

Laboratory	Electrical Research and Development Association, ERDA Road, Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat		
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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
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Location: 1

2.	Electrical and Electronic (Static) Energy Meters / Prepayment Meters and Tariff and Load Control equipment Electrical /Electronic Equipment. Electrical Measuring Transducers/ Electrical & Electronic Multifunction Measuring Meters	Impulse voltage Test	IS 13779: 1999 (RA 2004) Cl. 12.7.6.2 IS 14697: 1999 (RA 2004) Cl. 12.7.6.2 IS 12784: 1989 IEC 60688: 2002; Cl. 6.19 CBIP Report 304; Cl. 5.4.6.2 IEC 62052-11: 2003; Cl. 7.3.2 IEC 62053-21: 2003 IEC 62053-22: 2003 IEC 62053-23: 2003 IEC 61000-4: 12 IS 15884: 2010; Cl. 5.4.6.2 A.2.19 NMI M 6-: 2012 OIML TC 12: 2012 Cl. 6.4.10	0 to 12 kV 1.2/50 μs
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Location: 1

Electrical and Electronic (Static) Energy Meters / Prepayment Meters and Tariff and Load Control equipment Electrical / Electronic Equipment. Electrical Measuring Transducers/ Electrical & Electronic Multifunction Measuring Meters	Test of Influence Quantities	IS 13779: 1999 (RA 2004) Cl. 12.11	45 Hz to 55 Hz
	Frequency Variation	IS 14697: 1999 (RA 2004) Cl. 12.10	10 mA to 100 A
	Reverse Ph Sequence	IS 12784: 1989	
	Waveform 10% of third harmonic in current	IEC 60688: 2002 Cl. 6	Upto 480 V
	Voltage Variation	CBIP Report 304 Cl. 5.6.2	400 AT, 0.5 mT 10 mT, 0.2 T
	Magnetic Induction of external origin	IEC 62052-11: 2003 IEC 62053-21: 2003 Cl. 8.2	Upto 480 V
	Voltage unbalance	IEC 62053-22: 2003 Cl. 8.2	10 mA to 100 A
	DC Component in the AC current circuit / DC and even harmonics in the current circuit	IEC 62053-23: 2003 Cl. 8.2	10,000 AT Upto 0.5 T
	Continuous Magnetic Induction of external origin	IS 15884: 2010 Cl. 4.6.2	
	Auxiliary voltage	NMI M 6-1: 2012 Cl.5	Upto 480 V Upto 480 V
	Phase of auxiliary supply voltage changed by 120°	OIML TC 12: 2012 Cl.3.3.5, 6.3, 3.3.6	0.5 T & 0.27 T
	Operation of accessories		
	Magnetic Induction of permanent magnet		
	Harmonic component in the voltage and current circuits		
	Output Load		
	Auxiliary supply		Upto 480 V
	Current		100 A
Power factor		Upto 480 V	

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Location: 1

3.	Electrical and Electronic (Static) Energy Meters / Prepayment Meters and Tariff and Load Control equipment Electrical /Electronic Equipment, Electrical & Electronic Multifunction Measuring Meters	Limits of errors / Test of accuracy requirement	IS 13779: 1999 (RA 2004) Cl. 11.1 IS 14697: 1999 (RA 2004) Cl. 11.1 CBIP Report 304 Cl. 5.6.8 IEC 62052-11: 2003 IEC 62053-21: 2003 ; Cl. 8.1 IEC 62053-22: 2003 Cl. 8.1 IEC 62053-23: 2003 ; Cl. 8.1 IS 15884: 2010 ; Cl. 4.6.1 NMI M 6-1: 2012 ; Cl.4.8 OIML TC 12: 2012 ; Cl.3.3	Upto 480 V 10 mA to 200 A 1 ph, 2 W 3 ph, 3 W
		Test of meter constant	IS 13779: 1999 (RA 2004) Cl. 12.14 IS 14697: 1999 (RA 2004) CBIP Report 304 ; Cl. 5.6.6 IEC 62052-11: 2003 IEC 62053-21: 2003 ; Cl. 8.4 IEC 62053-22: 2003 ; Cl. 8.4 IEC 62053-23: 2003 Cl. 8.4 IS 15884: 2010 ; Cl. 5.6.5 NMI M 6-1: 2012 Cl.4.6 OIML TC 12: 2012 ; Cl.6.2.5	Upto 480 V, 10 mA to 200 A, 1 ph, 2 W 3 ph, 3 W 3 ph, 4 W

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Location: 1

Electrical and Electronic (Static) Energy Meters/ Prepayment Meters and Tariff and Load Control equipment Electrical / Electronic Equipment, Electrical & Electronic Multifunction Measuring Meters	Starting	IS 13779: 1999 (RA 2004) Cl. 12.14 IS 14697: 1999 (RA 2004) Cl. 12.13 CBIP Report 304 Cl. 5.6.5 IEC 62052-11: 2003 IEC 62053-21: 2003 Cl. 8.3 IEC 62053-22: 2003 Cl. 8.3 IEC 62053-23: 2003 Cl. 8.3 IS 15884: 2010 Cl. 5.6.4 NMI M 6-1: 2012 Cl.5.7 OIML TC 12: 2012 Cl.6.2.3	Upto 2000 mA
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Location: 1

