tests, which are specially recommended to be

performed at least twice a year on in-service turbine oils:

- Foaming sequence: ASTM D892
- Demulsification number: IP 19
- Emulsibility: ASTM D1401
- Rust prevention characteristics: IP 135 A&B
- Air release: IP313
- Oxidation stability (RPVOT): ASTM D2272
- Acid number: ASTM D664
- Varnish potential: patch colourimetry
- Water content: Karl Fischer method
- Flash point closed cup: ASTM D93
- Ruler

Further information about the different additional tests is found in the below *Technical Insight Box*. We have divided our monitoring into packages suiting your analysis requirements.

The content of each of the analysis packages is outlined in the table at the following pages.



## TECHNICAL INSIGHT

### Explanation of Turbine Oil Analysis Methods

Why are additional oil analysis tests important for optimization of your maintenance program? The following explains shortly, the different additional tests within our Health Check Service Program:

**Foaming Sequence:** The foaming characteristics of turbine oil can be analysed at the lab by blowing air through the oil and measuring the amount of foam generated. Too much foam can strongly affect a lubricant's ability to perform and might be derived from contamination of the oil, excessive agitation, or cavitation.

**Emulsibility:** In steam turbine applications, it is inevitable that the lubricating oil will come into contact with water. Therefore, it is vital that the oil's ability to shed water is monitored. Oil that sheds water quickly will continue to perform in a desired way. Oil that continues to hold the water will lose lubrication and oxidation resistance capabilities.

**Rust Prevention:** All turbine oils contain additives that will help inhibit rust. Rust particles can cause abnormal increases in wear metals within the lubricated system and increase the rate of oxidation.

**Air Release:** The air release properties of oils need to be monitored to ensure that the in-service oil continues to have the ability to detrain entrained air. Too much air in lubricating oils can lead to increased oxidation of the oil and reduced film strength properties.












**Oxidation Stability:** Over time turbine oils will oxidise. Monitoring the amount of oxidation resistance is critical to ascertain the remaining use-ful life of the oil. Using the RPVOT & RULER tests enables the laboratory to make a comparison against an unused RPVOT level to determine the oils' condition.

**Acid Number:** Abnormal increases in an oil's acid levels may indicate severe oxidation or overheating of the oil. These acids can corrode metallic components.

**Varnish Potential:** Varnish found within lubricated systems may affect operating temperatures, clearances, and increase component wear. It is usually derived from oxidised oil by-products or additives. It is possible to analyse by colourimetric testing.

**Ruler Test:** The RULER™ View generates a voltammogram, identifying the type and quantity of healthy antioxidants in the lubricating oil or grease. This information provides a window into the Remaining Useful Life of your lubricant. The RULER™ provides accurate documentation of machine events and contaminant ingressions. This technology is a critical part of an effective condition monitoring program.

**Water Content:** The amount of water present in the turbine oil will reflect the potential for rust formation and reduction in oxidation resistance. Therefore, it is vital that these water concentrations are monitored and kept at low levels. Water can also cause sludge formation and affect the oil's viscosity.

ANALYSIS	TPE	Standard Oil Analysis	ADVANCE KIT 1	ADVANCE KIT 1	ADVANCE KIT 1	ADVANCE KIT 2	ADVANCE KIT 2	ADVANCE KIT 2	ADVANCE KIT 2	ADVANCE KIT 2	Electrical Oil (Standard)	Customized Turn Key Analysis
<b>CONTENT</b>												
Additives, Wearmetals, Contamination (PPM)		●	●	●	●				●			
Kv40 & KV100 (VISC) & VI		●	●	●	●	●	●	●	●	●	●	
WATER KF (KFW)		●	●	●	●	●	●	●	●	●	●	
TAN		●	●	●	●	●	●	●	●	●	●	
FTIR		●	●	●	●	●	●	●	●	●	●	
ISO & SAE Particle Count (APC)		●	●	●	●	●	●	●	●	●	●	
RPVOT			●									
VPR based on ASTM 7843 (MPC)				●								
Ruler					●							
ICP						●	●	●	●	●	●	
Foam 1						●	●	●	●	●	●	
Water sep (D1401)						●	●	●	●	●	●	
Air Release						●	●	●	●	●	●	
Appearance						●	●	●	●	●	●	
Rust Characteristics						●	●	●	●	●	●	
Acid no.						●	●	●	●	●	●	
Resistivity												
Mineral Oil Content												
Open Flash Point												
Chlorine (ICP)												
Dielectric Strength (CLR)												
Colour of Insulation Fluid												●

### Online Trending and Web Site Access

The test results are sent as pdf attachment to specified email addresses. Further we offer client specific passwords enabling customers to access their complete historical database of all sample results and reports from a single secure website. Results are uploaded daily and the first page check allows you to view the status of recently uploaded results.

Results can be split by location for users who sample from multiple sites, and sample reports can be searched by many parameters including equipment make, model serial number or oil grade.

As well as viewing all samples submitted online, other aspects of our oil analysis services can be accessed, including:

- Online trending
- Creation of individual unit or multiple plant sampling schedule
- Print sample bottle labels
- Online registering samples before sending them off
- Optional support from lubrication analyst, NDT LA 2

### Does Your Oil Analysis Tell The Truth?

The reliability of an oil analysis is very much dependent on how the oil sample is extracted from the system and how it is treated afterwards. To secure reliable test results Ocean Team offers our assistance with representative oil sample extractions in accordance with ISO/API/ASTM/DIN standards.

Misleading results from oil analyses can result in inefficient and/or insufficient maintenance of your systems. A reliable contamination monitoring program secures the most optimal maintenance of your systems.

