

Laboratory	Alstom T & D India Limited, Plot No. 46, SIPCOT, Industrial Complex, Zuzuwadi Village, Hosur, Tamil Nadu		
Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Electrical Testing	Issue Date	30.01.2014
Certificate Number	T-1182	Valid Until	29.01.2016
Last Amended on	11.02.2014	Page	1 of 6

S.No.	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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I. INDUCTORS & TRANSFORMERS

1.	CURRENT TRANSFORMER	Verification of terminal marking and polarity	IS : 2705 (Part 1 to 4), 1992 With Part 1 Reaffirmed 1997, Edition 3.2 (2002-04) & IEC 60044-1 (2003)	NA
		Power Frequency voltage with stand test		5 kV to 1000 kV/ 2kV 1.5 kV to 5 kV/ 0.5kV
		Inter-turn overvoltage test		1 kVp to 10 kVp/ 0.5kVp
		Winding Resistance Test		0.5 to 2000 Ω/ 0.1Ω
		Knee point voltage & current test		1 kV to 6.6 kV/ 0.5kV, 1 A to 10 A/ 0.5A
		Composite Error test (Secondary method)		1 kV to 6.6 kV/ 0.5kV, 1 A to 10 A/ 0.5A
		Instrument Security Factor Test (Secondary method)		300V/ 25V & 10A/ 1A
		Accuracy Test (Ratio & Phase angle measurement, TRE)		Upto 200% / 1% 0 to 100VA
		Partial discharge test		Upto 50 pC
		Measurement of Capacitance & Tan δ		25 pF to 110 μF/ 10pF, 0.5 x 10 ⁻³ to 5 x 10 ⁻³ / 0.1 x 10 ⁻³

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	CURRENT TRANSFORMER	Temperature rise test	IS : 2705 (Part 1 to 4), 1992 With Part 1 Reaffirmed 1997, Edition 3.2 (2002-04) & IEC 60044-1 (2003)	20°C to 100°C / 1°C Upto 4800 A
		Visual Corona / Corona inception & Extinction test (Dry)	IS 2071 (1993) & As per Customer spec.	40 kV to 650 kV/ 2kV
		Thermal stability test	AS 1675 (1986)	Upto 4800 A Temp.: 20°C to 100°C 5 kV to 1000 kV
		Lightning Impulse	IEC 60060-1, IEC 60044-1 (2003)	300 kVp to 2700 kVp
		Lightning Impulse Chopping	IEC 60060-1, IEC 60044-1 (2003)	300 kVp to 2400 kVp
		Switching Impulse	IEC 60060-1, IEC 60044-1 (2003)	500 kVp to 1500 kVp
2.		CAPACITOR VOLTAGE TRANSFORMER & COUPLING CAPACITOR VOLTAGE TRANSFORMER	Measurement of Capacitance and Tan δ	IEC 60358 (1990-05), IEC 60044-5 (2004)
	Verification of the terminal markings & polarity		IEC 60358 (1990-05), IEC 60044-5 (2004)	NA
	Accuracy test (Ratio & Phase angle Measurement)		IEC 60358 (1990-05), IEC 60044-5 (2004)	RE Upto \pm 6 % / 0.01% PE Upto \pm 130' / 1' Burden 1.25 VA to 584 VA/ 0.8 lag

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	CAPACITOR	Partial discharge test	IEC 60358 (1990-05), IEC 60044-5 (2004)	Upto 50 pC
	VOLTAGE TRANSFORMER & COUPLING	Visual Corona / Corona inception & Extinction test (Dry)	IEC 60044-5(2004)	40 kV to 550 kV / 2 kV
	CAPACITOR	Ferroresonance test	IEC 60044-5(2004)	10 kV to 700 kV /2 kV
	VOLTAGE TRANSFORMER	Transient Response test (Eq. Method)	IEC 60044-5(2004)	2 kV to 17 kV / 2 kV
		Test for Stray Capacitance & Stray conductance	IEC 60044-5(2004)	Upto 1000 pF / 10 pF, Upto 400 μ s / 2 μ s
		High Frequency capacitance & series Resistance test	IEC 60044-5(2004)	Upto 1.1 μ F / 10 pF, 100 Ω / 2 Ω
		Short circuit withstand capability test	IEC 60044-5(2004)	2 kV to 630 kV / 2 kV
		Temperature rise test	IEC 60044-5(2004)	20°C to 100°C / 1°C
		Test for Temperature co-eff	IEC 60044-5(2004)	-5°C to 100°C / 1°C 25 pF to 110 μ F / 10pF
		Induced Over voltage test	IEC 60044-5(2004)	2 kV to 140 kV
		Tightness of the liquid-filled capacitor voltage divider	IEC 60044-5(2004)	0.5 kg/cm ² to 2 kg /cm ² / 0.2 kg /cm ²