6.	Electrical Measuring Transducers/ Electrical & Electronic Multifunction Measuring Meters	Permissible Limits of intrinsic error & class index	IS 12784: 1989 Cl. 3.7 & 3.8 IEC 60688: 2002 Cl. 4.4	Upto 1020 V Upto 11 A 45 Hz to 55 Hz 0.5 lag-UPF-0.5 lead
		Variation due to distorted waveform of the input quantities	IS 12784: 1989 Cl. 6.5 IEC 60688: 2002 Cl. 6.10	Upto 1020 V Upto 11 A 45 Hz to 55 Hz 0.5 lag-UPF-0.5 lead
		Variation due to continuous operation	IS 12784: 1989 Cl. 6.3 IEC 60688: 2002 Cl. 6.15	Upto 1020 V Upto 11 A 45 Hz to 55 Hz 0.5 lag-UPF-0.5 lead
		Variation due to unbalance currents	IS 12784: 1989 Cl. 6.4 IEC 60688: 2002 Cl. 6.12	Upto 1020 V Upto 11 A 45 Hz to 55 Hz 0.5 lag-UPF-0.5 lead
		Variation due to interaction between the measuring circuits	IS 12784: 1989 Cl. 6.6 IEC 60688: 2002 Cl. 6.13	Upto 1020 V Upto 11 A 45 Hz to 55 Hz 0.5 lag-UPF-0.5 lead
		Variation due to over range of measured quantity	IS 12784: 1989 Cl. 6.8 IEC 60688: 2002 Cl. 5.7	Upto 1020 V Upto 11 A 45 Hz to 55 Hz 0.5 lag-UPF-0.5 lead

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Location: 1

	Electrical Measuring Transducers/Electrical & Electronic Multifunction Measuring Meters	Test for Temperature rise	IEC 60688: 2002 Cl. 6.21	Upto 1020 V Upto 11 A 45 Hz to 55 Hz 0.5 lag-UPF-0.5 lead
7.	Electrical and Electronic (Static) Energy Meters and Tariff and Load Control equipment Electrical / Electronic Equipment	Durability	BS EN 62059-32-1: 2011-12 OIML TC 12: 2012 Cl.3.8	As defined in standard
8.	Electrical and Electronic (Static) Energy Meters / Prepayment Meters and Tariff and Load Control equipment Electrical / Electronic Equipment	Conformance to protocol implementation as per DLMS/COSEM base standards; IEC 62056	IS 15959 Annexure K-1 (a) Category A, B and C IEC 62056	As defined in standard
		Conformance to protocol Implementation of specific requirements related to : All mandatory parameters All data types All application associations with specified services Association objects with access rights and OBIS codes Events related to DLMS objects with event identifiers	IS 15959 Annexure K-1 (b) and K-2 Category A, B and C	As defined in standard

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Location: 1

9.	Energy Meter	Influence of short time over current tests	IS 13779: 1999 Cl. 9.2.3 IS 14697: 1999 Cl. 12.7.3 IEC 62053-21: 2003 Cl. 7.2 IEC 62053-22: 2003 Cl. 7.2 IEC 62053-23: 2003 Cl. 7.2 IS 15884: 2010 Cl. 4.4.3 NMI M 6-1: 2000 Cl. A.2.16 OIML TC 12 Cl. 6.4.9	0.5 kA to 40 kA for 3 s or 0.5 kA to 50 kA for 1SEC. 100V to 525 V
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II. TRANSFORMERS AND REACTORS

1.	Current Transformers	Verification of terminal marking and polarity	IS 2705 (Part 1): 1992 Cl. 9.2 IEC 61869-1: 2007-10 Cl. 7.3.6	Qualitative
		Measurement of winding Resistance	IS 2705 (Part 4): 1992 Cl. 6.2 IEC 61869-2: 2012-09 Cl. 7.3.201	100 μΩ to 20 kΩ

**Prachi Kukreti
Convenor**

**N. Venkateswaran
Program Manager**

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Location: 1

**Current
Transformers**

Temperature rise Test	IS 2705 (Part 1): 1992 Cl. 9.7 IEC 61869-1: 2007-10 Cl. 7.2.2 IEC 61869-2: 2012-09 Cl. 7.2.2	1 A to 5000 A
High voltage power frequency Test	IS 2705 (Part 1): 1992 Cl. 9.3 & 9.4 IEC 61869-1: 2007-10 Cl. 7.3.1, 7.3.3 & 7.3.4 IEC 61869-2: 2012-09 Cl. 7.3.1, 7.3.3 & 7.3.4	1 kV to 500 kV 0 to 5 kV
Over – voltage inter-turn Test	IS 2705 (Part 1): 1992 Cl. 9.5 IEC 61869-2: 2012-09 Cl. 7.3.204	0.1 A to 10 A
Instrument Security factor	IS 2705 (Part 2): 1992 Cl. 7.1.2 IEC 61869-2: 2012-09 Cl. 7.2.6.202 & 7.5.2	Qualitative
Determination of errors according to the requirements of appropriate accuracy class.	IS 2705 (Part 2 &3): 1992 Cl. 7.1.1 & 7.2.1 IEC 61869-1: 2007-10 Cl. 7.2.6 & 7.3.5 IEC 61869-2: 2012-09 Cl. 7.2.6 & 7.3.5	1 A to 5000 A

