



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

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Validity 30/12/2020 to 29/12/2022

Last Amended on

ELECTRICAL TESTING

Laboratory based Testing (Oil Immersed Distribution Transformers)

S. No.	Product /Material of Test	Name of Test Performed	Test Method Specification against which tests are performed	Range of Testing/Limits of Detection
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	1.9999 mΩ to 1.9999 KΩ
		Measurement of Voltage ratio and check of phase displacement	IS 1180(Part 1):2014 IS 2026(Part 1):2011 IEC 60076 (Part 1):2011	2 to 200
		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	Up to 12 kW
		Measurement of no-load loss and current	IS 1180(Part 1):2014 (RA 2019) IS 2026(Part 1):2011 IEC 60076 (Part 1):2011	Up to 12 kW, 50mA to 20A
		Measurement of insulation resistance	IS 1180(Part 1):2014 (RA 2019) IS 2026(Part 1):2011 IEC 60076 (Part 1):2011	Up to 20 GΩ
		Induced over-voltage withstand test	IS 1180(Part 1):2014 (RA 2019) IS 2026(Part 3):2009 IEC 60076 (Part 3):2013	Up to 70 kV Up to 100 Hz



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S. No.	Product /Material of Test	Name of Test Performed	Test Method Specification against which tests are performed	Range of Testing/Limits of Detection
		Separate source voltage withstand test (Primary & secondary)	IS 1180(Part 1): 2014 (RA 2019) IS 2026(Part 3):2009 IEC 60076 (Part 3):2013	up to 75kV up to 10 kV
		Pressure Test (Routine Test)	IS 1180(Part 1):2014 (RA 2019)	up to 2.1 kg/cm ²
		Oil leakage Test	IS 1180(Part 1):2014 (RA 2019)	up to 2.1 kg/cm ²
		Lightning Impulse Test	IS 1180(Part 1):2014 (RA 2019) IS 2026(Part 3):2009 IEC 60076 (Part 3):2013	up to 500 kVp
		Temperature rise test	IS 1180(Part 1):2014 (RA 2019) IS 2026(Part 2):2010 IEC 60076 (Part 2):2011	up to 110 °C
		Pressure test (Type Test)	IS 1180(Part 1):2014 (RA 2019)	up to 2.1 kg/cm ² and up to 760 mmHg
		Determination of sound level	IS 1180(Part 1):2014 (RA 2019) IS 2026(Part 10):2009 IEC 60076 (Part 10):2016	30 to 130 dB
		No load current at 112.5 % voltage	IS 1180(Part 1):2014 (RA 2019)	50 mA to 20 A
		Paint adhesion test	IS 1180(Part 1):2014 (RA 2019) ASTM D3359	Qualitative



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S. No.	Product /Material of Test	Name of Test Performed	Test Method Specification against which tests are performed	Range of Testing/Limits of Detection
		Oil BDV and moisture content of transformer oil	IS 1180(Part 1):2014 (RA 2019) IS 335:2018	up to 100 kV 1mg/kg to 1000 mg/kg
		Measurement of dimension and physical verification	IS 1180(Part 1):2014 (RA 2019)	0-300 mm,0-25 mm,0-1000 mm,15 mtr.
		Permissible flux density and over fluxing	IS 1180(Part 1):2014 (RA 2019)	110 % of the rated voltage.
		Measurement of zero-sequence impedance(s) on three phase transformers	IS:2026(Part 1):2011 IEC 60076-1:2011	0 to 100 %
		Measurement of Harmonic on no-load current	IS:2026 (Part 1):2011 IEC 60076-1:2011	1 st order to 50 th order
		Measurement of dissipation factor tan delta of the insulation system capacitances	IS: 2026 (Part 1):2011 IEC 60076-1:2011	up to 1.00
		Determination of capacitance winding to earth and between windings	IS: 2026 (Part 1):2011 IEC:60076-1:2011	Up to 30 nF 0.001 pF
		Unbalance current test	CBIP Publication No.:275 CBIP Publication No.:317	50 mA to 20 A
		Magnetic Balance test	CBIP Publication No.:275 CBIP Publication No.:317	60 mV to 750 Volts



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Laboratory based Testing (Dry Type Power Transformers)

