

Laboratory C and I Calibrations Pvt. Ltd., J-448 Sitapura Industrial Area, Jaipur, Rajasthan
 Location 1: J-448 Sitapura Industrial Area, Jaipur, Rajasthan
 Location 2: J-306 Sitapura Industrial Area, Jaipur, Rajasthan

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-6711 (in lieu of T-2730)

Page 1 of 9

Validity 30.11.2017 to 29.11.2019

Last Amended on 25.07.2018

Sl.	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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ELECTRICAL TESTING

AT LOCATION 1 & AT SITE				
I.	TRANSFORMERS AND REACTORS			
1.	Current Transformer 1 A – 3200 A / 5 – 1A	Verification of Terminal Marking & Polarity	IS 2705 (Part 1) Cl. No. 8.2 IS 16227(Part 1) Cl. No. 7.3.6 IS 16227(Part 2) Cl. No. 7.3.6	1 A to 3200 A primary 1 A & 5 A secondary 1 A to 3200 A primary 1 A & 5 A secondary
		Limits of current error and phase displacement	IS 2705 (Part 2) Cl. No. 3.3 IS 16227(Part 1) Cl. No. 7.3.5 IS 16227(Part 2) Cl. No. 7.3.5	1 A to 3200 A primary 1 A & 5 A secondary 1 A to 3200 A primary 1 A & 5 A secondary
II.	MEASURING INSTRUMENTS- ELECTRICAL AND ELECTRONIC (STATIC) ENERGY METERS			
		ac Voltage Test	IS 13779 Cl. No. 12.7.6.3 IS 14697 Cl. No. 12.7.6.3	Upto 4 kV
		Insulation Resistance	IS 13779 Cl. No. 12.7.6.4 IS 14697 Cl. No. 12.7.6.4	Upto 100 MΩ, 500 V DC
		Limits of Errors	IS 13779 Cl. No. 11.1 IS 14697 Cl. No. 11.1	1 Ø and 3 Ø Active and Reactive 40 V to 320V 1 mA to 120 A Upto 360° 45 Hz to 55 Hz

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Certificate Number TC-6711 (in lieu of T-2730)

Page 2 of 9

Validity 30.11.2017 to 29.11.2019

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		Meter Constant	IS 13779 Cl. No. 11.6 IS 14697 Cl. No. 12.14	1 Ø and 3 Ø Active and Reactive 40 V to 320V 1 mA to 120 A Upto 360° 45 Hz to 55 Hz
		Starting Conditions	IS 13779 Cl. No. 12.14 IS 14697 Cl. No. 12.13	1 Ø and 3 Ø Active and Reactive 40 V to 320V 1 mA to 120 A Upto 360° 45 Hz to 55 Hz
		No-load Condition	IS 13779 Cl. No. 12.13 IS 14697 Cl. No. 12.12	1 Ø and 3 Ø Active and Reactive 40 V to 320 V 45 Hz to 55 Hz.
		Repeatability of error	IS 13779 Cl. No. 12.17 IS 14697 Cl. No. 12.16	1 Ø and 3 Ø Active and Reactive 40 V to 320V 1 mA to 120 A Upto 360° 45 Hz to 55 Hz
		Initial start-up of the energy meter	IS 13779 Cl. No. 11.4.1 IS 14697 Cl. No. 11.4.1	1 Ø and 3 Ø Active and Reactive 40 V to 320V 1 mA to 120 A Upto 360° 45 Hz to 55 Hz
		Power Consumption	IS 13779 Cl. No. 9.1 IS 14697 Cl. No. 9.1	1 Ø 0.04 W to 38.4 kW 0.04 VA to 38.4 kVA 3 Ø 0.12 W to 115.2 kW to

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-6711 (in lieu of T-2730)

Page 3 of 9

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				0.12 VA to 115.2 kVA 40 V to 320 V 1 mA to 120 A
		Verification of Average Frequency Slot	Central Electricity Authority Notification No:502/70/CEA/DP&D Dtd: 17/03/2006 Schedule Part II 1b	Qualitative
		Verification of Reactive Energy Registration in Total, Low and High Var Registers	Central Electricity Authority Notification No:502/70/CEA/DP&D Dtd: 17/03/2006 Schedule Part II 1b	Qualitative

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-6711 (in lieu of T-2730)