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Location: 1

**Current
Transformers**

Composite error Measurement	IS 2705 (Part 3): 1992 Cl. 7.1.2 & 7.2.2 IEC 61869-2: 2012-09 Cl. 7.2.6.203 & 7.3.5.203	0.1 % to 10 %
Turns ratio Test	IS 2705 (Part 4): 1992 Cl. 6.3 IEC 61869-2: 2012-09 Cl. 7.3.5.206	1 to 4000
Partial discharge measurement	IS 2705 (Part 1): 1992 Cl. 9.1.2 (e) IEC 61869-1: 2007-10 Cl. 7.3.2 IS 11322: 1985	0.5 kV to 100 kV 1 pC to 999 pC
Measurement of knee point voltage & exciting Current	IS 2705 (Part 4): 1992 Cl. 6.1 IEC 61869-2: 2012-09 Cl. 7.3.203	0.1 V to 8 kV
Measurement of Capacitance & Tan δ	IS 2705 (Part 1): 1992 Cl. 9.1.3(b) IEC 61869-1 (Edition 1.0): 2007-10 Cl. 7.4.3 IEC 61869-2 (Edition 1.0): 2012-09 Cl. 7.4.3	0.1 kV to 200 kV Cap: 0.1 pF to 10 mF Tan δ : 0 to 10

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<u>Location: 1</u>				
2.	Potential Transformers	Verification of terminal marking and polarity	IS 3156 (Part 1): 1992 Cl. 9.2 IEC 61869-1: 2007-10 Cl. 7.3.6	Qualitative
		Temperature rise Test	IS 3156 (Part 1): 1992 Cl. 9.5 IEC 61869-1: 2007-10 Cl. 7.2.2 IEC 61869-3: 2011-07 Cl. 7.2.2	110 V to 220 kV
		Induced over voltage withstand Test	IS 3156 (Part 1): 1992 Cl. 9.3.1.2 & 9.3.2.2 IEC 61869-3: 2011-07 7.3.1.303	1 V to 140 kV AC
		Separate source voltage withstand Test	IS 3156 (Part 1): 1992 Cl. 9.3.1.1 & 9.3.2.1 IEC 61869-3: 2011-07 Cl. 7.3.1.302	1 V to 140 kV AC 0 to 5 kV AC
		High voltage power frequency Test	IS 3156 (Part 1): 1992 Cl. 9.3 & 9.4 IEC 61869-1: 2007-10 Cl. 7.3.1, 7.3.3, 7.3.4 IEC 61869-3: 2011-07 Cl. 7.3.1, 7.3.3, 7.3.4	1 V to 500 kV AC 0 to 5 kV AC

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Location: 1**Potential Transformers**

Determination of errors according to the requirements of appropriate accuracy class.

IS 3156 (Part 2): 1992 & Cl. 8.1.1 & 8.2.1
IS 3156 (Part-3): 1992 Cl. 10.1.1.2, 10.1.2.1
IEC 61869-1: 2007-10 Cl. 7.2.6 & 7.3.5
IEC 61869-3: 2011-07 Cl. 7.2.6 & 7.3.5

110 V to 66 kV/110 V

110 V/rt(3) to 66 kV/rt(3)/110 V/rt(3)

66 kV/rt(3)/110 V/rt(3) to 132 kV/rt(3)/110 V/rt(3)

Partial discharge measurement

IS 3156 (Part 1): 1992 Cl. 9.1.2 (d)
IEC 61869-1: 2007-10 Cl. 7.3.2
IEC 61869-3: 2011-07 Cl. 7.3.2
IS 11322: 1985

0.5kV to 100 kV
1 pC to 999 pC

Measurement of winding Resistance

IS 3156 (Part 1): 1992 Cl. 9.5
IEC 61869-1: 2007-10 Cl. 7.2.2
IEC 61869-3: 2011-07 Cl. 7.2.2

100 $\mu\Omega$ to 20 k Ω

Measurement of Capacitance & Tan δ

IEC 61869-1 (Edition 1.0): 2007-10 Cl. 7.4.3
IEC 61869-3 (Edition 1.0): 2011-07 Cl. 7.4.3

0.1 kV to 200 kV
Cap: 0.1 pF to 10 mF
Tan δ : 0 to 10

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Location: 1

3.	Distribution transformers/ Dry type transformers	Measurement of winding Resistance	IS 2026 (Part 1): 2011 Cl. 10.1.1a IS 1180 (Part 1): 1989 Cl. 22.4.a IS 1180 (Part 2): 1989 Cl. 21.4.a IS 11171: 1985 Cl. 13.2.a IEC 60076 (Part 1): 2011 Cl. 11.1.2.1.a IEC 60076 (Part 11): 2004-05 Cl.15 IS 1180 (Part 1): 2014 Cl. 21.2.a	100 $\mu\Omega$ to 20 k Ω
		Measurement of voltage ratio and check of voltage vector relationship/phase displacement	IS 2026 (Part 1): 2011 Cl. 10.1.1.b IS 1180 (Part 1): 1989 Cl. 22.4.b IS 1180 (Part 2): 1989 Cl. 21.4.b IS 11171: 1985 Cl. 13.2.b IEC 60076 (Part 1): 2011 Cl. 11.1.2.1.b IEC 60076 (Part 11): 2004-05 Cl. 16 IS 1180 (Part 1): 2014 Cl. 21.2.b	1 to 4000

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Location: 1

**Distribution transformers/
Dry type transformers**

Measurement of impedance voltage/short circuit impedance and Load loss.

