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CEB
SPECIFICATION

TRANSFORMER OIL BREAKDOWN VOLTAGE TEST SET

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SPECIFICATION FOR TRANSFORMER OIL BREAKDOWN VOLTAGE TEST SET

1.0 SCOPE

This specification covers the general requirements of the design and manufacture of Transformer Oil Breakdown Voltage Test Set to be used in determining the dielectric breakdown voltage at power frequency of insulating liquids.

2.0 SYSTEM PARAMETERS

(a)	Nominal voltage (U)	230V/400V
(b)	System highest voltage (U_m)	240V/440V
(c)	System frequency	50 Hz
(d)	Method of earthing	Effectively earthed
(e)	System faults level	25 kA
(f)	Fault duration	1s

3.0 SERVICE CONDITIONS

(a)	Annual average ambient temperature	30 °C
(b)	Maximum ambient temperature	40 °C
(c)	Maximum relative humidity	90%
(d)	Environmental conditions	Humid tropical climate with heavily polluted atmosphere
(e)	Operational altitude	From M.S.L. to 1000 m above M.S.L.
(f)	Isokeruanic (Thunder days) level	100 days

4.0 APPLICABLE STANDARDS

The Transformer Oil Breakdown Voltage Test Set supplied shall be preprogrammed atleast in accordance with the latest editions of the standard test methods specified in IEC 60156 and amendments thereof.

5.0. BASIC FEATURES

The Transformer Oil Tester shall be capable of measuring dielectric breakdown voltage of all liquids with nominal viscosity up to $350mm^2s^{-1}$ at 40°C. The device shall be portable and the electrical apparatus shall consist of Voltage Regulator, Step Up Transformer, Switching System and Energy Limiting Device. It shall be possible to operate the equipment to achieve a test voltage of 60kV. Test results shall be printed using an integrated printer attached to the device.

5.1 Power Supply

It shall be possible to operate the Transformer Oil Tester from 230V(±10%), 50Hz, single phase power supply & rechargeable batteries. The batteries shall be standard type & readily available in market. The battery charger shall be included in the complete package. Over current protection (fuse) shall be available for the power supply.

5.2 Construction

The test set shall have a steel casing with carrying handles fitted at each side.

5.2.1 Test Chamber

Test Chamber shall be of molded plastic construction with hinged polycarbonate cover.

The hinged cover to the test chamber shall be interlocked so that high voltage cannot be applied to the test chamber unless the interlock is closed. In case that the interlock released during the oil testing sequence, the high voltage shall be automatically cut off and the test shall be aborted. There shall be an indication to show that the test has been interrupted due to the release of

interlock. The mains supply shall still be on, and on/off switch shall be illuminated.

5.2.2 Test Vessel

The Test Vessel construction shall be in accordance with IEC 60156 and shall be fitted with spherical electrodes of 12.5mm to 13mm diameter. Test Vessel shall have the facility for charging Spherical and Partially Spherical electrode types. These electrodes shall be made either of brass, bronze or austenitic stainless steel. It shall be possible to set gap between electrodes and a set of spacing gauge for this purpose shall be supplied with the equipment.

The electrodes of the test vessel shall be automatically connected to the cradle terminals of the equipment when the vessel is placed in the test position.

5.2.3 Test Circuit

Test Circuit shall be controlled by microprocessors and shall have facility for pre-programmed tests, menu selection of functions and memory storage of test results.

5.2.4 Stirring

A two bladed impeller and magnetic bar shall be provided for stirring the specimen sample and shall be in accordance with the clause 4.3 of IEC 60156.

5.2.5 Control Panel and Display

All the standard functionalities available with the device shall be able to control through the control panel.

A suitable clear and bright display with backlight shall be provided giving full information in alpha numeric form. At least all the basic information regarding the tests carried out shall be indicated in the display.

5.3 Specimen Testing

The test set shall be easy to operate and shall require only a minimum of training to do so. The menus and the instructions on the display shall be straightforward and simple to follow. The tests shall be fully automatic. The operator shall have to simply prepare the test vessel, load it with oil, place it in the test chamber, select the appropriate standard for the test and then start the test sequence. The equipment shall carry out the test automatically and sequence of tests shall be decided by the pre selected standard.

It shall be possible to end the test during sequence and stop printing during the printing process.

At the completion of test the respective PASS/FAIL screen shall be presented. Operation of a key shall make it possible to start another test.

5.4 Programmable Test Methods

Preprogrammed test methods available with the device shall be atleast in accordance with the standard test method stipulated in Clause 4. Additional standard test methods offered by the manufacturer shall be indicated in Schedule of Guaranteed Technical Specifications in Annex-A.

The device may have fully programmable custom sequences, in addition to the preprogrammed test methods, which shall be stored within the memory of the test set.

Two types of straight forward proof (withstand) testing shall be available.

1. Subject the oil sample to a specified voltage for a defined length of time (1 minute) to see if it will withstand that voltage. Voltage is removed after the defined time.

2. It shall be possible to further increase the voltage after the defined length of time until the breakdown or maximum possible voltage is reached.

