



# **TRANSFORMER OIL ANALYSIS LABORATORY**



# TRANSFORMER OIL ANALYSIS **LABORATORY**

## Presentation Catalog



## IMPORTANCE OF THE ANALYSIS OF TRANSFORMER OILS

The more guiding blood analyzes are in the follow-up of human health, the more guiding electrical, physical, chemical tests and dissolved gas analyzes are in the follow-up of the transformer.

Mineral oils, which provide insulation in transformers and undertake the task of cooling, deteriorate chemically over time, either as a result of discharge between the active elements of the transformer due to various reasons, and as a result of air exchange caused by temperature differences depending on the load.



**KESİR** is at your service for oil sampling and testing needs of your transformers with competent personnel, first accredited laboratory in Turkey and 23 years of experience .

We are always working by "Security First for Zero Incident" principle with OHSAS 18001 standard.

We are the first mineral oil analysis laboratory in Turkey to have TS EN/ISO 17025 Türkak Accreditation

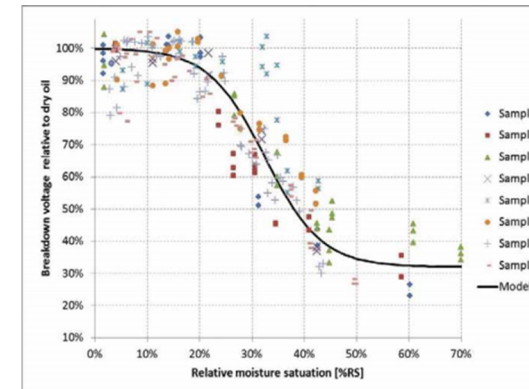
ISO 9001, ISO 14001 and ISO 10002 systems support us to achieve our Quality, Customer Satisfaction and HSE goals .

### Taking Oil Sample

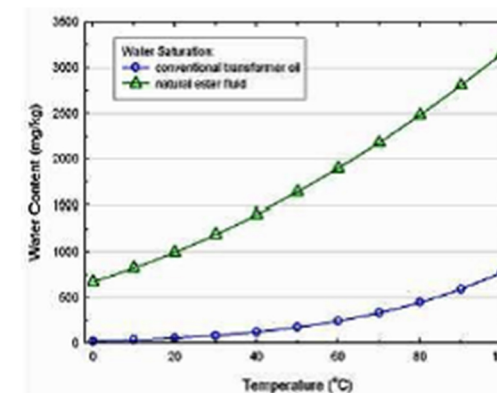
If we want to learn about and recognize a whole item, we can find the same information integrity in its smallest piece. For this purpose, to analyze a substance, a sufficient amount of that substance is called a sample. For this reason, the necessary rules should be followed and due care should be taken while taking samples. Samples are taken in accordance with ASTM D 923 and IEC 60567 Standards and brought to our laboratory in special transport packages to be tested. Since the samples represent all the substances, the oil sample will also represent all the oil in the transformer.

## Dissolved Gas Analysis (DGA) Tests

Gas analysis are quite important for the early detection of damage, fault detection and transformer failures that may occur in the future with the routine checks. Gas analysis give important findings for determining causes for faults that could happen or already happened. The purposes of gas analysis are to control new and repaired transformers, determine faults occurred during operation and get early warning from transformers in operation.



The Relationship Between Breakdown Voltage/ Water Amount



Relationship Between the Water Amount and Temperature

### The Importance of the Total Amount of Water in the Transformer;

- ✓ The total water content increased in the transformer, the dielectric strength of the insulation system begins to fall.
- ✓ Also, the water acting as a catalyst, accelerates the deterioration of oil, paper and other solid dielectrics.
- ✓ For this reason, Water Amount Measurement should be made at certain periods.



## Dielectric Breakdown Measurement

It is the ability of oils to withstand electrical voltage. A low value indicates the presence of water and water particles in the oil. One of the safest and healthiest way to learn the condition of the insulating fluid is to check the dielectric breakdown. The dielectric breakdown test is an essential item in the maintenance program of all devices containing insulating oil. In order to get the maximum efficiency from this test, it should be done at least once, preferably twice a year, and the results should be carefully recorded to be prepared for sudden changes.



Water Amount Test

The water the gets and formed inside transformer stays inside oil or insulation paper. The total water content increased in the transformer, the dielectric strength of the insulation system begins to fall. Also, the water acting as a catalyst, accelerates the deterioration of oil, paper and other solid dielectrics.



Inner Surface Tension Test

At inner surface tension test, the interfacial tension between two dense phase is measured . In our laboratory the boundary between oil and water surface force is measured.This test is sensitive to contamination and the presence of oxidation products. For new oils, high values indicate purity and low levels indicate contamination. It is nversely proportional toAcidity. Therefore as the acidity level increases, the inner surface tension decreases.The unit is dyn/cm and this value depends on contamination and oxidation of oil.

