



Federation for Development of Accreditation Services

SCOPE OF ACCREDITATION

Laboratory Name	M/s Rajasthan Test and Research Centre, Plot no.296, Sector-7, IMT Manesar, Gurugram, (Haryana)-122050, India		
Accreditation Standard	ISO/IEC 17025:2017		
Certificate Number	TL-101	Page No.:	1/12
Validity	17.06.2022 to 16.06.2024	Last Amended on

ELECTRICAL TESTING

Laboratory based Testing (Oil Immersed Distribution Transformers)

S. No.	Material/Products	Component/Parameter/ Characteristic tested	Test Method Specification against which tests are performed	Equipment Used
1.	Outdoor/Indoor Type Oil Immersed Distribution Transformers up to and including 2500 kVA,33 kV	Measurement of Winding Resistance	IS 1180(Part 1):2014 (RA 2019) IS 2026(Part 1):2011 IEC 60076 (Part 1):2011	Digital Micro- ohm Meter
		Measurement of Voltage ratio and check of phase displacement	IS 1180(Part 1):2014 IS 2026(Part 1):2011 IEC 60076 (Part 1):2011	Automatic Turn-Ratio Meter
		Measurement of Short Circuit Impedance (principal tapping, when applicable) and Load Loss at 50% and 100 % load	IS 1180(Part 1):2014 (RA 2019) IS 2026(Part 1):2011 IEC 60076 (Part 1):2011	Digital Power Meter
		Measurement of no-load loss and current	IS 1180(Part 1):2014 (RA 2019) IS 2026(Part 1):2011 IEC 60076 (Part 1):2011	Digital Power Meter
		Measurement of insulation resistance	IS 1180(Part 1):2014 (RA 2019) IS 2026(Part 1):2011 IEC 60076 (Part 1):2011	Digital Insulation Tester
		Induced over-voltage withstand test	IS 1180(Part 1):2014 (RA 2019) IS 2026(Part 3):2009 IEC 60076 (Part 3):2013	Motor Generator Set

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Accreditation Standard ISO/IEC 17025:2017

Certificate Number TL-101 Page No.: 2/12

Validity 17.06.2022 to 16.06.2024 Last Amended on

S. No.	Material/Products	Component/Parameter/ Characteristic tested	Test Method Specification against which tests are performed	Equipment Used
		Separate source voltage withstand test (Primary & secondary)	IS 1180(Part 1): 2014 (RA 2019) IS 2026(Part 3):2009 IEC 60076 (Part 3):2013	High-Voltage Test Set
		Pressure Test (Routine Test)	IS 1180(Part 1):2014 (RA 2019)	Pressure Gauge
		Oil leakage Test	IS 1180(Part 1):2014 (RA 2019)	Pressure Gauge
		Lightning Impulse Test	IS 1180(Part 1):2014 (RA 2019) IS 2026(Part 3):2009 IEC 60076 (Part 3):2013	Impulse Generator, Analyzer, Impulse Current Shunt
		Temperature rise test	IS 1180(Part 1):2014 (RA 2019) IS 2026(Part 2):2010 IEC 60076 (Part 2):2011	Temp Data logger/16 Channel & Glass Thermometer
		Pressure test (Type Test)	IS 1180(Part 1):2014 (RA 2019)	Pressure Gauge
		Determination of sound level	IS 1180(Part 1):2014 (RA 2019) IS 2026(Part 10):2009 IEC 60076 (Part-10)2016	Sound Level Meter
		No load current at 112.5 % voltage	IS 1180(Part 1):2014 (RA 2019)	Digital Power Meter

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Accreditation Standard ISO/IEC 17025:2017

Certificate Number TL-101 Page No.: 3/12

Validity 17.06.2022 to 16.06.2024 Last Amended on

S. No.	Material/Products	Component/Parameter/ Characteristic tested	Test Method Specification against which tests are performed	Equipment Used
		Paint adhesion test	IS 1180 (Part 1):2014 (RA 2019), ASTM D3359	Cutting Tool, Tape, Brush, Eyeglass Lenses.
		Oil BDV and moisture content of transformer oil	IS 1180(Part 1):2014 (RA 2019) IS 335:2018	Motorized Oil Test Set and Karl Fischer titrator
		Measurement of dimension and physical verification	IS 1180(Part 1):2014 (RA 2019)	Steel Scale, Measuring Tape
		Permissible flux density and over fluxing	IS 1180(Part 1):2014 (RA 2019)	Digital Vernier Caliper
		Measurement of zero- sequence impedance(s) on three phase transformers	IS:2026(Part 1):2011 IEC 60076-1:2011	Digital Power Meter
		Measurement of Harmonic on no-load current	IS:2026 (Part 1):2011 IEC 60076-1:2011	Digital Power Meter
		Measurement of dissipation factor tan delta of the insulation system capacitances	IS: 2026 (Part 1):2011 IEC 60076-1:2011	Capacitance & Ten-Delta Test Set
		Determination of capacitance winding to earth and between windings	IS: 2026 (Part 1):2011 IEC:60076-1:2011	Capacitance & Ten-Delta Test Set

