

# Must You Wait Till Your Transformer Fails?

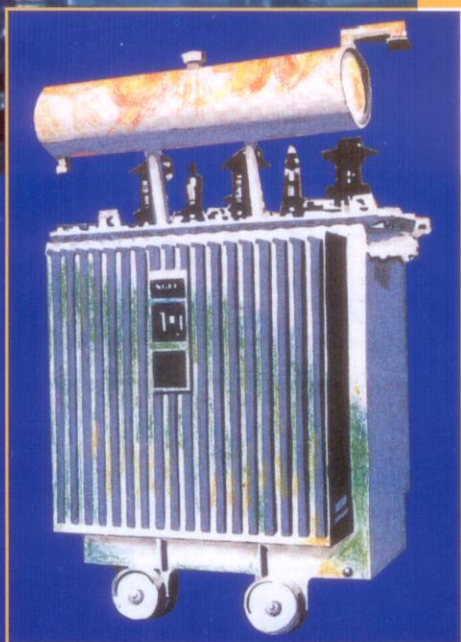
## ACT TODAY TEST OIL

### LEADING LABORATORY OFFERS

- SOPHISTICATED TESTS
- LATEST TECHNOLOGY
- LOWCOST COMPARED TO HIGH BENEFITS
- SOFTWARE BASED PREDICTIONS TO PREVENT FAILURES.

### PREVENT

- TRANSFORMER FAILURE/FIRE
- POWER FAILURE/PRODUCTION LOSS
- UNNECESSARY DEHYDRATION



AN ISO 17025 ACCREDITED LABORATORY UNDER NABL



**AES TESTING AND  
RESEARCH  
LABORATORIES**



## PROTECT YOUR TRANSFORMER

A study carried out by AES Testing & Research Laboratories for Rural Electrical Corporation in 1989 established that upto 70% of transformer failures are due to incorrect oil conditions in transformers.

## ANALYSE OIL IN YOUR TRANSFORMER

AES Testing & Research Laboratories, widely recognised as a leading laboratory for testing and analysis of Insulating Oils, bring the latest technology for testing and analysis of Insulating oils to your door step, to help you protect your transformers against failures and fires. The laboratory offers several ultra-sensitive tests for small and large transformers according to requirement, at prices negligible compared to the benefits derived. Our special software can help you plan take timely action to prevent accidents failures.

These highly sophisticated tests form the latest technology in testing of Insulating oils and are recommended by national and international organisations, IS : 1866 has laid down the code of practice for maintainance of oils in electrical transformers.

**Oil passing these tests need not be dehydrated.**

**Oil analysis results can be interpreted and timely action taken to prevent failure/fires in transformers.**

## TESTS & THEIR SIGNIFICANCE

### ■ ELECTRIC STRENGTH

The test is a measure of the resistance of oil to the Electric Stress. High electric strength of the oil is essential for the safe operation of transformer. However the test does not indicate the true condition of oil. The electric strength of oil is affected by moisture and also polar material.

### ■ WATER CONTENT

The presence of water/moisture in the oil can be the cause of arcing and subsequent failure. It also affects the Electric strength of the oil. KF Titrimeter can detect water content as low as 7 ppm, which is not visible even to human eye.

### ■ NEUTRALISATION VALUE (TOTAL ACIDITY)

The determination of neutralisation value is the most convenient and direct method of assessing the chemical aging of an oil. The acid products are formed by oxidation of the oil and actively encourage deterioration of Insulating Paper and Press Board used in the manufacture of transformer.

### ■ INTERFACIAL TENSION

Interfacial Tension value of oil against water is highly advanced and sophisticated test for determination of presence of polar contaminants in oil. Contamination by polar material accelerates oxidation of oil and subsequent overheating and failure of the transformer. It also affects Electric Strength.

### ■ DIELECTRIC DISSIPATION FACTOR (TAN DELTA)

An Extermely sensitive test to determine the presence of soluble contaminants and the power losses in the transformer.

### ■ RESISTIVITY

As contamination of oil increases it's resistivity decreases. Decreased resistivity indicates presence of cold precipitable material, water and other contaminants.

### ■ FLASH POINT

Flash point of an oil is the lowest temprature at which the vapour of the oil gets ignited. Insulating oil during use undergoes chemical changes that may lower the flash point of the oil. Lower Flash Point can result in fires.

### ■ SEDIMENTS

Sediment is any substance which is insoluble after dilution of the oil with n-Heptane. The presence of sediments reduces the electric strength of the oil and in addition the deposits hinder heat exchange, thus encouraging further deterioration of the insulating material.

### ■ DISSOLVED GAS ANALYSIS

The faults in power transformers such as arcing, over heating, partial discharge, etc. result in abnormal electrical and chemical disturbances. These disturbances are the main cause for liberation of gases. The gas chromatography analytical technique for gas analysis gives qualitative and quantitative inforamation enabling a precise definition of the type of fault and its location. The faults in power transformers even at incipient stage may liberatre gases slowly, but this will not operate the Buchholtz or gas relay, instead, the gases get dissolved in the oil. A quantitative and qualitative analysis of this oil sample containing minute quantities of gases, taken from different parts of the transformer, could help in taking preventive action, much before the fault occurs in the transformer. **A software developed by AES Laboratory predicts such failures based on the level of gases evolved.**