Power Factor Test

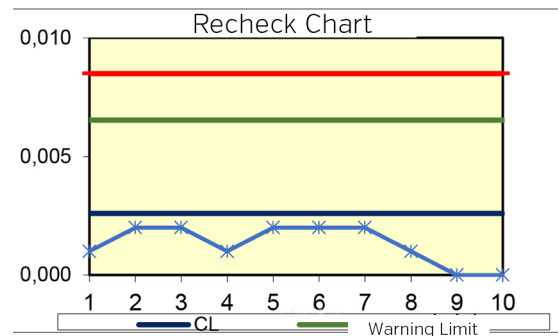
Power factor of an oil [ASTM 0924] is the ratio of real power to apparent power. In a transformer, a high power factor is usually water, oil and oxidized cellulose paper degradation as a result of polar contaminants, such as insulation oil is an indication that a significant deterioration in the process .

Tested Materials	Services Provided [Tests Performed]	Test Method National,International Internal Standards
Oily Type Transformer And	Sampling	ASTM-D923 IEC 60567
Transformer Insulating Oils	Dissolved Gas Analysis [DGA]	ASTM-D3612 IEC 60567
Transformer Insulating Oils	Power Factor Measurement	ASTM-D924 IEC 60247
Transformer Insulating Oils	Dielectric Breakdown Measurement	IEC 60156
Transformer Insulating Oils	Water Amount Measurement	ASTM-D1533
Transformer Insulating Oils	Acidity Measurement	IEC 62021-1
Transformer Insulating Oils	Internal Surface Tension Measurement	ASTM-D971
Transtormer Insulating Oils	Color Determination	ASTM-D1524
Transformer Insulating Oils	Specific Density Measurement	ASTM-D1298
Transformer Insulating Oils	Flash Point Determination	ASTM-D92
Transformer Insulating Oils	Furan Analysis	ASTM-D5837
Transformer Insulating Oils	Corrosive Sulfur Analysis	ASTM-D 1275 / B
Transformer Insulating Oils	Determination and evaluation of limits in the results obtained from the tests	IEC 602296 IEC 60422 IEC 60599



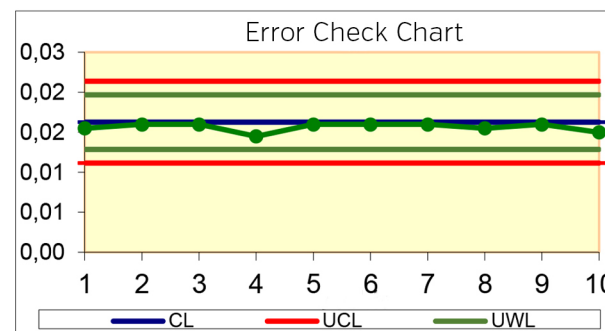
## Density Test

Density is the mass per unit volume of a substance .In transformers working in cold climate zones, high density oils generally causes problems . When the transformer deenergised, water collected at the bottom of the tank freezes and ice crystals form in the oil. If the density of oil is higher than ice crystals, the ice pieces starts to flow at the surface of water. When the transformer starts to work, ice pieces melt and cause shortcuts in energised zones. Therefore lower density oils are preferred at cold climate zones. Density is measured by Hydrometer.



**Kesir Experiment Laboratory** continues its services as a laboratory that fulfills the requirements of the TS EN / ISO 17025 Standard, constantly improves its quality system, works without compromising the principle of customer orientation, and keeps the quality of impartiality and service at the highest level.

Kesir Experiment Laboratory works with an expert and experienced staff from sampling to performing analyzes and reporting. For detailed information, you can reach us at [www.kesir.com.tr](http://www.kesir.com.tr).