IS 2026 (Part 1): 2011
Cl. 10.1.1.c
IS 1180 (Part 1): 1989
Cl. 22.4.c
IS 1180 (Part 2): 1989
Cl. 21.4.c
IS 11171: 1985
Cl. 13.2.c
IEC 60076 (Part 1): 2011
Cl. 11.1.2.1.c
IEC 60076 (Part 11): 2004-05
Cl. 17
IS 1180 (Part 1): 2014
Cl. 21.2.c

1 kVA to 2 mVA,
11-22-33 / 0.433 kV

Measurement of no Load loss and current

IS 2026 (Part 1): 2011
Cl. 10.1.1.d
IS 1180 (Part 1): 1989
Cl. 22.4.d
IS 1180 (Part 2): 1989
Cl. 21.4.d
IS 11171: 1985
Cl. 13.2.d
IEC 60076 (Part 1): 2011
Cl. 11.1.2.1.d
IEC 60076 (Part 11): 2004-05
Cl. 18
IS 1180 (Part 1): 2014
Cl. 21.2.d

1 kVA to 2 mVA,
11-22-33/0.433 kV

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Location: 1

**Distribution transformers/
Dry type transformers**

Measurement of insulation Resistance

IS 2026 (Part 1): 2011
Cl. 10.1.3.j
IS 1180 (Part 1): 1989
Cl. 22.4.e
IS 1180 (Part 2): 1989
Cl. 21.4.e
IEC 60076 (Part 1): 2011
Cl. 11.1.2.2.b
IS 1180 (Part 1): 2014
Cl. 21.2.e

250 V to 5 kV DC
1 kΩ to 1 TΩ

Temperature rise Test

IS 2026 (Part 1): 2011
Cl. 10.1.2.a
IS 1180 (Part 1): 1989
Cl. 22.3.j
IS 1180 (Part 2): 1989
Cl. 21.3.j
IS 11171: 1985
Cl. 13.1.h
IEC 60076 (Part 1): 2011
Cl. 11.1.3.a
IEC 60076 (Part 11): 2004-05
Cl. 23
IS 1180 (Part 1): 2014
Cl. 21.3.b

1 kVA to 2 mVA,
11-22-33/0.433 kV

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Location: 1

**Distribution transformers/
Dry type transformers**

Induced over voltage withstand Test

IS 2026 (Part 1): 2011 Cl. 10.1.3.a
 IS 1180 (Part 1): 1989 Cl. 22.4.f,
 IS 1180 (Part 2): 1989 Cl. 21.4.f
 IS 11171: 1985 Cl.13.2.f
 IEC 60076 (Part 1): 2011 Cl. 11.1.2.1.e
 IEC 60076: 2004-05 Cl. 20, (Part 11))
 IS 1180 (Part 1): 2014 Cl. 21.2.f

1 V to 1000 V @150 Hz

Separate source voltage withstand Test

IS 2026 (Part 1): 2011 Cl. 10.1.3.a
 IS 1180 (Part 1): 1989 Cl. 22.4.g
 IS 1180 (Part 2): 1989 Cl. 21.4.g
 IS 11171: 1985 Cl. 13.2.e
 IEC 60076 (Part 1): 2011 Cl. 11.1.2.1.e
 IEC 60076 (Part 11): 2004-05 Cl. 19
 IS 1180 (Part 1): 2014 Cl. 21.2.g

1 kV to 500 kV AC

Laboratory	Electrical Research and Development Association, ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat		
Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Electrical Testing	Issue Date	02.04.2015
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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
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Location: 1

**Distribution
transformers/
Dry type
transformers**

Measurement of zero sequence impedance for 3Ø transformer	IS 2026 (Part 1): 2011 Cl. 10.7 IEC 60076 (Part 1): 2011 Cl. 11.1.4.f	1 kVA to 2 mVA, 11-22-33/0.433 kV
Air pressure Test	IS 1180 (Part 1): 1989 Cl. 22.3.m IS 1180 (Part 2): 1989 Cl. 21.4.h/3.m CBIP publication no: 295 March: 2006 IS 1180 (Part 1): 2014 Cl. 21.2.h & 21.3.d	1 kVA to 2 mVA, 11-22-33/0.433 kV
Unbalanced current Test	CBIP publication no: 275 Oct: 1999	1 kVA to 2 mVA, 11-22-33/0.433 kV
Magnetic balance	CBIP publication no: 295 March: 2006 CBIP publication no: 317 April 2013	1 kVA to 2 mVA, 11-22-33/0.433 kV
Vacuum Test	CBIP publication no: 295 March: 2006 CBIP publication no: 317 April 2013	1 kVA to 2 mVA, 11-22-33/0.433 kV

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Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard **ISO/IEC 17025: 2005**

