OILWATCH
TRANSFORMER LABORATORIES

IMPROVING ASSET RELIABILITY THROUGH UNDERSTANDING TRANSFORMER HEALTH

Transformer Asset Management

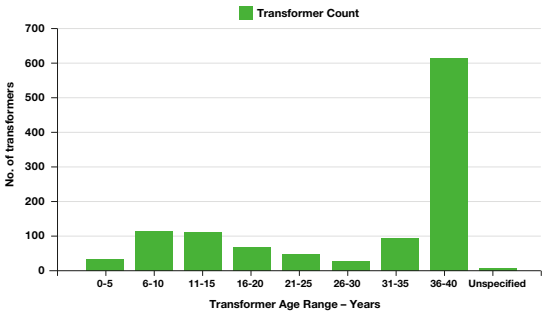
Power transformers are expensive and critical equipment in power systems and play a significant role in the transmission and distribution of electricity.

Transformer asset managers' focus is to achieve the required levels of safety and reliability from their fleet of transformers at minimum cost.

Knowledge of condition is therefore essential for efficient transformer asset management decisions. Without this information only the most basic activities are possible; such as time-based maintenance, replacement before end of life, or repair after failure.

The analysis of dielectric fluid in a transformer provides valuable information to assess changes in the internal condition of the transformer. These dielectric fluid tests are essential for the condition assessment, for the predictive maintenance and for preventing unexpected outages.

Age Distribution
Basic failure rate projection



What Outcome is required from a Transformer Condition Assessment Program?

- Predict Failures.
- Extend Reliable Life.
- Save Money.
- Justifiable to stakeholders and regulators in an competitive environment.
- Aligning technical programs directly with company financial objectives.

All test data is stored in our custom designed Oillogic program that's integrates with Windows® Excel/Word or .pdf for easy electronic transmittal via email.

Clients access to their Transformer Oil analysis via a Cloud-based server with a secure login and password.

OILWATCH
TRANSFORMER LABORATORIES

www.oilwatch.co.za

For more information, contact:

Cape Town | Durban | Johannesburg
Email: support@oilwatch.co.za
Tel: +27 (0)87 238 2188
Tel: +27 (0)21 531 7166
Tel: +27 (0)11 392 1497
Weekend Emergency: +27 (0)83 778 2904 / +27 (0)83 303 0934

Condition Assessment of Electrical Apparatus – Some Typical Tests

Water Content (IEC 60814)
Excessive moisture is one of the primary causes of low insulating liquid dielectric breakdown strength. High water content may be detrimental to the transformer under a variety of conditions.

Dielectric Breakdown Voltage (IEC 60156)
A low value indicates the presence of contaminants such as water, dirt or other conducting particles in the insulating liquid.

Acidity / Neutralization Number (ASTM D 974)
Monitors the progression of oxidation by detecting acidic compounds which accelerates deterioration of the solid insulation and are precursors to sludge formation.

Interfacial Tension (ASTM D 971)
Monitors the progression of oxidation and detects contaminants such as soaps, paints, varnishes and by-products of insulation aging.

Power Factor @ 90°C (IEC 60247)
High power factor indicates the presence of contaminants like carbon, metal, soaps and by-products of oxidation.

Color (ASTM D 1500)
Insulating liquids darken with the presence of oxidation by-products and Foreign materials.

Visual (ASTM D 1524)
Visual inspection identifies foreign material in the insulating liquid, which may lower its dielectric strength.

Specific Gravity (ASTM D 1298)
Identifies different types of insulating liquids, by determining the ratio of the weights of equal volumes of oil and water at the same temperatures.

Dissolved Gas Analysis (IEC 60567)
The single most important test you can perform to head-off potential transformer failures. Monitors gas generation in transformers for advance notice of developing faults. It's a good way to detect thermal and electrical problems before failure occurs.

Furanic Compounds (IEC 61198)
Since the paper is the most important dielectric component of the transformer, having the ability to assess its condition is a must. When the cellulose breaks down, furanic compounds are generated.

Degree of Polymerization of Paper (IEC 60450) This test provides a measure of paper aging, and correlates with important physical properties like resistance to tearing and bursting. This is a critical factor in estimating the real aging of the main transformer insulation.

Metals-In-Oil Metals
Such as copper, iron, zinc, and lead can be detected and can be indicators of incipient-fault conditions, potential bearing wear from pumps or other wear metals from vibration of components.

Polychlorinated biphenyl (PCB) analysis
Polychlorinated biphenyls PCBs, (or askarels as they are often known), are highly regulated therefore insulating liquids that may contain PCBs should be tested to ensure proper handling and disposal.

Transformer owners have a responsibility for identifying PCB contaminated installations and for actions required to dispose of contaminated oil and equipment.

Transformer Fault Diagnosis: Duval Pentagon : D2 Discharge fault