



**Technical Specifications of a Device
For measuring the Loss Factor (tan delta) of Transformer Insulating Oil**

According to method IEC 247

- Part I. Technical requirements**
- Part II. Data to be included in the offer**
- Part III. Special requirements**



Part I. Technical requirements

The device will be suitable for quality control of transformer insulating oil, regarding their degree of aging or the content in admixture produced during operation (e.g. oxidation products, varnishes etc.)

Therefore, the device will be suitable for measuring the loss factor (tan delta) and the relative dielectric constant (ϵ_r) of the insulating oil (using AC testing voltage), as well as for measuring the resistance of specified volume (ρ) (using DC testing voltage), related to the presence of free ions in the insulating medium.

Measuring of the above quantities will be automatic and according to the procedure introduced by the international standards. The device must offer programs for automatic measurement of all three aforementioned quantities according to IEC 247 / VDE 0380 – II – 1983, at least.

A.C. technical characteristics Q 0...2000 V / 50 Hz & 60 Hz

D.C. Testing Voltage : 0.....(\pm) 500 V

Tan delta measurement : up to 4,0 with a detail of 1×10^{-5}

Measurement of (ϵ_r) : 0...10,0

Measurement of (ρ) : 0...20 T Ω X m

Measurement of temperature : 0...120o C

Accuracy of measurements : 1% or better

The device will have a built-in circuit for inductive heating of the testing canister up to 120o C, at least

The device will have an built-in printer for printing the measurements

Power feed : 220V / 50 Hz

Weight less than 35Kg

Accessories:

The device will be accompanied by the following:

1. 2 pcs of testing canister for insulating oil samples, with the following characteristics:
 - Canister with three electrodes, for measuring very low values of tan delta
 - Canister suitable for measuring all the aforementioned quantities (tan delta, ϵ_r , ρ).
 - Canister supplied with valve, for continuous follow of oil.
 - Canister suitable for operation in temperature up to 120^o C and testing voltage up to 24kV.
2. Temperature sensor for measuring the canister temperature
3. External circuit for controlling the device measurement accuracy
4. Power cord.



ΑΔΜΗΕ

Part II. Data to be included in the offer :

1. Full description of the device, including all the technical characteristics. The offer will be accompanied by illustrated technical brochures including all the device characteristics.
2. The supplier must include, in the technical offer, a list of all clients (names, addresses, fax numbers) using the same device.
3. List with the proposed spare parts, for three years of operation of the device offered. The list will not include prices of the spare parts. An identical list, including spare parts prices must be included in the financial offer. The prices of spare parts will not be estimated for the financial classification of offers.

Part III. Special requirements:

- The supplier, after signing the contract will have to:
 1. Fully install the device.
 2. Prove the proper operation of the device in the laboratory, within one month after the arrival of the device in the laboratory of ADMIE.
 3. Prove the repeatability of each measurement, applying the requested methods for a satisfactory number of oil samples (at least 10).
 4. The device will be checked against the specified characteristics. In case of not fulfilling even one of the characteristics, then the device will not be accepted.
 5. The supplier will be obliged to provide full technical support for maintenance and proper operation of the device.
 6. There will be full coverage of spare parts for a period of five years. The supplier will be obliged to supply ADMIE with all the requested spare parts, within two months upon request.
 7. The device will need to be supplied with CE certification and the manufacturer must also be certified accordingly.
- The supplier will be obliged to deliver, along with the device, the manuals in both English and Greek language. The manuals must include full description of the device operation, as well as maintenance and tuning in case of improper operation
- After the successful installation and inspection of the device, the contracted price will be paid and the guarantee period will be initiated. The guarantee period will be covered by a letter of guarantee of 10% of the contracted price. The letter of guarantee will be returned to the supplier after the expiry of the guarantee period, unless forfeited for any reason. The guarantee period will have a duration of at least two years.