S. No.	Product /Material of Test	Name of Test Performed	Test Method Specification against which tests are performed	Range of Testing/Limits of Detection
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	1.9999 mΩ to 1.9999 KΩ
		Measurement of Voltage ratio and check of phase displacement	IS: 2026(Part1):2011 IEC 60076(Part 1):2011 IS 11171:1985	2 to 200
		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	up to 12 kW
		Measurement of no-load loss and current	IS: 2026(Part1):2011 IEC 60076(Part 1):2011 IS 11171:1985	up to 12 kW, 50 mA to 20 A
		Measurement of insulation resistance	IS: 2026(Part1):2011 IEC 60076(Part 1):2011 IS 11171:1985	up to 20 GΩ
		Induced over-voltage withstand test	IS: 2026(Part 3):2009 IEC 60076(Part 3):2013 IS 11171:1985	up to 70 kV up to 100 Hz
		Separate source voltage withstands test (Primary & Secondary)	IS: 2026(Part3):2009 IEC 60076(Part 3):2013 IS 11171:1985	up to 75 kV up to 10 kV
		Lightning Impulse test	IS: 2026(Part 3):2009 IEC 60076-(Part 3):2013 IS 11171:1985	up to 500 kVp



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S. No.	Product /Material of Test	Name of Test Performed	Test Method Specification against which tests are performed	Range of Testing/Limits of Detection
		Temperature rise test	IS: 2026(Part 2):2010 IEC 60076 (Part 2):2011 IS: 11171:1985	up to 110 °C
		Partial discharge measurement	IS: 11171:1985 IS: 6209: 1985 Annex A of IS: 2026 (Part 3):2009	1 to 800 pC
		Determination of sound sound level	IS: 2026(Part 10):2009 IEC:60076 (Part 10):2016 IS: 11171:1985	30 to 130 dB
		Measurement of zero-sequence impedance(s) on three phase transformer	IS: 2026(Part 1):2011 IEC:60076-1:2011	0 to 100 %
		Paint adhesion test	IS 1180(Part 1):2014 (RA 2019) ASTM D3359	Qualitative
		Measurement of Harmonic on no-load current	IS: 2026(Part 1):2011 IEC:60076-1:2011	1 st order to 50 th order
		Measurement of dissipation factor tan delta of the insulation system capacitances	IS: 2026 (Part 1):2011 IEC:60076-1:2011	up to 1.00
		Determination of capacitance winding to earth and between windings	IS: 2026 (Part 1):2011 IEC:60076-1:2011	up to 30 nF 0.001 pF
		Unbalance current test	CBIP Publication No.:275 CBIP Publication No.:317	50mA to 20 A
		Magnetic Balance test	CBIP Publication No.:275 CBIP Publication No.:317	60 mV to 750 V



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Laboratory based Testing (Transformers Oil)

S. No.	Product /Material of Test	Name of Test Performed	Test Method Specification against which tests are performed	Range of Testing/Limits of Detection
3.	New Insulating Oils As per IS:335: 2018	Viscosity	IS:1448(Part 25/sec 1):2018 ISO: 3104:1994	0 to 2400 mm ² /s
		Pour point	IS:1448(Part 10/sec 2):2013 ISO: 3016:1994	-20 °C to 50°C
		Water Content	IEC:60814: 1997 IS 13567:2018	3 mg/kg to 1000 mg/kg
		Breakdown Voltage	IS 6792:2017 IEC 60156:1995	0 to 100 kV
		Density	IS:1448(Part 16):2014 ISO 3675:1998	0.6 to 1.10 g/ml
		Dielectric dissipation factor (DDF)	IS: 6262:1971 IS 16086:2013(RA 2018) IEC: 61620:1998	Capacitance: 0 to 30 nF Tan delta: 0 to 1.00
		Particle Content	IS 13236:2013 IEC:60970: 2007	0 to 200 µm
		Appearance	Clause 6.6 of IS: 335:2018	Qualitative
		Acidity	IS: 1448(Part 16):2014 IEC:62021-1:2003	up to 10 mgKOH/g
		Interfacial Tension (IFT)	ASTM D971:2020	1 to 999 Dynes
		Total Sulphur content	ISO: 14596:2007or ASTM D4294:2016 ASTM D129:2018	up to 5 %
		Corrosive Sulphur	DIN: 51353:1985	Qualitative