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Accreditation Standard ISO/IEC 17025:2017

Certificate Number TL-101 Page No.: 4/12

Validity 17.06.2022 to 16.06.2024 Last Amended on

S. No.	Material/Products	Component/Parameter/ Characteristic tested	Test Method Specification against which tests are performed	Equipment Used
		Unbalance Current Test	CBIP Publication No.: 275 CBIP Publication No.: 317	Digital Power Meter, Clamp Meter
		Magnetic Balance Test	CBIP Publication No.: 275, CBIP Publication No.: 317	Digital Power Meter

Laboratory based Testing (Dry Type Power Transformers)

2	Dry Type Power Transformer up to 2500 kVA,33 kV	Measurement of Winding Resistance	IS: 2026(Part1):2011 IEC 60076(Part 1):2011 IS 11171:1985	Digital Micro- ohm Meter
		Measurement of Voltage ratio and check of phase displacement	IS: 2026(Part1):2011 IEC 60076(Part 1):2011 IS 11171:1985	Automatic Turn-Ratio
		Measurement of short circuit impedance (principal tapping, when applicable) and Load Loss at 50 % and 100 % load	IS: 2026(Part1):2011 IEC 60076(Part 1):2011 IS 11171:1985	Digital Power Meter
		Measurement of no- load loss and current	IS: 2026(Part1):2011 IEC 60076(Part 1):2011 IS 11171:1985	Digital Power Meter
		Measurement of insulation resistance	IS: 2026(Part1):2011 IEC 60076(Part 1):2011 IS 11171:1985	Insulation Tester

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Accreditation Standard ISO/IEC 17025:2017

Certificate Number TL-101 Page No.: 5/12

Validity 17.06.2022 to 16.06.2024 Last Amended on

S. No.	Material/Products	Component/Parameter/ Characteristic tested	Test Method Specification against which tests are performed	Equipment Used
		Induced over-voltage withstand test	IS: 2026: (Part 3): 2009, IEC 60076 (Part 3): 2013, IS: 11171: 1985	Motor Generator Set
		Separate source voltage withstand test (Primary & secondary)	IS: 2026: (Part 3): 2009, IEC 60076 (Part 3): 2013, IS: 11171: 1985	High-Voltage Test Set
		Lightning Impulse test	IS: 2026: (Part 3): 2009, IEC 60076 (Part 3): 2013, IS: 11171: 1985	Impulse Measuring & Analyzing System, Imp Impulse Current Shunt
		Temperature rise test	IS: 2026(Part 2):2010 IEC 60076 (Part 2):2011 IS: 11171:1985	Temp Data logger/16 Channel & Glass Thermometer
		Partial discharge measurement	IS: 11171:1985 IS: 6209: 1985 Annex A of IS: 2026 (Part 3):2009	PD Test Analyzer, PD Calibrator
		Determination of sound sound level	IS: 2026(Part 10):2009 IEC:60076(Part-10):2016 IS: 11171:1985	Sound Level Meter
		Measurement of zero- sequence impedance(s) on three phase transformer	IS: 2026(Part 1):2011 IEC:60076-1:2011	Digital Power Meter

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Accreditation Standard ISO/IEC 17025:2017

Certificate Number TL-101 Page No.: 6/12

Validity 17.06.2022 to 16.06.2024 Last Amended on

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		Measurement of Harmonic on no-load current	IS 2026 (Part 1): 2011, IEC: 60076-1: 2011	Digital Power Meter
		Measurement of dissipation factor tan delta of the insulation system capacitances	IS 2026 (Part 1): 2011, IEC: 60076-1: 2011	Capacitance & Ten-Delta Test Set
		Determination of capacitance winding to earth and between windings	IS 2026 (Part 1): 2011, IEC: 60076-1: 2011	Capacitance & Ten-Delta Test Set
		Unbalance Current Test	CBIP Publication No: 275 CBIP Publication No.: 317	Digital Power Meter, Clamp Meter
		Magnetic Balance Test	CBIP Publication No.: 275, CBIP Publication No.: 317	Digital Power Meter/ Multimeter
Laboratory based Testing (Transformers Oil)				
3	New Insulating Oils As per IS:335: 2018 New Insulating Oils As per IS:335: 2018	Viscosity	IS:1448(Part 25/sec 1):2018 ISO: 3104:1994	Digital Kinematic Viscosity Bath (RTRC-214), Low Temp Kinematic Viscosity Bath (RTRC-306)

