

Transformer Oil Analysis

Before electrical machinery fails, signs of trouble appear

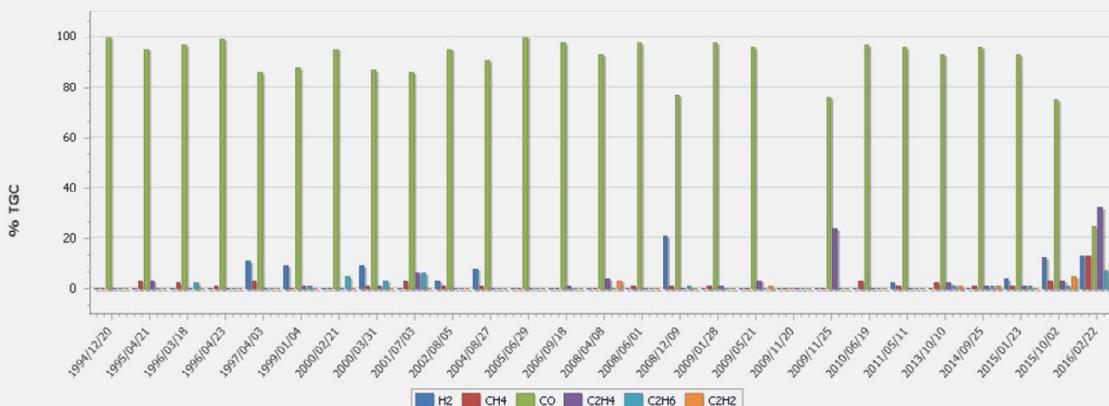
Determine the condition of your power generation, transmission or distribution system assets using analysis of the insulating liquid. Testing can detect developing apparatus problems such as local overheating at a loose connection or electrical discharge between turns, so problems can be managed. Oil degrades as a result of oxidation and operation. Degradation of the oil produces sludge and other by-products that can cause your equipment to fail. And if oil degradation is not enough, there is a variety of other conditions that can also adversely affect the performance of the oil and the apparatus. Condensation, leaking gaskets, internal arcing, to name a few, can drastically affect the dielectric properties of the liquid as well as the physical condition of the insulation. With proper diagnostic testing, catastrophic failures can be avoided.



What type of condition assessment programme do YOU have?

The analytical services performed by WearCheck's transformer condition monitoring division provide you with the accurate information you need to intelligently diagnose any existing and potentially devastating problems in your liquid-filled equipment. Compared with the cost of premature or catastrophic failure, regularly scheduled oil testing is a cost effective and sound maintenance practice that is used to extend the life of your transformers and circuit breakers. Optimise your maintenance practices using the knowledge obtained from diagnostic oil testing. Perform maintenance where needed, rather than by a time-based schedule.

Fault condition: DGA signature – localised thermal fault



Condition assessment of electrical apparatus – some typical tests

Oil quality testing

Colour (ASTM D 1500)

Insulating liquids darken with the presence of oxidation byproducts and Foreign materials.

Visual (ASTM D 1524)

Visual inspection identifies foreign material in the insulating liquid, which may lower its dielectric strength.

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.

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.

Interfacial tension (ASTM D 971)

Monitors the progression of oxidation and detects contaminants such as soaps, paints, varnishes and by-products of insulation aging.

Acidity / neutralisation 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.

Power factor @ 90°c (IEC 60247)

High power factor indicates the presence of contaminants like carbon, metal, soaps and by-products of oxidation.

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.

Diagnostic testing

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.

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.

Paper quality testing

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.



All test data is stored in our custom-designed TCMS web programme that integrates with Windows® Excel/Word or .pdf for easy electronic transmission via email.

Clients will be able to access their transformer oil analysis from our server via the Internet with a secure login & password.

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SANS 17025

Revision Date: May 2017

