



INSULATING OIL DIELECTRIC BREAKDOWN TESTER

Insulating Oil Dielectric Breakdown Tester TT-1816

Insulating Oil Dielectric Breakdown Tester TT-1816 conforms to ASTM D1816 Standard Test Method for Dielectric Breakdown Voltage of Insulating Oils of Petroleum Origin Using VDE Electrodes, ASTM D877 Standard Test Method for Dielectric Breakdown Voltage of Insulating Liquids Using Disk Electrodes, and IEC 60156 Insulating Liquids—Determination of the Breakdown Voltage at Power Frequency.

Oils that combine a high flashpoint with high dielectric strength have long been used as an insulating medium in transformers, switchgear, and other electrical equipment. To ensure that the dielectric strength of the oil does not deteriorate, proper maintenance is essential, and the basis of proper maintenance is testing. For many electrical systems and enterprises, inner insulation is mostly oil-insulated. The oil dielectric strength test is one of the essential routine tests.

APPLICATIONS

The Torontech TT-1816 is a fundamental diagnostic tool for determining the dielectric breakdown voltage of insulating liquids per key standards like ASTM D1816, D877, and IEC 60156. This test provides the most important measure of an oil's ability to act as an insulator and is a direct indicator of contamination by water or conductive particles. It is the frontline test for assessing the health of oil in high-voltage equipment.

This necessary analysis is important for the safety and reliability programs in:

- **Electric Power Utilities:** Used for routine, in-field, and laboratory testing of transformers, switchgear, and circuit breakers to enable predictive maintenance and prevent catastrophic failures that can lead to grid outages.
- **Transformer & Switchgear Manufacturers:** A mandatory quality control step to certify that new electrical apparatus meets stringent dielectric performance standards before shipment and commissioning.
- **Industrial & Commercial Maintenance:** For in-house maintenance teams at large facilities like data centers, hospitals, and manufacturing plants to monitor the health of their important power assets and avoid costly unplanned

downtime.

- **Electrical Service & Repair Companies:** As a primary diagnostic instrument for assessing equipment condition, guiding maintenance decisions, and validating the success of oil reclamation or repair work.

FEATURES

- Large-capacity single-chip microcomputer control ensures stability and reliability.
- Built-in wide-range WDT prevents system deadlock.
- Supports multiple operations, including standard and customized options.
- One-time cast special glass oil cup prevents unexpected interferences like oil leakage.
- Unique high-voltage side sampling design allows test values to enter the A/D converter directly, avoiding errors from the analog circuit and providing more accurate measurements.
- Features overcurrent, overvoltage, and short circuit protection, along with strong anti-interference ability and good electromagnetic compatibility.
- Portable design allows convenient operation both indoors and outdoors.
- Ensures reliable, reproducible measurements with consistent results across multiple tests, thanks to a short switch-off time of less than 10 μ s.

THEORY & METHOD

An insulating oil dielectric breakdown tester measures the electrical strength of transformer and switchgear oil. The test shows how much voltage the oil can withstand before it conducts, which is a direct indicator of the oil's condition and its ability to insulate live equipment.

How the Breakdown Test Works

A sample of oil is placed in a test cell between two electrodes separated by a precise gap. The instrument applies an alternating voltage that rises steadily until the oil can no longer resist it and an electric arc jumps across the gap. The voltage at the instant of that arc is the breakdown voltage.

What the Result Reveals

Clean, dry oil withstands a high voltage before breaking down. Moisture, dissolved particles, and aging products lower the breakdown voltage, so a low result warns that the oil needs filtering or replacement. The test follows methods such as ASTM D877, ASTM D1816, and IEC 60156, which fix the electrode shape, gap, and voltage rate so results are comparable and dependable.

TECHNICAL SPECIFICATIONS

1. Voltage Booster Capacity: 1.5 kVA
2. Voltage Ramp Rate: 0.5 kV/s, 1.0 kV/s, 2.0 kV/s, 3.0 kV/s, 5.0 kV/s (optional)
3. Output Voltage: 0 to 100 kV
4. Power Distortion Rate: <1%
5. Display Mode: Large LCD display
6. Electrode Gap: Standard 2.5 mm
7. Dimensions: 409 x 393 x 388 mm
8. Weight: 29 kg
9. Ambient Temperature Requirement: 0 to 40°C

10. Relative Humidity: $\leq 85\%$

11. Rated Voltage: AC 220V $\pm 10\%$, 50Hz $\pm 10\%$ (110V also available)

12. Power Consumption: $< 200W$

Differences between three major standards			
	ASTM 877	ASTM D1816	IEC 60156
Electrode type	Disk	VED	Ball or VDE
Electrode gas	2.54mm	1 or 2mm	2.5mm
Stirring	None	Continuous with impeller	Optional with magnetic stirring bar
Voltage rise rate	3kV/s	0.5kV/s	2kV/s
Breakdown value	Mean of 5 measurements	Mean of 5 measurements	Mean of 5 measurements

Packing List	
Main Unit	1 set
Oil cup	1 set
Power cord	1 piece
Standard gauge	1 piece
Fuse, 3A	2 pieces



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