

Laboratory	C and I Calibrations Pvt. Ltd., J-448, Sitapura Industrial Area, Jaipur, Rajasthan		
Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Electrical Testing	Issue Date	29.11.2013
Certificate Number	T-2730	Valid Until	28.11.2015
Last Amended on	15.06.2015	Page	1 of 7

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
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AT LABORATORY & AT SITE

I. ELECTRICAL INDICATING AND RECORDING INSTRUMENTS

1. AC watthour and var-hour meters (class 0.2, 0.2s, 0.5, 0.5s, 1 & 2) (Energy meters)	AC Voltage Test	IS 13779: 1999 Clause 12.7.6.3 IS 14697:1999 Clause 12.7.6.3 IEC 62053-21 (2003) (Clause 7.4) IEC 62053-22 (2003) (Clause 7.4) IS 13010: 2002 Clause 11.10.3 CBIP publication no.304 (Clause 5.4.6.3)	Upto 4 kV
	Insulation Resistance Test	IS 13779: 1999 Clause 12.7.6.4 IS 14697: 1999 Clause 12.7.6.4 IS 13010: 2002 Clause 11.2 CBIP publication no.304 (Clause 5.4.6.4)	Test Upto 100 MΩ, Test Voltage 500 VDC
	Test on Limits of Errors	IS 13779: 1999 Clause 11.1 IS 14697: 1999 Clause 11.1 IEC 62053-21 (2003) (Clause 8.1) IEC 62053-22 (2003) (Clause 8.1) IS 13010: 2002 Clause 11.5.1 CBIP publication no.304 (Clause 5.4.6.4)	1Phase and 3 Phase Active & Reactive 40 V to 320 V 1 mA to 120 Amp. 0 to 360 °, 40 Hz to 70 Hz
	Test of Meter Constant/Registration	IS 13779: 1999 Clause 11.6 IS 14697: 1999 Clause 12.14 IEC 62053-21 (2003) (Clause 8.4) IEC 62053-22 (2003) (Clause 8.4) IS 13010: 2002 Clause 11.6 CBIP publication no.304 (Clause 5.6.6)	1Phase and 3 Phase Active & Reactive 40 V to 320 V 1 mA to 120 A 0 to 360 ° 40 Hz to 70 Hz

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	AC watthour and var-hour meters (class 0.2, 0.2s, 0.5, 0.5s, 1 & 2) (Energy meters)	Test of Starting Conditions	IS 13779: 1999 Clause 12.1 IS 14697: 1999 Clause 12.13 IEC 62053-21 (2003) (Clause 8.3.3) IEC 62053-22 (2003) (Clause 8.3.3) IS 13010: 2002 Clause 11.4 CBIP publication no.304 (Clause 5.6.5)	1 Phase and 3 Phase Active & Reactive 40 V to 320 V 1 mA to 120 A 0 to 360 ° 40 Hz to 70 Hz
		Test of No-load Condition	IS 13779: 1999 Clause 12.13 IS 14697: 1999 Clause 12.12 IEC 62053-21 (2003) (Clause 8.3.2) IEC 62053-22 (2003) (Clause 8.3.2) IS 13010: 2002 Clause 11.3 CBIP publication no.304 (Clause 5.6.4)	1 Phase and 3 Phase Active & Reactive 40 V to 320 V, 40 Hz to 70Hz
		Test of Repeatability of error	IS 13779: 1999 Clause 12.17 IS 14697: 1999 Clause 12.16 IS 13010: 2002 Clause 11.19 CBIP publication no.304 (Clause 5.6.9)	1Phase and 3 Phase Active & Reactive 40 V to 320 V 1 mA to 120 A 0 to 360 °, 40 Hz to 70 Hz
		Initial start-up of the energy meter	IS 13779: 1999 Clause 11.4.1 IS 14697: 1999 Clause 11.4.1 IEC 62053-21 (2003) (Clause 8.3.1) IEC 62053-22 (2003) (Clause 8.3.1) CBIP publication no.304 (Clause 5.6.5)	1 Phase and 3Phase Active &Reactive 40 V to 320 V 1 mA to 120 A 0 to 36 0° 40 Hz to 70 Hz

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	AC watthour and var-hour meters (class 0.2, 0.2s, 0.5, 0.5s, 1 & 2) (Energy meters)	Test of Power Consumption	IS 13779: 1999 Clause 9.1 IS 14697: 1999 Clause 9.1 IEC 62053-22 (2003) Clause 7.1 IEC 62053-21 (2003) Clause 7.1 IS 13010: 2002 Clause 11.8 CBIP publication no.304 (Clause 5.4.1)	1 Phase : 38.4 kW to 0.04W & 38.4 kVA to 0.04 VA and 3 Phase:115.2 kW to 0.12 W and 115.2 kVA to 0.12 VA 40 V to 320 V 1 mA to 120 A
		Verification of Average Frequency Slot	CBIP-304# (Clause 6.9) Central Electricity Authority Notification No:502/70/CEA/DP&D Dtd: 17/03/2006	---
		Verification of Reactive Energy Registration in Total, Low and High Varh Registers	CBIP-304 (Clause 6.9) Central Electricity Authority Notification No:502/70/CEA/DP&D Dtd: 17/03/2006	---

II. TRANSFORMER & REACTORS

1. Current Transformer	Verification of Terminal Marking & Polarity	IS 2705 (Part 1): 1992 Clause 8.2 IEC 60044-1 (2003) (Clause 10.1)	1 A to 2000 A primary, 1 A & 5 A secondary
	Limits of current error and phase displacement	IS 2705 (Part 2): 1992 Clause 3.3 IEC 60044-1 (2003) (Clause 11.1 & 11.2)	1 A to 2000A primary, 1 A & 5A secondary