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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
<u>Location: 1</u>				
	Distribution transformers/ Dry type transformers	Permissible flux density and over fluxing	IS 1180 (Part 1): 1989 Cl. 22.3.n IS 1180 (Part 2): 1989 Cl. 21.3.n IS 1180 (Part 1): 2014 Cl.6.9,7.9,8.9	1 kVA to 2 mVA, 11-22-33/0.433 kV
		Oil leakage Test	IS 1180 (Part 1): 2014 Cl. 21.2.j CBIP publication no: 317 April 2013	1 kVA to 2 mVA, 11-22-33/0.433 kV
4.	Distribution transformers/ Power Transformers	Measurement of Capacitance & Tan δ	IS 2026 (Part 1): 2011 Cl. 10.1.3(b) & (j) IEC 60076 – 1 (Edition 3.0): 2011-04 Cl. 11.1.4(c)& (d)	0.1 kV to 200 kV Cap: 0.1 pF to 10 mF Tan δ : 0 to 10
5.	Current limiting reactors and neutral earthing reactors, Damping reactors, Tuning Reactors, Earthing transformers, Arc Suppression Reactors, Smoothing reactors	Measurement of winding resistance	IS 5553 (Part 3): 1990 Cl. 9.3.a IS 5553 (Part 4): 1989 Cl. 8.2.a IS 5553 (Part 5): 1989 Cl. 5.3.a IS 5553 (Part 6): 1990 Cl. 8.3.a IS 5553 (Part 7): 1990 Cl. 8.2.a IS 5553 (Part 8): 1990 Cl. 7.2.1.a	100 $\mu\Omega$ to 20 k Ω

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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
<u>Location: 1</u>				
6.	Shunt reactors	Measurement of reactance	IS 5553 (Part 2): 1990 Cl. 7.3.c	1 V to 2100 V, 1 A to 4000 A
7.	Shunt reactors, Current limiting reactors and neutral earthing reactors, Tuning Reactors, Earthing transformers, Arc Suppression Reactors, Smoothing reactors	Measurement of loss	IS 5553 (Part 2): 1990 Cl. 7.7 IS 5553 (Part 3): 1990 Cl. 9.6 IS 5553 (Part 5): 1989 Cl. 5.3.g IS 5553 (Part 6): 1990 Cl. 8.3.g IS 5553 (Part 7): 1990 Cl. 8.3.g IS 5553 (Part 8): 1990 Cl. 7.8	1 V to 2100 V, 1 A to 4000 A
8.	Shunt reactors, Current limiting reactors and neutral earthing reactors, Damping reactors, Tuning Reactors, Earthing transformers, Arc Suppression Reactors, Smoothing reactors	Separate source voltage withstand Test	IS 5553 (Part 2): 1990 Cl. 7.3.e IS 5553 (Part 3): 1990 Cl. 9.7 IS 5553 (Part 4): 1989 Cl. 8.6 IS 5553 (Part 5): 1989 Cl. 5.3.e IS 5553 (Part 6): 1990 Cl. 8.3.e IS 5553 (Part 7): 1990 Cl. 8.7 IS 5553 (Part 8): 1990 Cl. 7.5	1 kV to 500 kV AC

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Accreditation Standard **ISO/IEC 17025: 2005**

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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
<u>Location: 1</u>				
9.	Shunt reactors, Current limiting reactors and neutral earthing reactors, Damping reactors, Tuning Reactors, Earthing transformers, Arc Suppression Reactors, Smoothing reactors	Temperature rise Test	IS 5553 (Part 2): 1990 Cl. 7.15 IS 5553 (Part 3): 1990 Cl. 9.9 IS 5553 (Part 4): 1989 Cl. 6 IS 5553 (Part 5): 1989 Cl. 5.7 IS 5553 (Part 6): 1990 Cl. 8.5 IS 5553 (Part 7): 1990 Cl. 8.6 IS 5553 (Part 8): 1990 Cl. 7.8	1 V to 2100 V 1 A to 4000 A
10.	Current limiting reactors and neutral earthing reactors	Measurement of impedance	IS 5553 (Part 3): 1990 Cl. 9.5	1 V to 2100 V 1 A to 4000 A
11.	Damping reactors, Tuning Reactors, Smoothing reactors	Measurement of inductance	IS 5553 (Part 4): 1989 Cl. 8.2.c IS 5553 (Part 5): 1989 Cl. 5.4 IS 5553 (Part 8): 1990 Cl. 7.4	1 V to 2100 V 1 A to 4000 A
12.	Damping reactors, Tuning Reactors	Measurement of Q-factor	IS 5553 (Part 4): 1989 Cl. 8.7 IS 5553 (Part 5): 1989 Cl. 5.6	1 V to 2100 V 1 A to 4000 A

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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
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Location: 1

13.	Shunt reactors, Earthing transformers	Measurement of zero-sequence impedance/ reactance	IS 5553 (Part 2): 1989 Cl. 7.4.a IS 5553 (Part 6): 1989 Cl. 8.3.c	1 V to 2100 V 1 A to 4000 A
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14.	Shunt reactors, Earthing transformers, ARC Suppression Reactors	Measurement of voltage ratio and/ or check of voltage vector relationship	IS 5553 (Part 2): 1989 Cl. 7.3.f IS 5553 (Part 6): 1989 Cl. 8.3.f IS 5553 (Part 7): 1990 Cl. 8.2.d	1 V to 2100 V 1 A to 4000 A
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15.	ARC Suppression Reactors	Measurement of current at all adjustments	IS 5553 (Part 7): 1990 Cl. 8.2.c	1 V to 2100 V 1 A to 4000 A
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III. CABLES AND ACCESSORIES

1.	H.T. XLPE Cable Single / Three Core	Partial discharge Test	IS 7098 (Part 2): 2011 Cl. 20.2 IS 7098 (Part 3): 1993 Cl. 20.1 IEC 60502 (Part 2): 2014 Cl. 16.3,18.2.5	Voltage: 100 kV, Minimum Detection Limit of pC : 1 pC
		Bending Test	IS 7098 (Part 2): 2011 Cl. 20.3 IS 7098 (Part 3): 1993 Cl. 20.11 IEC 60502 (Part 2): 2014 Cl.18.2.4	Diameter Upto 3700 mm