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Laboratory Name M/s Rajasthan Test and Research Centre, Plot no.296, Sector-7,
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Accreditation Standard ISO/IEC 17025:2017

Certificate Number TL-101 Page No.: 7/12

Validity 17.06.2022 to 16.06.2024 Last Amended on

S. No.	Material/Products	Component/Parameter/ Characteristic tested	Test Method Specification against which tests are performed	Equipment Used
		Pour point	IS:1448(Part 10/sec 2):2013 ISO: 3016:1994	Automatic Cloud point & Pour point Apparatus (RTRC-213), Cloud and Pour Point Apparatus (RTRC-305)
		Water Content	IEC:60814: 1997 IS 13567:2018	Karl Fischer Titrator
		Breakdown Voltage	IS 6792:2017 IEC 60156:1995	Automatic Oil Test Set
		Density	IS:1448(Part 16):2014 ISO 3675:1998	Liquid Glass bath (Density Bath) Refrigerated
		Dielectric dissipation factor (DDF)	IS: 6262:1971 IS 16086:2013 (RA 2018) IEC: 61620:1998	Capacitance & Tan Delta Test set
		Particle Content	IS 13236:2013 IEC:60970: 2007	Particle counter
		Appearance	Clause 6.6 of IS:335:2018	Qualitative Test

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SCOPE OF ACCREDITATION

Laboratory Name M/s Rajasthan Test and Research Centre, Plot no.296, Sector-7,
IMT Manesar, Gurugram, (Haryana)-122050, India

Accreditation Standard ISO/IEC 17025:2017

Certificate Number TL-101 Page No.: 8/12

Validity 17.06.2022 to 16.06.2024 Last Amended on

S. No.	Material/Products	Component/Parameter/ Characteristic tested	Test Method Specification against which tests are performed	Equipment Used
		Acidity	IEC:62021-1:2003	Potentiometric Titrator
		Interfacial Tension (IFT)	ASTM D971:2020	Digital Surface Interfacial Tensiometer
		Total Sulphur content	ISO: 14596:2007 or ASTM D4294:2016 ASTM D129:2018	EDXRF
		Corrosive Sulphur	DIN: 51353:1985	Hot Air Oven
		Potentially corrosive Sulphur	IS: 16310:2017 IEC: 62535:2008	Copper Strip Corrosion Test Apparatus
		DBDS	IS:16497(Part 1)2017 IEC:62697-1:2012	Gas Chromatography Mass Spectrometer
		Inhibitors	IS: 13631:2017 IEC: 60666:2010	HPLC (High Performance Liquid Chromatography)
		Metal Passivator additives	IS 13631:2017 IEC: 60666:2010	HPLC (High Performance Liquid Chromatography)
		2-Furfuryl Alcohol(2- Furfural and related compound content)	IS: 15668:2006 IEC: 61198:1993	HPLC (High Performance Liquid Chromatography)

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Laboratory Name M/s Rajasthan Test and Research Centre, Plot no.296, Sector-7,
IMT Manesar, Gurugram, (Haryana)-122050, India

Accreditation Standard ISO/IEC 17025:2017

Certificate Number TL-101 Page No.: 9/12

Validity 17.06.2022 to 16.06.2024 Last Amended on

S. No.	Material/Products	Component/Parameter / Characteristic tested	Test Method Specification against which tests are performed	Equipment Used
		5-Hydroxymethyl-2-Furfural(2-Furfural and related compound content)	IS: 15668:2006 IEC: 61198:1993	HPLC (High Performance Liquid Chromatography)
		2-Furfural (2-Furfural and related compound content)	IS: 15668:2006 IEC: 61198:1993	HPLC (High Performance Liquid Chromatography)
		2-Furyl Methyl Ketone (2 Acetyl Furan)(2-Furfuraland related compound content)	IS: 15668:2006 IEC: 61198:1993	HPLC (High Performance Liquid Chromatography)
		5-Methyl-2-Furfural (2- Furfural and related compound content)	IS: 15668:2006 IEC: 61198:1993	HPLC (High Performance Liquid Chromatography)
		Oxidation Stability	Method C of IS: 12422:2017 IEC: 61125:1992	Oxidation Stability Test Apparatus
		a. Total acidity	As per 1.9.4 of IS:12422:2017 IEC: 61125:1992	Glass Burette A CLASS Capacity-1 ml Q 3 283Q
		b. Sludge	As per 1.9.1 of IS:12422:2017 IEC: 61125:1992	Weighing Balance
		c. DDF at 90°C	As per 1.9.6 of IS:12422:2017 IEC: 61125:1992	Capacitance & Tan Delta Test set