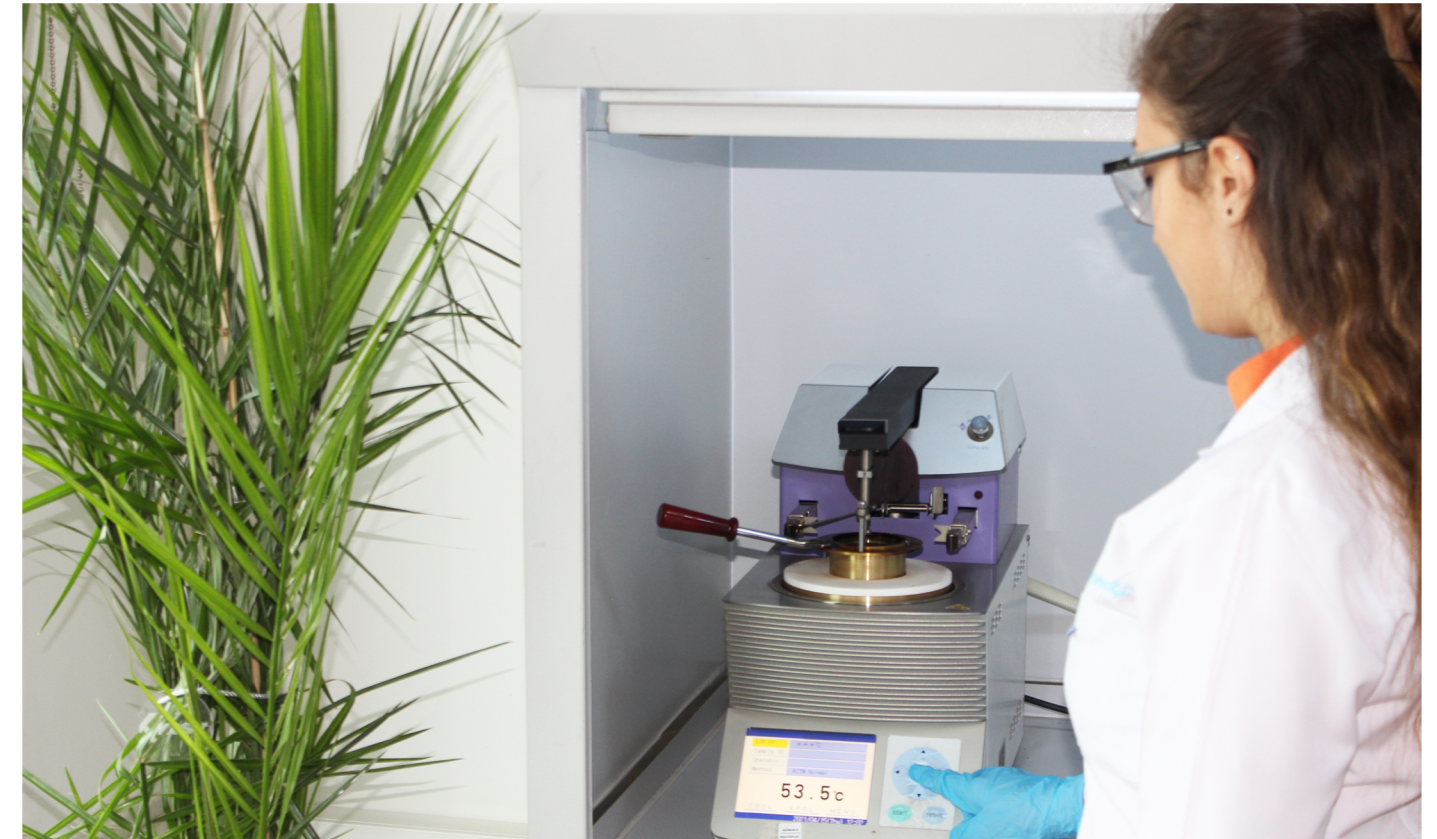


## Flash Point Test

Flash Point gives important information about the Flammability of the transformer. This test is not a routine test for transformers in operation. However, if the oil is changed, failure happened or there is unusual smell at oil the flashpoint should be tested. Extremedecreases at flash point indicates that flammable materials formed in oil.

## Color and Appearance Test

Does not show the quality of the new oil. Darkening of the color in oil in service indicates pollution and/or degradation . Oil must be clean and clear. As the amount of water in the oil increases, the transparency of oil gets blurred . If the image is fuzzy and in the service of an oil breakdown voltage is normal, the cause of blurry image is the mud that formed by oxidation .



### The Importance of Flash Point Measurement ;

- ✓ Flash Point is the highest temperature at which oil vapor can burn.
- ✓ It indicates the presence of flammable, volatile and light substances in the oil.
- ✓ Transformers operating in hot environments require oils with high flash points.
- ✓ If the flash point of the oil is too low, it indicates the formation of flammable products.
- ✓ Therefore, it is especially important in terms of security.

## Acidity Measurement

It is the measurement of the amount of acid in the oil. High values indicate that the oil is contaminated with foreign substances or is subject to oxidation. It causes corrosion of metals and wear of cellulose part. It prevents heat transfer. These substances impair the electrical properties of the oil.



