



Transformer Oil Analysis Laboratory

SRC can help you read the pulse of your transformers with our Transformer Oil Assessment Package

Are your transformers in trouble? Their distress signals can only be decoded by testing the transformer oil, the heart of the Electrical Transformer Power design. When working properly and within specifications, transformer oil:

- increases transformer efficiency and useful lifetime
- serves as a dielectric fluid and heat transfer medium
- saves on replacement costs, cuts downtime, and improves customer service

SRC's Transformer Assessment Package will tell you if your transformer oil is within specifications and diagnose internal faults inside the paper, windings, and core. The package consists of:

- a set of six ASTM fluid quality tests
- dissolved gas content of the oil

Part A: ASTM Transformer Oil Tests

The American Society for Testing and Materials (ASTM) is the standard reference body used by most utilities in North America. A routine transformer check-up requires only six of these ASTM tests to tell the quality of the oil. The tests recommended are the following:

Dielectric Strength (Breakdown Voltage): ASTM D877 or D1816

In D877, an oil sample is placed between two electrodes with a 2.54 mm gap. A constant increasing voltage is applied until the oil discharges at a certain kV. New oil is, on average, between 35 kV (minimum specification) and 45 kV.

Neutralization (Acid Number): ASTM D974

This test measures the neutralization number. When oil oxidizes in a transformer, acid and sludge are produced, as well as water. A severe increase in neutralization number can be detrimental to the insulation system. New oil specification is 0.03 or less.

Interfacial Tension (IFT): ASTM D971

ASTM D971 is very sensitive in detecting oil-soluble polar contaminants, such as acids and sludges formed from the oxidation of transformer oil. The more contaminants in the oil, the lower the interfacial tension. New oil specification is 40 dynes/cm minimum.

Moisture Content: ASTM D533

New oil specification is less than 35 ppm. This is a very important test as moisture affects the dielectric properties of the oil.

Power Factor: ASTM D924

This test measures the leakage current that passes through oil. A very sensitive indicator of deterioration products, it has become one of the more useful tests in the industry. The greater the power factor, the more polar the contamination in the oil.

Colour and Visual: ASTM D1524

This test checks turbidity, cloudiness, suspended particles and colour. New oil has a colour rating of 0.5 and is bright and clear.

Part B: Dissolved Gas Analysis ASTM D3612

Large utilities worldwide recognize Dissolved Gas Analysis (DGA) as a proven, effective diagnostic method when used in a routine yearly checkup. A gas sample is extracted from the oil and nine key gas components are analyzed: Hydrogen, Oxygen, Nitrogen, Methane, Carbon Monoxide, Carbon Dioxide, Ethane, Ethylene and Acetylene.

When a transformer is failing, the chemical compounds in the oil break down to give off these gases. Elevated concentrations can signal corona discharge, overheating, arcing or cellulose insulation pyrolysis. By using the Transformer Oil Analyst™ software, the fault condition of the transformer can be diagnosed.

Data Services

- SRC provides analysis reports with both ASTM and Dissolved Gas results in your preferred format.
- All data can be downloaded either as Adobe PDF or in text format by email for import into the Delta X Transformer Oil Analyst Program, or databases such as Access or Excel.
- Our database can track and trend samples by serial number, equipment number or location.

Other Transformer Oil Tests Available at SRC

- Oxidation Inhibitor Content ASTM D2668
- Density ASTM D1298
- PCB Content (Gas Chromatography, modified ASTM D4059)
- Power Factor (@ 100C)

Sample Container and Syringes

ASTM Transformer Oil Test:

Requires 1 litre of oil in a polyethylene container provided by SRC.

Dissolved Gas Analysis:

Requires sample of oil in a 50-ml syringe.

SRC can loan bottles and syringes to you at no cost. We provide the appropriate shipping containers and labels to identify each individual unit. We can also provide appropriate vials for PCB testing.



General Information

Rush services are available at a surcharge rate. We can provide same-day results if needed.

Normal turnaround time is 5 to 10 days.

Volume discounts are available, and can be discussed before we start the work. Volume discounts will apply to single unit prices only.

We are accredited by the Canadian Association for Laboratory Accreditation (CALA) for PCB analysis.

SRC also has a full-service environmental CALA accredited laboratory in Saskatoon.