Page 4 of 9

Validity 30.11.2017 to 29.11.2019

Last Amended on 25.07.2018

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ELECTRICAL TESTING

AT LOCATION 2 & AT SITE				
I.	INDUCTORS AND TRANSFORMERS			
		Short circuit impedance and load losses	IS 2026 (Part 1) Cl. No. 10.4 IS 1180 (Part 1) Cl. No. 21.2c IS 11171, IEC 60076	4 % to 10 % 40 W to 30 kW
		No load losses and current	IS 2026 (Part I) Cl. No. 10.5 IS 1180 (Part I) Cl. No. 21.2d	10 W to 5 kW 10 mA to 20 A
		Temperature Rise	IS 2026(Part II) Cl. No. 5, 10.4 IS 2026 (Part I) Cl. No. 5.6 IS 1180 (Part I) Cl. No. 21.2, 21.3 b 6.10, 7.10, 8.10)	40 W to 30 kW 0.1 A to 200 A 30 °C to 85 °C
		Induced AC Voltage Test	(Cl. No. 12.1) IS 2026 (Part III) Cl. No. 12.1 IS 11171 Cl. No. 15 IS 1180 (Part I) Cl. No. 21.2f	460 V to 33 kV @ 100 Hz
		Separate source AC withstand voltage test	IS 2026 (Part III) Cl. No. 11 IS 11171 Cl. No. 14.1 IS 1180 (Part I) Cl. No. 21.2g	3 kV to 80 kV ac
		Unbalanced Current	CBIP publication no. GP 317: 2013	1 A to 10 A
		Zero sequence impedance for 3 phase transformer	IS 2026 (Part-I) Cl. No. 10.7 IS 11171 IS 1180 (Part I)	4% to 10%

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-6711 (in lieu of T-2730)

Page 5 of 9

Validity 30.11.2017 to 29.11.2019

Last Amended on 25.07.2018

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		Air Pressure	IS 1180 (Part 1) Cl. No. 15.2, 21.5, 21.5.1, 21.5.1.2, 21.5.2.1, 21.5.2.2, 21.5.3.1, 21.5.3.2) CBIP publication no 317: 2013 Cl. No. 17.3,3	0.1 kg/cm ² to 1 kg/cm ²
		Vacuum	IS 1180 (Part 1) Cl. No. 15.2, 21.5, 21.5.1, 21.5.1.2, 21.5.2.1, 21.5.2.2, 21.5.3.1, 21.5.3.2) CBIP publication no 317: 2013 Cl. No. 17.3,3	5 mm to 760 mm of Hg 0.006 bar to 1.01 bar
		Oil Leakage	IS 1180(part 1) Cl. No. 21.2j, 21.5, 21.5.1.3, 21.5.2.3, 21.5.3.3	0.1 kg/cm ² to 1 kg/cm ²
		Paint Adhesion	IS 1180 (Part 1) Cl. No. 21.4d ASTM D 3359	Qualitative
		Moisture Content of oil in the transformer	IS 1180 (Part 1) Cl. No. 21.4 e, IS 335:1993 Cl. No. 3.5 IS 2026 (Part I) IS 13567	0.01 mg/kg to 50000 mg/kg
		BDV in the transformer	IS 1180 (Part 1):2014 Cl. No. 21.4 e, (IS 335:1993 Cl 3.5) IS 2026 (Part I) IS 13567	Upto 100 kV
		Permissible Flux Density and Over fluxing	IS 1180 (Part 1) Cl. No. 6.9, 7.9, 8.9	Upto 5 MVA
		Sound Level	IS 1180:2014, Cl. No. 21.4 a IS 2026 : 2011 Part 1.	40 dB to 110 dB

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Page 6 of 9

Validity 30.11.2017 to 29.11.2019

Last Amended on 25.07.2018

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			Cl. No. 10.1.3 CBIP publication no 317: 2013 IS 2026 (Part10) : 2009 IS 13964 : 1994	
		Harmonics of the No Load Current	IS 2026 Part 1: 2011 Cl. No. : 10.6	1 to 40 % in Voltage & Current
		Winding Resistance	IS 2026 (Part I) Cl. No. 10.2 IS 1180 (Part 1) Cl. No. 21.2 a IS 11171 IEC: 60076	2 mΩ to 2 kΩ
		Voltage ratio and check of phase displacement (vector group)	IS 2026 (Part I) Cl. No.10.3 IS 1180 (Part 1) Cl. No. 21.2 b, 6.5, 6.6. 7.5, 7.6, 8.5, 8.6	1 to 2000 All Vector Groups
		Insulation resistance to earth of the windings	IS 2026 (Part I) Cl. No. 10.1.3, 16.6 IS 1180 (Part 1) Cl. No. 21.2 e	500 V to 5 kV 100 kΩ to 200 GΩ
		Magnetic Balance Test at Low Voltage	CBIP publication no 317: 2013	230 V to 250V
		Magnetizing Current at Low Voltage	CBIP publication no 317: 2013 IS 2026(Part-I):2011	At 230 V, 10 mA to 10A