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	CAPACITOR	Lightning Impulse test	IEC 60060-1& IEC 60044-5	300 kVp to 2700 kVp
	VOLTAGE TRANSFORMER & COUPLING	Chopping Impulse test	IEC 60060-1& IEC 60044-5	300 kVp to 2400 kVp
	CAPACITOR	Switching Impulse test	IEC 60060-1& IEC 60044-5	500 kVp to 1500 kVp
	VOLTAGE TRANSFORMER			

II. TRANSMISSION LINE EQUIPMENT & ACCESSORIES

1. LINE TRAP	Measurement of blocking resistance & blocking Impedance	IEC – 60353 (2002) Amd. 1	10 Ω to 2000 Ω / 2 Ω
	Measurement of Tapping loss and Tapping loss based on resistance	IEC – 60353 (2002) Amd. 1	NA
	Power frequency voltage test on Tuning device	IEC – 60353 (2002) Amd. 1	2 kV to 21 kV/ 1 kV
	Measurement of rated Inductance of the main coil	IEC – 60353 (2002) Amd. 1	0.1 mH to 2 mH/ 0.1 mH
	Measurement of Power frequency Inductance of the main coil	IEC – 60353 (2002) Amd. 1	0.1 mH to 2 mH /0.1 mH
	Temperature rise test	IEC – 60353 (2002) Amd. 1	Upto 3200 A Temp. Upto 100°C
	Measurement of winding resistance	IEC – 60353 (2002) Amd. 1	1 μΩ to 199.9 μΩ/ 1 μΩ

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	LINE TRAP	Visual Corona / Corona inception & Extinction test (Dry)	IS 2071 (1993) & Customer requirements	40 kV to 650 kV / 2 kV
2.	CONDENSER BUSHING	Measurement of Capacitance and Tan δ	IS 2099 (1992) IEC 60137 (2003)	10 pF to 110 μ F/10 pF 0.5×10^{-3} to 5×10^{-3} / 0.1×10^{-3} @ 630kV
		Power Frequency voltage withstand test	IS 2099 (1992) IEC 60137 (2003)	2kV to 670 kV /2kV
		Partial discharge test	IS 2099 (1992) IEC 60137 (2003)	Upto 500 pC
		Temperature rise test	IS 2099 (1992) IEC 60137 (2003)	20°C to 150°C/ 1°C
		Thermal stability test	IS 2099 (1992) IEC 60137 (2003)	1 A to 10 A/ 0.5 A, 50 A to 3160 A / 10A, 25 pF to 110 μ F/ 10 pF, 10°C to 150°C / 1°C, 0.5×10^{-3} to 5×10^{-3} / 0.1×10^{-3}
		Tightness test.	IS 2099 (1992) IEC 60137 (2003)	0.5 kg/cm ² to 2 kg/cm ² / 0.2 kg /cm ²
		Lightning impulse Test	IEC 60060-1 & IEC 60137 (2008)	300 kVp to 2700 kVp

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	CONDENSER BUSHING	Dry Switching impulse test	IEC 60060-1 & IEC 60137 (2008)	500 kVp to 1500 kVp
		Chopping Impulse Test	IEC 60060-1 & IEC 60137 (2008)	300 kVp to 2400 kVp
III. INSULATING MATERIALS & INSULATORS				
1.	TRANSFORMER OIL	Electric Strength (BDV)	IS 6792 (1992)	Upto 100 kV
		Specific Resistance (Resistivity)	IS 6103 (1971)	$10^6 \Omega$ to $10^{16} \Omega$ / $10^6 \Omega$
		Dielectric dissipation factor (Tan δ at 90 /100°C)	IS 6262 (1971)	0.005 / 0.0001
		Inter facial Tension at 27 °C	IS 6104 (1971)	10 to 180 dyne/cm / 1 dyne/cm
		Water Content	IS 13567 (1992)	2 ppm to 100 ppm / 1 ppm
		DGA	IEC 60599:1999 IEC 60567:2011	1 ppm to 2500 ppm
		Partical Counter	ISO 11171:2010	1 micron to 100 micron (NIST/AC)

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