



## Federation for Development of Accreditation Services

### CERTIFICATE OF ACCREDITATION (AS PER ISO/IEC 17025:2017)

This is to attest that

#### **M/s RAJASTHAN TEST AND RESEARCH CENTRE.**

Plot no. 296, Sector-7, IMT Manesar,  
Gurugram (Haryana) -122050, India

#### **Testing Laboratory**


has demonstrated compliance with ISO/IEC Standard 17025:2017, General requirements for the competence of testing and calibration laboratories and supplementary criteria for testing laboratories.

**Certificate Number:** TL-101

**Issue Date:** 30/12/2020

**Valid Until:** 29/12/2022

The certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard and the relevant requirements of FDAS. (for scope of accreditation visit website [www.fdasindia.org](http://www.fdasindia.org)).

  
**DEVI SARAN TEWARI**  
President



# 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

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### 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 <sup>2</sup>
		Oil leakage Test	IS 1180(Part 1):2014 (RA 2019)	up to 2.1 kg/cm <sup>2</sup>
		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 <sup>2</sup> 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 <sup>st</sup> order to 50 <sup>th</sup> 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 <sup>st</sup> order to 50 <sup>th</sup> 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 <sup>2</sup> /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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S. No.	Product /Material of Test	Name of Test Performed	Test Method Specification against which tests are performed	Range of Testing/Limits of Detection
		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 <sup>2</sup> /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