

Laboratory	Central Power Research Institute, Medipally PO, Uppal, Hyderabad, Telangana		
Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Electrical Testing	Issue Date	26.07.2015
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S. No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
I. SWITCHGEAR EQUIPMENT				
1.	High Voltage switchgear & control gear and AB switches Ratings upto 1200 kV system	Lightning Impulse Voltage Test	IEC 62271-102: 2001, Amd. 1: 2011, Amd.2: 2013 IEC 62271-1: 2007 Amd.1: 2011	25 kV _p to 4200 kV _p
		Switching Impulse Voltage Test (Dry & Wet)	IEC 62271-203: 2011 IS 9921 (Part 1): 1981, IS 9921 (Part 2): 1982,	100 kV _p to 3200 kV _p
		Power Frequency Voltage Test (Dry & Wet)	IS 9921 (Part 3): 1982, IS 9921 (Part 4): 1985, All Part (RA 1992)	5 kV _{rms} to 1200 kV _{rms}
		(EMC) Radio interference Voltage Test	IS 9920 (Part 1): 2002 IS 9920 (Part 2): 2001 IS 9920 (Part 3): 1982 IS 9920 (Part 4): 1985 (RA 2002)	100 μV to 1 V
		Mechanical Endurance Test	IS 9920 (Part 4): 1985 (RA 2002) IS 9921 (Part 4): 1985 (RA 2002) IEC 62271- 102: 2001 Amd.1: 2011 Amd. 2: 2013	Mechanical operations
		Artificial Pollution Test by Salt-fog Method on Insulators upto 800 kV System	IEC 60507: 2013 IS 8704: 1995	5 kV _{rms} to 1200 kV _{rms}
		Corona Inception & Extinction Voltage Test	SOP No. 01/01, 02/01, 03/01, 04/01, 05/01 Issue Date: 04.09.2015	5 kV _{rms} to 1200 kV _{rms}
		Visible Discharge Test		5 kV _{rms} to 1200 kV _{rms}

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2.	Alternating Current Circuit breakers Rating upto 1200 kV System	Lightning Impulse Voltage Test	IEC 62271-100: 2008, Amd. 1: 2012	25 kV _p to 4200 kV _p
		Switching Impulse Voltage Test (Dry & Wet)	IEC 62271-200: 2011, IEC 62271-203: 2011	100 kV _p to 3200 kV _p
		Power Frequency Voltage Test (Dry & Wet)	IEC 62271-1: 2007, Amd. 1: 2011, Amd. 2: 2013 IS 12729: 2004, IS 13118: 1991 (RA 1997)	5 kV _{rms} to 1200 kV _{rms}
		(EMC) Radio Interference Voltage Test		100 μV to 1 V
		Artificial Pollution Test by Salt-fog Method on insulators upto 800 kV System	IEC 60507/2013; IS 8704/1995	5 kV _{rms} to 1200 kV _{rms}
		Corona Inception & Extinction Voltage Test	SOP No. 01/01, 02/01, 03/01, 04/01, 05/01 Issue Date: 04.09.2015	5 kV _{rms} to 1200 kV _{rms}
		Visible Discharge Test		5 kV _{rms} to 1200 kV _{rms}
II. TRANSFORMERS AND REACTORS				
1.	Reactor upto 1200 kV System	Lightning Impulse Voltage withstand Test	IEC 60076-4: 2002 IS 5553 (Part 1 to 8): 1990	25 kV _p to 4200 kV _p
2.	Combined instrument transformer (up to 1200 kV System)	Lightning Impulse Voltage Test	IEEE C57.13: 1993 IEC 61869-1: 2007 IEC 61869-2: 2012 and	25 kV _p to 4200 kV _p
		Power frequency Voltage Test (Dry & Wet)	IEC 61869-3: 2011, IS 2705 (Part 1): 2002 IS 2705 (Part 2): 2002 IS 2705 (Part 3): 2002 IS 3156 (Part 1 to 4): 1992 (RA 2002)	5 kV _{rms} to 1200 kV _{rms}

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3.	Current Transformer (upto 1200 kV System)	Tests for Accuracy	IS 2705 (Part 1): 2002 IS 2705 (Part 2): 2002 IS 2705 (Part 3): 2002	0.1 Class and above (100 A to 5 kA)
		Temperature rise Test	IEC 61869-1: 2007 IEC 61869-2: 2012	1 °C to 75 °C (Temp rise)
		Enclosure tightness Test at ambient temperature		Qualitative (Visual check for leakages)
		High Voltage power frequency Test on primary winding		5 kV _{rms} to 1200 kV _{rms}
		High Voltage power frequency Test on Secondary winding		5 kV _{rms} to 1200 kV _{rms}
		High Voltage power frequency wet withstand Voltage Test on outdoor Current transformer		5 kV _{rms} to 1200 kV _{rms}
		Measurement of capacitance and Dielectric Dissipation factor (Tan Delta) for liquid immersed Current transformer		C: 0.01 pF up to 75 nF Tan delta: 1 x 10 ⁻⁴ to 100
RIV Test		100 μV to 1 V		

