



Shell Care®
OIL ANALYSIS SERVICE

Complete Electrical Oil Analysis Safeguards Electrical Power Equipment



The use of quality electrical insulating oils, combined with periodic oil analysis, ensures safe, uninterrupted operation of power transformers, switchgear, and X-ray equipment.

That's why Shell and its distributors offer Diala® Oils and the Shell Care® Oil Analysis Service.

This product and service combination is one of the ways Shell can help you keep your power equipment operating reliably.

Diala Means Quality

Shell Diala® A and Diala® AX Oils are light viscosity oils made specifically to meet the demanding requirements of transformers, switchgear, and X-ray equipment.

They are manufactured by Shell to meet ASTM D3487, the national standard for mineral oil based transformer and switchgear oils. All Diala Oils have naturally good oxidation stability to resist the formation of acids and sludge. Diala AX also contains an oxidation inhibitor additive.

Diala Oils provide excellent insulating properties. They meet very high standards for cleanliness. And, they have never contained polychlorinated biphenyls (PCBs).

Complete Electrical Oil Analysis

To provide continual assurance of electrical oil performance, Shell Care employs a full range of leading technology lab testing. These lab tests not only include analysis of the oil's physical properties, but also dissolved gas analysis (DGA).

The Shell Care program begins with spectrochemical analysis of each oil sample. This detects the presence of oxides as products of internal corrosion and can identify the use of silicone fluids.

Physical properties analysis include a battery of ASTM tests to detect oxidation and contamination from normal use and the

oil's exposure to high temperatures. This analysis determines viscosity, water content, and the dielectric strength of the oil. It also detects the presence and levels of acids that could promote corrosion and increased oil degradation, higher interfacial tension and color change.

Analysis for oxidation inhibitor content and power factor are also available.

These tests confirm serviceability and the condition of the oil. This allows you to schedule maintenance to avoid unplanned outages.

DGA Reveals Faults

In addition to physical properties testing, the Shell Care transformer program includes Dissolved Gas Analysis (DGA).

Dissolved gases are extracted from your oil sample, separated, and then quantitatively identified through gas chromatography.

Gases develop through high temperature degradation of insulating oil and other insulating materials. Faults in transformers occur in areas immersed in the electrical oil and/or are in close proximity to cellulose insulation.

Should a fault be active, the degradation rate can be significant. Varying mixtures of degradation gases are generated for

Depending on the type of transformer in service, any combination of different gas concentrations can indicate potential problems that you'll want to avoid.

DGA identifies the presence and levels of: hydrogen, nitrogen, carbon monoxide, oxygen, methane, carbon dioxide, ethane, ethylene, acetylene. Concentration levels of these gases are measured in parts-per-million.

By analyzing and monitoring the composition of gases, the three basic fault processes are identified and quantified.

Monitoring the rate of gas generation allows expert data analysts to assess the magnitude of each fault.

DGA Benefits from Shell Care

DGA services empower transformer owners to diagnose internal operating conditions and to manage the predictive maintenance of these critical electrical components.

Shell Care creates benchmarks and establishes trend lines that correspond to corrective maintenance recommendations. From such data and its interpretation, you can distinguish the presence and the magnitude of electrical fault processes at their earliest stages.

Arcing, corona, pyrolysis and sparking are quickly and accurately identified so that corrective action can be taken.

The benefits of DGA analysis with Shell Care include:

- Determination of the condition and serviceability of oil in use
- Early detection of developing faults

- Indication of improperly functioning units
- Proper scheduling of repair and maintenance
- Determination of status for new and repaired units

Few labs perform correct transformer analysis. Even fewer offer a full range of fluid analysis services like those available to you through Shell Care.

In fact, the organization that Shell uses for this service maintains the highest standards of excellence and technology. Its laboratories are both ISO 9002 certified and nuclear-certified under 10CFR50, Appendix B.

Ideal Predictive Maintenance Tool

Based on your application, the type and size of your transformers, Shell Care representatives will recommend sampling intervals for each transformer on your program. They will show you how to properly take samples, complete necessary forms, and interpret data analysis reports.

Shell Care provides



user-friendly sampling kits. Special syringes have been designed for drawing oil samples. Cylinders can be provided if required. Mailing containers and forms are convenient to use.

You can expect lab testing and analysis to be completed within



72 hours after the lab's receipt of your samples. That way, you quickly know the condition of the insulating oil and the action required to correct threatening situations.

Analysis reports—identifying your transformer by unit identification number, work site, manufacturer, model and hours of operation—indicate results of each analytical phase. Should critical or abnormal conditions be indicated, you will be notified immediately.

Data can also be downloaded to your system through **LOAMS**® to help you effectively manage your maintenance and oil sampling data.

Regional Service

Call the Shell Care customer service representative at the toll-free number below.

1-800-743-5582

Or, call the Shell Care laboratory nearest you:

Atlanta, GA 800-241-6315
Chicago, IL 800-222-0071
Houston, TX 800-248-7778
Louisville, KY 888-491-6063
Oakland, CA 800-424-0099



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