5.5 Accessories Supplied with the Instrument

Manufacturer shall supply atleast following accessories along with the instrument;

(a) Mains supply lead
(b) Built in battery charger with rechargeable batteries
(c) Oil test vessel fitted with spherical electrodes
(d) Two partially spherical electrodes
(e) Stirring arrangements as per clause 5.2.4
(f) Electrode spacing gauge set for 2.5mm gap.
(g) Protective cover
(h) 10 nos. of spare fuses.

6.0 QUALITY ASSURANCE

The manufacturer shall possess ISO 9001:2008 Quality Assurance Certification valid throughout the delivery period of this bid, for the manufacture of Transformer Oil Breakdown Voltage Test Sets for the plant where manufacturing is being done. The Bidder shall furnish a copy of the ISO certificate certified as true copy of the original by the manufacturer, along with the offer.

7.0 ADDITIONAL REQUIREMENTS

7.1 Manufacturing Experience

The manufacturer shall have minimum of fifteen (15) years experience in manufacturing similar type of oil testing equipment. In addition, minimum of ten (10) years experience shall be in manufacturing similar type of oil testing equipment for orders from outside the country of the manufacturer. Manufacturer shall furnish a list of purchasers with year and quantity of the product offered with the offer to prove his manufacturing experience.

7.2 Warranty

Warranty period of at least one year after the delivery against design and manufacturing defects shall be applied for the equipment and spares supplied. Manufacturer shall agree to supply such defective parts or rectify such defects on free of charge during the warranty period.

Manufacturer shall guarantee that the spare parts are available for at least 10 years from the date of delivery of the equipment.

8.0 TESTING

Type test reports to prove performance of the plant/equipment shall be submitted with the offer and shall be from an **accredited independent testing laboratory acceptable to the CEB**. Proof of accreditation by a national/ international authority shall be forwarded with the offer. Test reports shall be complete including all the pages as issued by the testing authority. Type test reports shall be in English language. Parts of test reports shall not be acceptable.

9.0 INFORMATION TO BE FURNISHED WITH THE OFFER

The following shall be furnished with the offer.

(a) A comprehensive catalogues describing the instrument offered, including the model No.
(b) Operation manual with operational instructions of the equipment supplied.
(c) Type Test Certificates in accordance with the clause 8.
(d) Duly filled and signed Guaranteed Schedule of Technical Particulars.

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(e) Documents to prove manufacturer's experience in accordance with Clause 7.1.
(f) ISO 9001:2008 Quality Assurance Certificate in accordance with clause 6.

Failure to furnish the above information will result in the offer being rejected.

10.0 ANNEX

Annex – A : Schedule of Guaranteed Technical Particulars

Annex – B : Non-Compliance Schedule

Annex- A

SCHEDULE OF GURANTEED TECHNICAL PARTICULARS

(Following Information shall be furnished with the offer)

		CEB Requirement	Offered
1.	Name of the Manufacturer		
2.	Country of Origin		
3.	Model		
4.	Output Voltage (Maximum)	60kV	
5.	Power Supply	230V AC, Single Phase, 50Hz	
6.	Built-in battery charger and Rechargeable batteries	Yes	
7.	Possible adjustment of rate of rise of output voltage	0.5kV/s to 5kV/s Continuous	
8.	Minimum Standard Tests Pre-Programmed	IEC 60156	
9.	Standard Tests Pre-Programmed in addition to test method specified in Clause 4		
10.	Electrode types provided	Spherical and Partially Spherical	
11.	Stirring arrangement provided	Two bladed impeller and magnetic bar as per IEC 60156	
12.	No. of fully programmable custom test sequences provided		
13.	Custom Test Parameters (if provided)		
	(a) All Parameters Settable	Yes	
	(b) Number of tests	1-99	
	(c) Initial Stand Time	0-99min	
	(d) Voltage rate of rise	0.5kV/s to 5kV/s	
	(e) Stir Time	0-99min	
	(f) Intermediate stand Time	0-99min	
14.	Proof(Withstand Test) 1		
	Voltage rises at 2kV/s to user pre-set withstand voltage. Maintain there for 1 min. Voltage can be removed unless breakdown occurs		
15.	Proof(Withstand Test) 2		
	Voltage rises at 2kV/s to user pre-set withstand voltage. Maintain there for 1 min. Then rises at 2kV/s rate to maximum unless breakdown occurs		
16.	Display:	Suitable clear bright display with backlight giving alpha numeric information and kV test voltage.	
17.	Temperature Range		
	(a) Operating Range	0°C to 40°C	
	(b) Storage	-40°C to +70°C	

18.	Humidity Range		
	(a) Operating Range	80% RH at 40°C	
	(b) Storage	90% RH at 40°C	
19.	Warranty	1 year from delivery	
20.	Experience	15 Years	
21.	Dimension (W x H x B) in mm		
22.	Weight (kg)		

.....
Signature of the Manufacturer and seal

.....
Date

I/We certify that the above data are true and correct

.....
Signature of the Bidder and seal

.....
Date

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Annex – B

Non-Compliance Schedule

On this schedule the bidder shall provide a list of non-compliances with this specification, documenting the effects that such non-compliance is likely to have on the equipment life and operating characteristics. Each non-compliance shall be referred to the relevant specification clause.

Clause No.	Non-Compliance

.....
Signature of the Manufacturer and seal

.....
Date

I/We certify that the above data are true and correct

.....
Signature of the Bidder and seal

.....
Date

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