

Laboratory	EMCO Limited, Transformer Testing Laboratory, Plot No. N-104 MIDC Area Village-Mehrur Jalgaon, Maharashtra		
Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Electrical Testing	Issue Date	13.01.2015
Certificate Number	T- 3265	Valid Until	12.01.2017
Last Amended on	-	Page	1 of 4

S. No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
I. TRANSFORMERS & REACTORS				
1.	Transformer 80MVA (3Ø), 132 kV Class & below 45 MVA (1Ø), 132 kV & below	Voltage ratio	IS 2026 (Part 1): 2011 IEC 60076 (Part 1): 2011 IEEE C57.12.90: 2010 IEEE C57.12.00: 2010	1 to 20000
		Phase displacement (Vector Group)	IS 2026 (Part 1): 2011 IEC 60076 (Part 1): 2011 IEEE C57.12.90: 2010 IEEE C57.12.00: 2010	All vector groups
		Magnetic balance & magnetizing current measurement	CBIP 317	1 V to 230 V 1 mA to 1A
		Winding resistance	IS 2026 (Part 1): 2011 IEC 60076 (Part 1): 2011 IEEE C57.12.90: 2010 IEEE C57.12.00: 2010	0.05 µΩ to 1kΩ
		Insulation resistance	IS 2026 (Part 1): 2011 IEC 60076 (Part 1): 2011 IEEE C57.12.90: 2010 IEEE C57.12.00: 2010	Upto 15 TΩ Upto 10 kV
		Capacitance Dissipation factor (Tan Delta)	IS 2026 (Part 1): 2011 IEC 60076 (Part 1): 2011 IEEE C57.12.90: 2010 IEEE C57.12.00: 2010	8.1 pF to 88 µF 0.01 % to 100 % Upto 12 kV
		No-Load Loss & Current	IS 2026 (Part 1): 2011 IEC 60076 (Part 1): 2011 IEEE C57.12.90: 2010 IEEE C57.12.00: 2010	Upto 300 kW 1mA to 100A Upto 48 kV

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Last Amended on	-	Page	2 of 4

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	Transformer 80MVA (3Ø), 132 kV Class & below 45 MVA (1Ø), 132 kV & below	Harmonics of No-Load current	IS 2026 (Part 1): 2011 IEC 60076 (Part 1): 2011 IEEE C57.12.90: 2010 IEEE C57.12.00: 2010	Upto 100 %
		Short circuit impedance Load Loss	IS 2026 (Part 1): 2011 IEC 60076 (Part 1): 2011 IEEE C57.12.90: 2010 IEEE C57.12.00: 2010	Upto 300 kW 1 mA to 1500 A Upto 26 kV
		OLTC tests	IS 2026 (Part 1): 2011 IEC 60076 (Part 1): 2011 IEEE C57.12.90: 2010 IEEE C57.12.00: 2010	Qualitative
		Zero sequence impedance on three phase transformers	IS 2026 (Part 1): 2011 IEC 60076 (Part 1): 2011 IEEE C57.12.90: 2010 IEEE C57.12.00: 2010	Upto 1500 A , Upto 26 kV
		Temperature rise	IS2026 (Part 2): 2011 IEC60076 (Part 2): 2011 IEEE C57.12.90: 2010 IEEE C57.12.00: 2010	Upto 300 kW 1mA to 1500 A Upto 26 kV
		Separate source AC withstand voltage	IS 2026 (Part 3): 2011 IEC 60076 (Part 3): 2011 IEEE C57.12.90: 2010 IEEE C57.12.00: 2010	1 kV to 300 kV
		Induced overvoltage	IS 2026 (Part 3): 2011 IEC 60076 (Part 3): 2011 IEEE C57.12.90: 2010 IEEE C57.12.00: 2010	1 kV to 275 kV

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Last Amended on	-	Page	3 of 4

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	Transformer 80MVA (3Ø), 132 kV Class & below 45 MVA,(1Ø), 132 kV & below.	Lightning impulse	IS 2026 (Part 3): 2011 IEC 60076 (Part 3): 2011 IEEE C57.12.90: 2010 IEEE C57.12.00: 2010	Upto 1000 kV
		Sound level	IS 2026 (Part 1): 2011 IEC 60076 (Part 1): 2011 IEEE C57.12.90: 2010 IEEE C57.12.00: 2010 NEMA-TR1 1993 (RA 2000) IEC 60076 (Part 10): (2009)	100 dB max.
		Power taken by fans & pumps	IS 2026 (Part 1): 2011 IEC 60076 (Part 1): 2011 IEEE C57.12.90: 2010 IEEE C57.12.00: 2010	Upto 600 V Upto 25A upto 10 kW
		Sweep Frequency Response Analysis(SFRA) test	IEC 60076 (Part 18): 2012 CBIP Manual on transformer (Publication No. 317) Guidelines	10 Hz to 20 MHz

II. ELECTRICAL MATERIALS- LIQUID DIELECTRIC MATERIALS

1. Transformer Oil	Break Down Voltage	IS 6792: 1992 IEC 60156: 1995	Upto 100 kV
	Water Content	SOP No. WI/QAD/04/RO Date. 01.03.2014	0.0001 % to 0.1 %
	Dissolve Gas Analysis	IS 9434:1992	
	H ₂	IS 10593: 2006	0.0005 % to 0.5 %
	CH ₄ ,C ₂ H ₄ ,C ₂ H ₆ ,C ₂ H ₂	IEC 60599:2007	0.0001% to 5.1 %
	CO		0.0025 % to 0.5 %
	CO ₂		0.0025 % to 2 %

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Last Amended on - **Page** 4 of 4

S. No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Transformer Oil	Dissipation factor@90 °C	IS 6262: 1971 IS 6103: 1971	0.00001 to 10
		Resistivity@ 90 °C	IS 6262: 1971 IS 6103: 1971	10 ⁹ Ωcm to 10 ¹⁵ Ωcm

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