Laboratory

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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
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Location: 1**H.T. XLPE Cable
Single / Three Core**

Tan delta/Dielectric power factor & Capacitance measurement Test as a function of voltage

IS 7098 (Part 2): 2011
Cl. 20.4.1
IS 7098 (Part 3): 1993
Cl. 20.12,20.18

Voltage : 200 kV,
Tan δ 0 to 10,
Capacitance
0.1 pF to 10 mF

Tan delta/Dielectric power factor Test as a function of temperature

IS 7098 (Part 2): 2011
Cl. 20.4.2
IS 7098 (Part 3): 1993
Cl. 20.13
Cl.18.2.6 of
IEC 60502 (Part 2): 2014

Voltage: 200 kV,
Tan δ : 0 to 10,
Temperature :
0 °C to 200 °C

Heating cycle

IS 7098 (Part 2): 2011
Cl. 20.5
IEC 60502 (Part 2): 2014
Cl. 18.2.7

Current : 5000 A ,
Temperature :
0 to 200 °C

Load Cycle Test

IS 7098 (Part 3): 1993
Cl. 20.14

Voltage: 200 kV,
Current : 5000 A ,
Temperature :
0 to 200 °C

Impulse voltage Test

IS 7098 (Part 2): 2011
Cl. 20.6
IS 7098 (Part 3): 1993
Cl. 20.15
IEC 60502 (Part 2): 2014
Cl. 18.2.8

5 kVp to1600 kVp ,
80 kJ

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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
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Location: 1

	H.T. XLPE Cable Single / Three Core	High voltage Test	IS 7098 (Part 2): 2011 Cl. 20.7 IS 7098 (Part 3): 1993 Cl. 20.15.1,20.17 IEC 60502 (Part 2): 2014 Cl. 16.4,17.9,18.2.9,18.3.4	Voltage : 200 kV
2.	H.T. PVC Cable Single / Three Core	Partial discharge Test	IS 1554 (Part 2): 1988 Cl. 19.2 IEC 60502 (Part 2): 2014 Cl. 16.3,18.2.5	Voltage:100 kV, Minimum Detection Limit of pC : 1 pC
		Bending Test	IS 1554 (Part 2): 1988 Cl. 19.3 IEC 60502 (Part 2): 2014 Cl.18.2.4	Diameter Upto 3700 mm
		Dielectric power factor Test as a function of voltage	IS 1554 (Part 2): 1988 Cl. 19.4.a	Voltage : 200 kV, Tan δ 0 to 10
		Tan delta/Dielectric power factor Test as a function of temperature	IS 1554 (Part 2): 1988 Cl. 19.4.b Cl.18.2.6 of IEC 60502 (Part 2): 2014	Voltage: 200 kV, Tan δ: 0 to 10, Capacitance 0.1 pF to 10 mF, Temperature : 0 to 200 °C
		Heating cycle	IS 1554 (Part 2): 1988 Cl. 19.5 IEC 60502 (Part 2): 2014 Cl. 18.2.7	Current : 5000 A , Temperature : 0 to 200 °C

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Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat****Accreditation Standard****ISO/IEC 17025: 2005****Discipline****Electrical Testing****Issue Date 02.04.2015****Certificate Number****T-0071****Valid Until 30.03.2017****Last Amended on****-****Page 45 of 315**

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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Location: 1

	H.T. PVC Cable Single / Three Core	Impulse voltage Test	IS 1554 (Part 2): 1988 Cl. 19.6 IEC 60502 (Part 2): 2014 Cl. 18.2.8	5 kVp to 1600 kVp, 80 kJ
		High voltage Test	IS 1554 (Part 2): 1988 Cl. 19.7 IEC 60502 (Part 2): 2014 Cl. 16.4,17.9,18.2.9,18.3.4	Voltage : 200 kV
3.	H.T. Elastomer Cable Single / Three Core	Partial discharge Test	IS 9968 (Part 2): 2002 Cl. 23.2 IEC 60502 (Part 2): 2014 Cl. 16.3,18.2.5	Voltage:100 kV, Minimum Detection Limit of pC : 1 pC
		Bending Test	IS 9968 (Part 2): 2002 Cl. 23.3 IEC 60502 (Part 2): 2014 Cl.18.2.4	Diameter Upto 3700 mm
		Dielectric power factor Test as a function of voltage	IS 9968 (Part 2): 2002 Cl. 23.4.1	Voltage : 200 kV, Tan δ 0 to 10
		Tan delta/Dielectric power factor Test as a function of temperature	IS 9968 (Part 2): 2002 Cl. 23.4.2 IEC 60502 (Part 2): 2014 Cl.18.2.6	Voltage: 200 kV, Tan δ : 0 to 10, Capacitance 0.1 pF to 10 mF, Temperature : 0 to 200 °C