## Our References

**ENKA**



**ZORLU**

**ENERJİSA** NETHERLANDS

**BAYMİNA ENERJİ**

TURKEY  
**LimakPort**  
iskenderun

YENİKÖYKEMERKÖY

**İSKEN**

**Cargill**

**ENTEK**

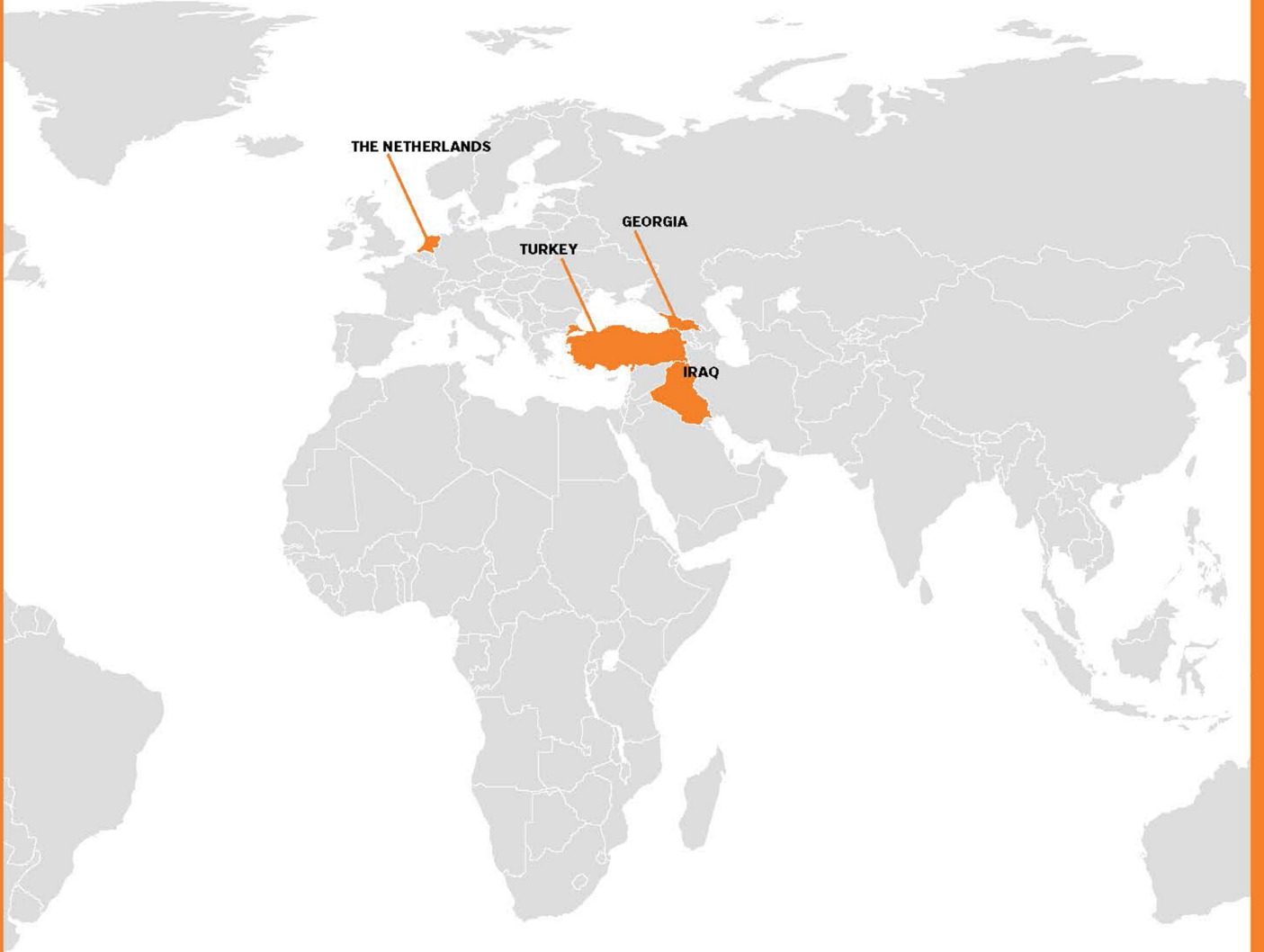
**ciner**

**HEAŞ** Limak

**BEST**







### Kesir Europe

Mariniersweg 359,  
3011 NM  
Rotterdam / Holland

### Kesir Georgia

Old Tbilisi District  
Chiqobaa str., No 55  
Tbilisi /Georgia

### Kesir Iraq

30mt. St. Opposite  
Shereton Hotel  
Erbil / Iraq

### Headquartes

Şerifali Mahallesi  
Hendem Caddesi  
No:38/2 Ümraniye  
İstanbul / Türkiye

[www.KESIR.com.tr](http://www.KESIR.com.tr)

[info@kesir.com.tr](mailto:info@kesir.com.tr)

[linkedin.com/company/kesir](https://www.linkedin.com/company/kesir)



T: +90 216 466 43 06 (pbx) F: +90 216 466 43 10