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	Current Transformer (upto 1200 kV System)	Verification of Terminal Markings & Polarity	IS 2705 (Part 1): 2002 IS 2705 (Part 2): 2002 IS 2705 (Part 3): 2002	Qualitative (Visual check)
		Over Voltage inter turn Test	IEC 61869-1: 2007 IEC 61869-2: 2012	20 kV _{rms} to 1200 kV _{rms}
		Lightning impulse Voltage Test on primary winding		25 kV _p to 4200 kV _p
		Chopped Lightning impulse Voltage Test on Primary winding		
		Measurement of Transmitted over Voltage		
		Switching impulse Voltage withstand Test on primary winding (Dry & Wet)		100 kV _p to 3200 kV _p
		Chopped wave Test/ Fast Transient Test		25 kV _p to 4200 kV _p
		Corona Test	SOP No. 01/01, 02/01, 03/01, 04/01, 05/01 Issue Date: 04.09.2015	5 kV _{rms} to 1200 kV _{rms}
4.	Voltage transformer & capacitor Voltage transformers transformer (upto 1200 kV System)	Tests for Accuracy	IEC 61869-1: 2007 IEC 61869-3: 2011 IEC 61869-5: 2011	0.1 Class and above (5 kV _{rms} to 1200 kV _{rms})
		Temperature rise Test	IS 3156 (Part 1 to 4): 1992 (RA 2002)	1 °C to 75 °C (Temp rise)
		Enclosure tightness Test at ambient temperature		Qualitative (Visual check for leakages)

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	Voltage transformer & capacitor Voltage transformers transformer (upto 1200 kV System)	High Voltage power frequency withstand Tests on primary terminals (On external insulation-wet Test)	IEC 61869-1: 2007 IEC 61869-3: 2011 IEC 61869-5: 2011 IS 3156 (Part 1 to 4): 1992 (RA 2002)	5 kV _{rms} to 1200 kV _{rms}
		Verification of terminal Markings & Polarity		Qualitative (Visual check)
		High Voltage Power Frequency withstand Tests on Secondary Terminals		5 kV _{rms} to 1200 kV _{rms}
		Ferro Resonance Test and Transient Response Test		5 kV _{rms} to 1200 kV _{rms}
		Short Circuit Withstand Capability Test (Except PD measurement)		5 kV _{rms} to 1200 kV _{rms}
		Chopped Lightning Impulse Voltage Test on Primary Winding		25 kV _p to 4200 kV _p
		Switching impulse Voltage withstand Test on primary winding (Dry & Wet)		100 kV _p to 3200 kV _p
		Lightning impulse Voltage withstand Test on Capacitor Voltage transformer		25 kV _p to 4200 kV _p
		RIV Test		100 μV to 1 V

Rajeshwar Kumar
Convenor

N. Venkateswaran
Program Manager

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	Voltage transformer & capacitor Voltage transformers transformer (upto 1200 kV System)	Measurement of Transmitted over Voltage	IEC 61869-1: 2007 IEC 61869-3: 2011 IEC 61869-5: 2011 IS 3156 (Part 1 to 4): 1992 (RA 2002)	25 kV _p to 4200 kV _p
		Measurement of Capacitance and Dielectric Dissipation Factor (Tan Delta) on Capacitor Voltage Transformer	IEC 60358: 1990 IS 9348: 1998	C: 0.01 pF upto 75 nF Tan delta: 1 x 10 ⁻⁴ to 100
		Measurement of High Frequency Capacitance & Equivalent series Resistance Measurement Measurement of Stray Capacitance and Conductance Measurement	IEC 60358: 1990	HFC: 20 pF to 20 nF ESR: 0.2 Ω to 200 Ω Stray C: 2 pF to 500 pF Stray conductance: 0.2 S to 200 S
		Corona Test	SOP No. 01/01, 02/01, 03/01, 04/01, 05/01 Issue Date: 04.09.2015	5 kV _{rms} to 1200 kV _{rms}
5.	Power/ Distribution/ Traction/Auto Transformers upto 1200 kV System	Separate Source Voltage withstand Test	IS 2026 (Part 3): 2009	5 kV _{rms} to 1200 kV _{rms}
		Measurement of dielectric Dissipation Factor (tan delta) and Capacitance of the Windings	IS 2026 (Part 3): 2009 IS 11171: 1985 (RA 2006) IEC 60076-3: 2013 IEC 60310-1: 2014	C: 0.01 pF upto 75 nF Tan delta: 1 x 10 ⁻⁴ to 100
		Lightning Impulse Voltage withstand Test (dry)	BS 171 (Part 3): 1987 ANSI:C-57.12.00: 2000 ANSI:C.57.12.90: 1993	25 kV _p to 4200 kV _p
		Chopped Lightning Test Transfer Surge Test		