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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
<u>Location: 1</u>				
	H.T. Elastomer Cable Single/Three Core	Heating cycle	IS 9968 (Part 2): 2002 Cl. 23.5 IEC 60502 (Part 2): 2014 Cl. 18.2.7	Current : 5000 A , Temperature : 0 to 200 °C
		Impulse Test	IS 9968 (Part 2): 2002 Cl. 23.6 IEC 60502 (Part 2): 2014 Cl. 18.2.8	5 kVp to 1600 kVp, 80 kJ
		High voltage Test	IS 9968 (Part 2): 2002 Cl. 23.7 IEC 60502 (Part 2): 2014 Cl. 16.4,17.9,18.2.9,18.3.4	Voltage : 200 kV

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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
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Location: 1

4.	Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Annealing Test	IS 10810 (Part 1) IS 692 Cl. 24.1.a IS 694 Cl. 10.3.a.1 IS 1554 (Part 1 & 2) Cl. 15.1.a.1,18.1.a.1 IS 1596 IS 2465 Cl. 12.1.a IS 4289 (Part 1 & 2) Cl. 17.1.b,18.1.a.1 IS 7098 (Part 1, 2 & 3) Cl.15.1.a.1,19.1.1.a,19.1.a.1 IS 8783 (Part 1 to 4) Cl. 3.2.2 IS 9857 Cl. 10.1.a.1 IS 9968 (Part 1 & 2) Cl. 21.1.1,22.1.a.1	Upto 300 mm
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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
<u>Location: 1</u>				
	Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Tensile strength	IS 14494 Cl. 25.1.a.1 IS 10810 (Part 2) IS 692 Cl. 24.1.b IS 694 Cl. 10.3.a.2 IS 1554 (Part 1 & 2) Cl. 15.1.a.2,18.1.a.2 IS 1596 IS 7098 (Part 1 & 2) Cl.15.1.a.2, 19.1.1.b IS 9968 (Part 1 & 2) Cl. 21.1.3,22.1.a.2 IS 14255 Cl. 10.1.a.1	Upto 10000 N
		Wrapping Test	IS 10810 (Part 3) IS 692 Cl. 24.1.c IS 694 Cl. 10.3.a.3 IS 1554 (Part 1 & 2) Cl. 15.1.a.3,18.1.a.3 IS 1596 IS 7098 (Part 1 & 2) Cl.15.1.a.3, 19.1.1.c IS 9968 (Part 1 & 2) Cl. 21.1.4, 22.1.a.3 IS 14255 Cl. 10.1.a.2	Qualitative

Laboratory	Electrical Research and Development Association, ERDA Road, Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat		
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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
<u>Location: 1</u>				
	Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Conductor Resistance Test	IS 10810 (Part 5) IS 692 Cl. 24.1.d IS 694 Cl. 10.3.a.4 IS 1554 (Part 1 & 2) Cl. 15.1.a.4,18.1.a.4 IS 1596 IS 2465 Cl. 12.1.c IS 4289 (Part 1 & 2) Cl. 17.1.c,18.1.a.2 IS 7098 (Part 1, 2 & 3) Cl.15.1.a.4, 19.1.1.d,19.1.a.2 IS 8783 (1 to 4) Cl. 3.2.3 IS 9857 Cl. 10.1.a.2 IS 9968 (Part 1 & 2) Cl. 21.1.5, 22.1.a.4 IS 14494 Cl. 25.1.a.2 IS 14255 Cl. 10.1.a.3 IEC 60227 Cl. 2.1 IEC 60245 Cl. 2.1 IEC 60502 (Part 1 & 2) Cl. 15.2, 16.2 IEC 60228 BS 6360 IEC 60840 Cl. 10.5 BS 7846 Cl. 16.2 BS 6724 Cl. 16.2 BS 6708 Cl. 6.2 BS 7211 Cl. 15.2	Upto 2kΩ

Laboratory

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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
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Location: 1

**Paper Insulated
Lead Sheathed
Cables, PVC
Insulated armored /
unarmored cables,
PVC Insulated (HD)
armored /
unarmored Electric
cables, PE Insulated
cables, Cables for
Motor Vehicle,
Flexible cables for
lifts and other
flexible connections,
XLPE Insulated
armored /
unarmored cable,
HR PVC Winding
wires for
submersible motor,
Welding cables,
Elastomer- Rubber
insulated cables,
Elastomer Insulated
Cables for use in
mines, Aerial
Bunched Cable**

Physical Tests on Insulation
& Sheath

Thickness of insulation and
sheath / Overall
Dimensions

IS 10810 (Part 6)
IS 692 Cl. 24.1.e
IS 694 Cl. 10.3.b
IS 1554 (Part 1 & 2)
Cl. 15.1.c,18.1.c
IS 1596
IS 2465 Cl. 12.1.d
IS 4289 (Part 1 & 2)
Cl. 17.1.d,18.1.b
IS 7098 (Part 1,2 & 3)
Cl.15.1.c, 19.1.1.4,19.1.b.1
IS 8783 (Part 1 to 4) Cl. 4.1
IS 9857 Cl. 10.1.b
IS 9968 (Part 1 & 2)
Cl. 21.1.2,22.1.c.1
IS 14494 Cl. 25.1.c
IS 14255 Cl. 10.1.e
IEC 60227 Cl. 1.9
IEC 60245 Cl. 1.9
IEC 60502 (Part 1 & 2)
Cl. 18.1, 17.5
IEC 60811 (Part 201)
BS EN 60811 (Part 201)
IEC 60840 Cl. 10.6
BS 7846 Cl. 6.2,11.2
BS 6724 Cl. 6.2,11.2
BS 6708 Cl. 6.4
BS 7211 Cl. 7.3

