

# OIL TESTING LABORATORY

## CAPABILITY STATEMENT



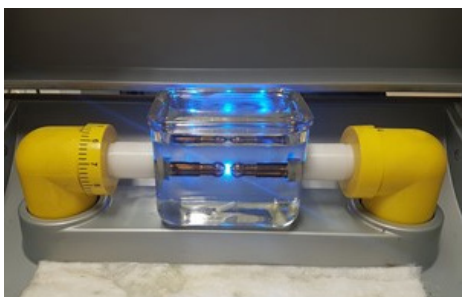
*Insulating oil testing is a critical step in the management of transformer assets to optimise operational availability. Oil sampling is a cost-effective way of determining the health of your transformer with no need for down time. Sample results are used to determine the suitability of the insulating oil for future use as well as indicate if a possible fault exists in the transformer.*

We provide a wide range of insulating oil analysis services for a diverse client base. Our current clients include power stations, electrical distribution networks, mines and transformer build and maintenance companies.

### **ANALYSIS IS PROVIDED ON:**

#### **Dissolved Gas Analysis (DGA)**

DGA is the analysis of gases dissolved in the transformer oil. When a fault occurs in the transformer it causes the formation of gas from the breakdown of the oil. Key gases can indicate what type of fault may exist. A sudden increase in key gases and the rate of gas production may indicate an active fault.



BAUR Electrical Strength Test Cell

#### **Moisture**

High water content in the oil indicates high water content in the insulation paper. Water is one of the major contributors to the paper deterioration which is irreversible. Water is also produced during oxidation of the oil and paper, which further accelerates the breakdown of the paper.

#### **Acidity**

Acidity measures the breakdown products of the oil (organic acids). It is an indication of the extent of oxidation of the oil and whether oil treatment or replacement is required. The acidity of the oil increases as the oil ages/degrades and the rate of degradation is dependent on temperature.

#### **Interfacial Tension (IFT)**

IFT measures a physical property of the oil (surface tension) that decreases with increasing presence of oxidation products (acidity). IFT is a very sensitive test to the early oxidation of oil. The IFT of an oil will decrease with the ageing/degradation of the oil.

#### **Electrical Strength or Breakdown Voltage**

The breakdown voltage is a measure of the ability of the oil to withstand electrical stress. This property is complex and depends on particle content, particles type and water content. The breakdown voltage decreases with increasing moisture and particle content of the oil.

### Degree of Polymerisation (DP)

One of the most dependable means of determining paper deterioration and remaining life is the DP test of the cellulose in the paper. The cellulose molecule is made up of a long chain of glucose rings which form the mechanical strength of the molecule and the paper. DP is the average number of these rings in the molecule. As paper ages or deteriorates from heat, acids, oxygen, and water the number of glucose rings decrease. DP is the average number of glucose units per cellulose molecule in the paper.

### Furan Analysis

Furans are a family of organic compounds which are formed by degradation of paper insulation. Furan analysis is a non-destructive test carried out on oil, which gives information about the integrity and remnant life of the insulation paper. A relationship between one of the more stable furans produced, 2-Furaldehyde (also known as 2-Furfural or 2FAL) and Degree of Polymerisation (DP) can be determined. Thus, by measuring the 2FAL content of the oil an indication of the integrity of the paper insulation can be obtained.



*Shimadzu GC/ECD used for PCB analysis*

### Polychlorinated biphenyls (PCBs)

PCBs are a group of very stable chlorinated aromatic hydrocarbons. PCBs are amongst a broader group of harmful Persistent Organic Pollutants that are toxic, persist in the environment and animals, bioaccumulate through the food chain and pose a risk of causing adverse effects to human health and the environment. PCBs were in common use for insulating electrical equipment from 1930 until the mid-1970s, are banned by law and serve as sources of contamination to the environment.

Other analysis services available include:

- Corrosive sulphur
- Passivator
- Inhibitor
- Dissolved metals
- Particle count
- Buchholz gas analysis
- Sediment/sludge
- Viscosity
- Flashpoint
- Density