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III. TRANSMISSION LINE EQUIPMENT AND LINE ACCESSORIES

1.	Hollow Insulator, Post insulator (Indoor/ Outdoor) upto 1200 kV System	Lightning Impulse Voltage withstand Test	IEC 60168: 2001 IS 5621: 1980 (RA 1988) IS 5350 (Part 1): 1970 (RA 1999)	25 kV _p to 4200 kV _p
		Dry or wet Power frequency Voltage withstand Test	IS 5350 (Part 2): 1973 (RA 1991) IS 5350 (Part 3): 1971 (RA 1991)	5 kV _{rms} to 1200 kV _{rms}
		Dry or wet Power frequency Voltage flashover Test		
		Switching impulse Voltage withstand Test (Dry & Wet)		100 kV _p to 3200 kV _p
2.	HV Fuses (Horn Gap) upto 33 kV System	Lightning impulse Voltage Dry Test	IEC 60282-1&2: 2002 and 2008 IS 9385 (Part 2): 1980 (RA 2002) ANSI C37.41: 2000	25 kV _p to 4200 kV _p
		Power Frequency Voltage dry and wet Test		5 kV _{rms} to 1200 kV _{rms}
3.	Porcelain Insulators for over Head Power Lines with Nominal Voltage greater than 1000 V, Insulator string, Post insulators, Solid core insulator, Composite insulators, pin Insulator, Polycrrete Housings up to 1200 kV System	Visual Examination	IEC 60168: 2001	Qualitative (Visual check)
		Verification of Dimensions	IEC 60383-1: 1993 IEC 60383-2: 1993	
		Visible Discharge Test	IEC1109: 2008 IEC 60433: 1998	5 kV _{rms} to 1200 kV _{rms}
		Dry Power frequency Voltage withstand Test and Flashover Test	IS 2544: 1973 (RA 2006) Amd. 4: 1991 IS 731: 1971 Amd. 7: 2008 IS 1445: 1977, Amd. 5: 1993, (RA 1989)	
		Wet Power Frequency Voltage withstand Test and Flashover Test		

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	Porcelain Insulators for over Head Power Lines with Nominal Voltage greater than 1000 V, Insulator string, Post insulators, Solid core insulator, Composite insulators, pin Insulator, Polycrrete Housings up to 1200 kV System	Voltage Distribution Test (As per Customer Request) & power Frequency puncture Test	IEC 60168: 2001 IEC 60383-1: 1993 IEC 60383-2: 1993 IEC1109: 2008 IEC 60433: 1998	25 kV _p to 4200 kV _p
		Lightning Impulse Voltage withstands Test (dry) and 50% impulse Voltage Flashover Test	IS 2544: 1973 (RA 2006) Amd. 4: 1991 IS 731: 1971 Amd. 7: 2008 IS 1445: 1977, Amd. 5: 1993, (RA 1989)	100 kV _p to 3200 kV _p
		Switching Impulse Voltage withstand Test (dry & wet)		5 kV _{rms} to 1200 kV _{rms}
		Corona Inception and Extinction Voltage Test	SOP No. 01/01, 02/01, 03/01, 04/01, 05/01 Issue Date: 04.09.2015	
		Artificial Pollution Test by Salt-fog Method	IEC 60507: 2013 IS 8704: 1995	
4.	High Voltage insulators upto 1200 kV System	Radio Interference Voltage Test	IEC 60437: 1997	100 μV to 1 V
5.	Surge Arrester for Alternating Current Systems upto 1200 kV System	Power Frequency Voltage withstand Tests of arrester Housing (Dry & Wet)	IEC 60099-4: 2014 IS 3070 (Part 3): 1993 (RA 2004)	5 kV _{rms} to 1200 kV _{rms}
		Lightning Impulse Voltage Test on Arrester Housing (Dry)		25 kV _p to 4200 kV _p
		Switching impulse Voltage Test on Arrester Housing (Dry & wet)		100 kV _p to 3200 kV _p
		RIV Test		100 μV to 1 V