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S. No.	Product /Material of Test	Name of Test Performed	Test Method Specification against which tests are performed	Range of Testing/Limits of Detection
		Potentially corrosive Sulphur	IS: 16310:2017 IEC: 62535:2008	Qualitative
		DBDS	IS:16497(Part 1)2017 IEC:62697-1:2012	up to 1000 mg/kg
		Inhibitors	IS: 13631:2017 IEC: 60666:2010	up to 1000 mg/kg
		Metal Passivator additives	IS 13631:2017 IEC: 60666:2010	up to 1000 mg/kg
		2-Furfuryl Alcohol(2-Furfural and related compound content)	IS: 15668:2006 IEC: 61198:1993	up to 50 mg/kg
		5-Hydroxymethyl-2-Furfural(2-Furfural and related compound content)	IS: 15668:2006 IEC: 61198:1993	up to 50 mg/kg
		2-Furfural (2-Furfural and related compound content)	IS: 15668:2006 IEC: 61198:1993	up to 50 mg/kg
		2-Furyl Methyl Ketone (2 Acetyl Furan)(2-Furfural and related compound content)	IS: 15668:2006 IEC: 61198:1993	up to 50 mg/kg
		5-Methyl-2-Furfural (2- Furfural and related compound content)	IS: 15668:2006 IEC: 61198:1993	up to 50 mg/kg
		Oxidation Stability	Method C of IS: 12422:2017 IEC: 61125:1992	Ambient to 250 °C
		a. Total acidity	As per 1.9.4 of IS:12422:2017 IEC: 61125:1992	Up to 10 mgKOH/g



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S. No.	Product /Material of Test	Name of Test Performed	Test Method Specification against which tests are performed	Range of Testing/Limits of Detection
		b. Sludge	As per 1.9.1 of IS:12422:2017 IEC: 61125:1992	up to 5 %
		c. DDF at 90°C	As per 1.9.6 of IS:12422:2017 IEC: 61125:1992	up to 1.00
		Gassing Tendency	Method A of IEC: 60628:1985	up to 11 ml
		Flash Point	IS:1448(Part 21) ISO: 2719:2016	50 to 400 °C Max
		PCA Content	IP: 346:2015	up to 10 %
		PCB Content	IS: 16082:2013 IEC: 61619:1997	Up to 100 mg/kg
4	Mineral Insulating Oils in electrical supervision and maintenance guidance as per IS: 1866:2017 or IEC:60422:2013	Color & Appearance	ISO: 2049:1996	Qualitative
		Breakdown Voltage	IEC: 60156:2018	0 to 100 kV
		Water Content	IEC:60814: 1997	3 mg/kg to 1000 mg/kg
		Acidity (Neutralization value)	IEC:62021-1:2003 IEC:62021-2:2007	up to 10 mgKOH/g
		Dielectric dissipation factor (DDF) and resistivity	IEC: 60247: 2004	Capacitance: 0 to 30 nF Tan delta: 0 to 1.00
		Inhibitor content	IEC: 60666:2010	up to 1000 mg/kg
		Sediment/Sludge	Annex-C of IS:1866: 2017/IEC: 60422:2013	up to 5%
		Interfacial Tension (IFT)	ASTM D971, EN14210	1 to 999 Dynes
		Particle (counting and sizing)	IEC: 60970:2007	0 µm to 200 µm



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		Oxidation Stability	IEC: 61125:1992	Ambient to 250 °C
		a. Total acidity	IEC: 61125:1992	up to 10 mgKOH/g
		b. Sludge	IEC: 61125:1992	up to 5 %
		c. DDF at 90°C	IEC: 61125:1992	up to 1.00
		Flash point	ISO 2719 :2016	50 to 400° C Max.
		Compatibility	IEC: 61125:1992	Qualitative
		Pour point	ISO: 3016:1994	-20°C to 50°C
		Density	ISO 3675:1998	0.6 to 1.10 g/ml
		Viscosity	ISO: 3104:1994	0 to 2400 mm ² /s
		Polychlorinated Biphenyls (PCBs)	IEC: 61619:1997	up to 100 mg/kg
		Corrosive Sulphur	IEC:62535, ASTMD1275, Method B of DIN:51353	Qualitative
		Dibenzyl disulfide (DBDS) content	IEC:62697-1:2012	up to 1000 mg/kg
		Passivator content	Annex B of IEC: 60666:2010	up to 1000 mg/kg
		Dissolved gas analysis	IS: 10593:2006 and IEC: 60599:1999	1 to 100000ppm