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IMT Manesar, Gurugram, (Haryana)-122050, India

Accreditation Standard ISO/IEC 17025:2017

Certificate Number TL-101 Page No.: 10/12

Validity 17.06.2022 to 16.06.2024 Last Amended on

S. No.	Material/Products	Component/Parameter / Characteristic tested	Test Method Specification against which tests are performed	Equipment Used
		Gassing Tendency	Method A of IEC: 60628:1985	Gassing Tendency Apparatus
		Flash Point	IS:1448(Part 21) ISO: 2719:2016	Pensky Marten flash Point Tester
		PCA Content	IP: 346:2015	Weighing Balance
		PCB Content	IS: 16082:2013 IEC: 61619:1997	Gas Chromatography Mass Spectrometer
4	Mineral Insulating Oils in electrical supervision and maintenance guidances as per IS: 1866:2017 or IEC:60422:2013	Color & Appearance	ISO: 2049:1996	Color Comparator
		Breakdown Voltage	IEC: 60156:2018	Automatic Oil Test Set
		Water Content	IEC:60814: 1997	Karl Fischer Titrator
		Acidity (Neutralization value)	IEC:62021-1:2003 IEC:62021-2:2007	Potentiometric Titrator
		Dielectric dissipation factor (DDF) and resistivity	IEC: 60247: 2004	Capacitance & Tan Delta Test set Resistivity (Million Mega Ohm Meter)
		Inhibitor content	IEC: 60666:2010	HPLC (High Performance Liquid Chromatography)
		Sediment/Sludge	Annex-C of IS:1866:2017 IEC: 60422:2013	Weighing Balance

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Accreditation Standard ISO/IEC 17025:2017

Certificate Number TL-101 Page No.: 11/12

Validity 17.06.2022 to 16.06.2024 Last Amended on

S. No.	Material/Products	Component/Parameter / Characteristic tested	Test Method Specification against which tests are performed	Equipment Used
		Interfacial Tension (IFT)	ASTM D971, EN14210	Digital Surface Interfacial Tensiometer
		Particle (counting and sizing)	IEC: 60970:2007	Particle counter
		Oxidation Stability	IEC: 61125:1992	Oxidation Stability Test Apparatus
		a. Total acidity	IEC: 61125:1992	Glass Burette A CLASS Capacity-1 ml
		b. Sludge	IEC: 61125:1992	Weighing Balance
		c. DDF at 90°C	IEC: 61125:1992	Capacitance & Tan Delta Test set
		Flash point	ISO 2719 :2016	Pensky Marten flash Point Tester
		Compatibility	IEC: 61125:1992	Qualitative Test (Not Applicable)
		Pour point	ISO: 3016:1994	Automatic Cloud point & Pour point Apparatus, Cloud and Pour Point Apparatus
		Density	ISO 3675:1998	Liquid Glass bath (Density Bath) Refrigerated

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Accreditation Standard ISO/IEC 17025:2017

Certificate Number TL-101 Page No.: 12/12

Validity 17.06.2022 to 16.06.2024 Last Amended on

S. No.	Material/Products	Component/Parameter / Characteristic tested	Test Method Specification against which tests are performed	Equipment Used
		Viscosity	ISO: 3104:1994	Digital Kinematic Viscosity Bath, Low Temp Kinematic Viscosity Bath
		Polychlorinated Biphenyls (PCBs)	IEC: 61619:1997	Gas Chromatography Mass Spectrometer (RTRC-243)
		Corrosive Sulphur	IEC:62535, ASTM D1275, Method B of DIN:51353	Hot Air Oven
		Dibenzyl disulfide (DBDS) content	IEC:62697-1:2012	Gas Chromatography Mass Spectrometer
		Passivator content	Annex B of IEC: 60666:2010	HPLC (High Performance Liquid Chromatography)
		Dissolved gas analysis	IS: 10593:2006 IEC: 60599:1999	Gas Chromatography

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