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	Surge Arrester for Alternating Current Systems upto 1200 kV System	Corona Test	SOP No. 01/01, 02/01, 03/01, 04/01, 05/01 Issue Date: 04.09.2015	5 kV _{rms} to 1200 kV _{rms}
		Contamination/Pollution Test on Lightning Arrester	ANSI/IEEE C62.11: 2005, and IS 3070 (Part 3): 1993 (RA 2004)	5 kV _{rms} to 1200 kV _{rms}
6.	Bushing for Alternating Voltage upto 1200 kV System	Dry Power Frequency Voltage Withstand Test	IEC 60137: 2008 IS 2099: 1986 (RA 2003) Amd. 1: 1989, Amd. 2: 1993	5 kV _{rms} to 1200 kV _{rms}
		Wet Power Frequency Voltage withstand Test (on outdoor, Outdoor-Indoor and Outdoor-Oil Immersed Bushing of which units upto 245 kV)	IEEE C 57.19.01: 2000	
		Lightning Impulse Voltage withstand Test (dry) and 50% Impulse Voltage Flashover Test.		25 kV _p to 4200 kV _p
		Switching Impulse Voltage withstand Test (Dry & wet)		100 kV _p to 3200 kV _p
		EMC (RIV)		100 μV to 1 V
		Measurement of Dielectric Dissipation Factor and Capacitance at Ambient Temperature		C: 0.01 Pf upto 75 nF Tan delta: 1 x 10 ⁻⁴ to 100

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	Bushing for Alternating Voltage upto 1200 kV System	Corona Test	SOP No. 01/01, 02/01, 03/01, 04/01, 05/01 Issue Date: 04.09.2015	5 kV _{rms} to 1200 kV _{rms}
		Artificial Pollution Test by Salt-Fog Method	IEC 60507: 2013 IS 8704: 1995	5 kV _{rms} to 1200 kV _{rms}
7.	Aluminium Conductor for Overhead Transmission Lines Connectors & Clamps upto 1200 kV System	Radio Interference Voltage Test	IEC 60437: 1997 IS 398 (Part 5): 1992 (RA 1997) IEC 61284: 1997	100 μV to 1 V
		Corona inception and extinction Voltage Test	SOP No. 01/01, 02/01, 03/01, 04/01, 05/01 Issue Date: 04.09.2015	5 kV _{rms} to 1200 kV _{rms}
8.	On load Tap Changer & Tap Changers	Power Frequency Voltage Test	IS 8468: 1977 (RA 2006) Amd. 1: 1980 IEC 60214: 2003	5 kV _{rms} to 1200 kV _{rms}
		Lightning Impulse Voltage withstand Test		25 kV _p to 4200 kV _p
9.	Coupling Capacitor and Capacitor Divider upto 1200 kV System	Lightning Impulse Voltage Test on Arrester housing (Dry)	IEC 60358: 1990 IS 9348: 1998 IEC 61869-5: 2011	25 kV _p to 4200 kV _p
		Switching Impulse Voltage withstand Test (Dry & Wet)		100 kV _p to 3200 kV _p
		Discharge Test		
		Measurement of Capacitance and Dielectric dissipation Factor (Tan delta)		C: 0.01 pF up to 75 nF Tan delta: 1 x 10 ⁻⁴ to 100

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	Coupling Capacitor and Capacitor Divider upto 1200 kV System	High frequency Capacitance and ESR Measurements	IEC 60358: 1990 IS 9348: 1998 & As per customer Reference IEC 61869-5: 2011	HFC: 20 pF to 20 nF ESR: 0.2 Ω to 200 Ω
		Stray Capacitance and Conductance Measurements		Stray C: 2 pF to 500 pF Stray conductance: 0.2 S to 200 S
10.	Insulators and similar Equipment upto 800 kV DC System	Dry DC Voltage withstand and flashover Test	IEC 61325: 1995, IEC 60060-1: 2010	(\pm) 8 kV to (\pm) 1200 kV DC
		Wet DC Voltage withstand and flashover Test		
		Dry DC Voltage long duration withstand Test	IEC 60060-1: 2010	(\pm)8 kV to (\pm)1200 kV DC
		Wet DC Voltage long duration withstand Test		
		RIV Test	IEC 60437: 1997, IEC 61284: 1997, CISPR 18-2: 2010	100 μ V to 1 V
		Corona Test	IEC 61284: 1997 PGCIL/NTPC specification	(\pm)8 kV to (\pm)1200 kV DC
		Lightning impulse Voltage Test	IEC 61325: 1995, IEC 60060-1: 2010	25 kV _p to 4200 kV _p
	Dry and Wet switching Impulse Voltage Test		100 kV _p to 3200 kV _p	

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Rajeshwar Kumar
Convenor

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Program Manager