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AT SITE

I. TRANSFORMERS AND REACTORS

1. Distribution Transformers Upto 1250 kVA	Measurement of short circuit impedance and load losses	IS 2026 (Part 1): 2011 Clause 10.4 IS 1180 (Part 1): 1989 Clause 16 IS 1180 (Part 2): 1989 Clause 16 IS 11171: 1985 Clause 20.1	15% 15 kW
	Measurement of no load losses and current	IS 2026 (Part 1): 2011 Clause 10.5	5 kW 50 Amps
	Temperature Rise Test	IS 2026 (Part 2): 2010 IS 1180 (Part 1): 1989 Clause 15 IS 1180 (Part 2): 1989 Clause 15.1 IS 11171: 1985 Clause 17	Upto 100 °C
	Induced AC Voltage Test	IS 2026(Part 3): 2009 (Clause 12.1) IS 11171 - 1985(Claude 15)	Upto 11000 V @ 100 Hz
	Separate source AC withstand voltage test	IS 2026 (Part 3): 2009 Clause 11 IS 11171: 1985 Clause 14.1	Upto 30 kV AC
	Measurement of Unbalanced Current	CBIP publication no 275	Upto 2 % of rated LV Current
	Measurement of Zero sequence impedance for 3 phase transformer	IS 2026 (Part 1): 2011 Clause 10.7 IS 1117: 1985	Upto 13 %

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2.	Distribution/Power Transformers upto 100 MVA 220 kV Class	Measurement of winding Resistance	IS 2026(Part 1): 2011(Clause 10.2) IS 1180: 1989 IS 11171: 1985 IEC 60076 – 2011	2 mΩ to 2 kΩ 10 mA to 10 A
		Measurement of voltage ratio and check of phase displacement (vector group)	IS 2026 (Part 1): 2011 Clause 10.3	Upto 2000 /1 All Vector Groups
		Measurement of insulation resistance to earth of the windings	IS 2026 (Part 1): 2011 Clause 10.1.3	Voltage:5 kV IR:1 TΩ
		Magnetic Balance Test at Low Voltage	CBIP publication no 295 (Clause 7.3 & 8.7)	230 to 250 V
		Magnetising Current at Low Voltage	CBIP publication no 295 (Clause 3.1.4) IS 2026 (Part 1): 2011	At 230 V,10 A

AT LAB

1 TRANSFORMERS AND REACTORS

1.	Distribution/Power Transformers upto 5 MVA	Short circuit impedance Load losses	IS 2026 (Part I): 2011 Clause 10.4 IS 1180 (Part I): 2014 Clause 21.2 IS 1180 (Part II):1989 Clause 6.8, 7.8, 8.8 IS 11171 : 1985 Clause 20.1	4 % to 10 % 40 W to 30 kW
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	Distribution/ Power Transformers Upto 5 MVA	No load loss	IS 2026 (Part I): 2011	10 W to 5 kW
		No load current	Clause 10.5	10 mA to 20 A
		Temperature Rise	IS 2026 (Part II): 2010 IS 1180 (Part I): 2014 Clause 21.2, 6.10, 7.10, 8.10 IS 1180 (Part II): 1989 Clause 17 IS 11171 : 1985	40 W to 30 kW 0.1 A to 200 A 30 °C to 85 °C
		Induced AC Voltage	IS 2026 (Part III): 2009 Clause 12.1 IS 11171 : 1985 Clause 15	460 V to 33 kV @ 100 Hz
		Separate source AC withstand voltage	IS 2026 (Part III): 2009 Clause 11 IS 11171 : 1985 Clause 14.1	3 kV to 70 kV ac
		Unbalanced Current	CBIP publication no. 275	0.1 % to 2 % of rated LV Current
		Zero sequence impedance for 3 phase transformer	IS 2026 (Part I): 2011 Clause 10.7 IS 11171 : 1985	4 % to 10 %
		Air Pressure	IS 180 (Part I): 2014 Clause 15.2, 21.5 IS 1180 (Part 2): 1989	0.1 kg/cm ² to 1 kg/cm ² 760 mm to 5 mm of Hg
		Vacuum	CBIP publication no. 295	
		Permissible Flux Density and Over fluxing	IS 1180 (Part I): 2014 Clause 6.9, 7.9, 8.9 CBIP publication no. 295	Upto 5 MVA

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	Distribution/ Power Transformers Upto 5 MVA	Sound Level	IS 1180: 2014 Clause 21.4 IS 2026 (Part 1): 2011 Clause 10.1.3 CBIP publication no. 295 IS 2026 (Part X): 2009 IS 13964 : 1994	40 dB to 110 dB
2.	Distribution/Power Transformers upto 5MVA 33kV Class	Winding Resistance	IS 2026 (Part I): 2011 Clause 10.2 IS 1180 (Part I): 2014 Clause 21.2 IS 11171: 1985 IEC 60076 : 2011	2 mΩ to 2 kΩ
		Voltage Ratio	IS 2026 (Part: I): 2011 Clause 10.3	1 to 2000
		Phase displacement (vector group)	IS 1180 (Part I): 2014 Clause 21.2, 6.5, 6.6. 7.5, 7.6, 8.5, 8.6	All Vector Groups
		Insulation Resistance of the windings to earth	IS 2026 (Part I): 2011 Clause 10.1.3	100 kΩ to 200 GΩ at 500 V to 5 kV
		Magnetic Balance Test at Low Voltage	CBIP publication no. 295 Clause 7.3, 8.7	230 V to 250 V
		Magnetizing Current at Low Voltage	CBIP publication no. 295 Clause 3.1.4 IS 2026 (Part I): 2011	At 230 V 10 mA to 10 A

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