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Page 7 of 9

Validity 30.11.2017 to 29.11.2019

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ELECTRICAL TESTING

AT SITE				
I.	TRANSFORMERS AND REACTORS			
1.	Distribution/Power Transformers Upto 100 MVA 220 kV Class	Winding Resistance	IS 2026 (Part I) Cl. No. 10.2 IS 1180 (Part 1) Cl. No. 21.2 a IS 11171 IEC: 60076	2 mΩ to 2 KΩ
		Voltage ratio and check of phase displacement (vector group)	IS 2026 (Part I) Cl. No.10.3 IS 1180 (Part 1) Cl. No. 21.2 b, 6.5, 6.6. 7.5, 7.6, 8.5, 8.6	1 to 2000 All Vector Groups
		Insulation resistance to earth of the windings	IS 2026 (Part I) Cl. No. 10.1.3, 16.6 IS 1180 (Part 1) Cl. No. 21.2 e	500 V to 5 kV 100 kΩ to 200 GΩ
		Magnetic Balance Test at Low Voltage	CBIP publication no 317: 2013	230 V to 250 V
		Magnetizing Current at Low Voltage	CBIP publication no 317: 2013 IS 2026 (Part 1)	At 230 V 10 mA to 10 A

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Page 8 of 9

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ELECTRICAL TESTING

AT LOCATION 2				
1.	TRANSFORMERS AND REACTORS			
1.	Distribution /Power Transformers , Upto 33 kV class	Full wave lightning impulse test for the line terminals (LI)	IS 2026-3 Cl. No. 13, 14 IEC 60076-3 Cl. No. 13 IS 1180-1 Cl. No. 21.3.a IS 11171 Cl. No. 16 IEC 60076-11 Cl. No. 21	Upto 300 kVp
		Chopped wave lightning impulse test for the line terminals (LIC)	IS 2026-3 Cl. No. 14 IS 1180-1 Cl. No. 21.3.a IEC:60076-3 Cl. No. 14 Table 4 of IEC 60076-11 CBIP 217:2013 Cl. No. 6.2	Upto 300 kVp
		Lightning impulse test for the neutral terminals (LIN)	IEC 60076-03 Cl. No. 13.3.2 IS 2026-03 Cl. No. 13.3.2 IS 1180-1 Cl. No. 21.3.a	Upto 300 kVp
2.	Current Transformer upto 33 kV	Lightning Impulse	IS 2705 (Part 1) Cl. No. 9.8 IS 16227-1 Cl. No. 7.2.3.2 IS 16227 (Part 4) Cl. No. 7.2.3 IS 16227 (Part 2) Cl. No. 7.2.3	Upto 300 kVp
		Chopped Impulse for external insulation	IS:2705(Part 1) Cl. No. 9.10 IS 16227 (Part 4) Cl. No. 7.4.1 IS 16227 (Part 2) Cl. No. 7.4.1 IS 16227 (Part 5) Cl. No. 7.2.3	Voltage 0 to 300 kVp

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Page 9 of 9

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3.	Potential Transformer up to 33 kV	Lightning Impulse Voltage Test on Primary Terminal	IS 3156 (Part 1) Cl. No. 9.6 IS 16227-1 Cl. No. 7.2.3.2 IS 16227 (Part 4) Cl. No. 7.2.3 IS 16227 (Part 3) CL. No. 7.2.3	Upto 300 kVp
		Chopped Impulse for external insulation	IS 3156 (Part 1) Cl. No. 9.8 IS 16227 (Part 4) Cl. No. 7.4.1 IS 16227 (Part 3) Cl. No. 7.4.1	Upto 300 kVp
II.	TRANSMISSION LINE EQUIPMENT AND ACCESSORIES			
1.	Insulator, Bushing upto 36 kV	Dry Impulse withstand voltage	IS 731 Cl. No. 10.3 IS 2544 Cl. No. 9.3 IS 9431 Cl. No. 9.2 IS 2099 Cl. No. 11.4	Upto 300 kVp
		Fifty percent Dry Impulse Flashover voltage	IS 731 Cl. No. 10.3.5 IS 2544 Cl. No. 9.3.6 IS 9431 Cl. No. 9.2 IS 2099 Cl. No. 11.4	Upto 300 kVp

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