Upto 22 mm
Upto 150 mm

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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
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Location: 1

	Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Tensile strength & Elongation at break	IS 10810 (Part 7) IS 692 Cl. 24.1.k.1 IS 694 Cl. 10.3.c.1 IS 1554 (Part 1 & 2) Cl. 15.1.d.1,18.1.d.1 IS 1596 IS 2465 Cl. 12.1.e.1 IS 4289 (Part 1 & 2) Cl. 17.1.e.1,18.1.c.1 IS 7098 (Part 1, 2 & 3) Cl.15.1.d.1, 19.1.3.a,19.1.b.2 IS 8783 (Part 1 to 4) Cl. 3.3.3 IS 9857 Cl. 10.1.c.1 IS 9968 (Part 1 & 2) Cl. 21.1.3.a,22.1.c.2 IS 14494 Cl. 25.1.d.1 IS 14255 Cl. 10.1.c.1 IEC 60227 Cl. 3 IEC 60245 Cl. 3 IEC 60502 (Part 1 & 2) Cl. 18.3, 19.5 IEC 60811 (Part 501) BS EN 60811 (Part 501) IEC 60840 Cl. 12.5.3 BS 7846 Cl. 6.1.1,11.1.1 BS 6724 Cl. 6.1.1,11.1.1 BS 6708 Cl. 6.3 BS 7211 Cl. 7.1	Upto 10 kN Upto 250 mm
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Laboratory Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat
 Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
 Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard ISO/IEC 17025: 2005

Discipline Electrical Testing **Issue Date** 02.04.2015

Certificate Number T-0071 **Valid Until** 30.03.2017

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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
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Location: 1

Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Loss of mass Test	IS 10810 (Part 10) IS 692 Cl. 24.1.k.2 IS 694 Cl. 10.3.c.2 IS 1554 (Part 1 & 2) Cl. 15.1.d.5, 18.1.d.5 IS 1596 IS 2465 Cl. 12.1.e.3 IS 4289 (Part 1 & 2) Cl. 18.1.c.3 IS 7098 (Part 1 & 2) Cl. 15.1.e.3, 19.1.6.e, 19.1.g.2.3 IS 9968 (Part 1 & 2), Cl. 22.1.c.10 IEC 60227 Cl. 3 IEC 60502 (Part 1 & 2) Cl. 18.6, 19.8 IEC 60811 (Part 409) BS EN 60811 (Part 409) IEC 60840 Cl. 12.5.5	RT-200 °C Upto 150 mm Upto 180 gm
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Laboratory Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat
 Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
 Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard ISO/IEC 17025: 2005

Discipline Electrical Testing **Issue Date** 02.04.2015

Certificate Number T-0071 **Valid Until** 30.03.2017

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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
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Location: 1

Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Ageing in air oven	IS 10810 (Part 11) IS 692 Cl. 24.1.k.5 IS 694 Cl. 10.3.c.3 IS 1554 (Part 1 & 2) Cl. 15.1.d.2, 18.1.d.2 IS 1596 IS 2465 Cl. 12.1.e.2 IS 4289 (Part 1 & 2) Cl. 17.1.e.2, 18.1.c.2 IS 7098 (Part 1 & 2) Cl. 15.1.d.2, 19.1.3.b, 19.1.b.3 IS 8783 (Part 1 to 4) Cl. 3.3.4 IS 9857 Cl. 10.1.c.2 IS 9968 (Part 1 & 2) Cl. 21.1.3.b, 22.1.c.3 IS 14494 Cl. 25.1.d.2 IS 14255 Cl. 10.1.c.2 IEC 60227 Cl. 3 IEC 60245 Cl. 3 IEC 60502 (Part 1 & 2) Cl. 18.4, 19.5 IEC 60811 (Part 401) BS EN 60811 (Part 401) IEC 60840 Cl. 12.5.3 BS 7846 Cl. 6.1.2, 11.1.2 BS 6724 Cl. 6.1.2, 11.1.2 BS 6708 Cl. 6.3 BS 7211 Cl. 7.1	RT – 200 °C Upto 150 mm, Upto 10000 N
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Laboratory	Electrical Research and Development Association, ERDA Road, Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat		
Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Electrical Testing	Issue Date	02.04.2015
Certificate Number	T-0071	Valid Until	30.03.2017
Last Amended on	-	Page	54 of 315

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
<u>Location: 1</u>				
	Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Shrinkage Test	IS 10810 (Part 12) IS 692 Cl. 24.1.k.3 IS 694 Cl. 10.3.c.4 IS 1554 (Part 1 & 2) Cl. 15.1.d.3, 18.1.d.3 IS 1596 IS 2465 Cl. 12.1.e.6 IS 4289 (Part 2) Cl. 18.1.c.5 IS 7098 (Part 1 & 2) Cl.15.1.d.4, 19.1.3.e, 19.1.b.5 IS 8783 (Part 1 to 4) Cl. 3.3.5 IS 9968 (Part 1 & 2) Cl.22.1.c.8 IS 14255 Cl. 10.1.c.4 IEC 60502 (Part 1 & 2) Cl. 18.16, 19.18 IEC 60811 (Part 502 & 503) BS EN 60811 (Part 502 & 503) IEC 60840 Cl. 12.5.16 BS 7846 Cl. 18.3, 18.6 BS 6724 Cl. 18.3, 18.6 BS 6708 Cl. 6.3 BS 7211 Cl. 17.6	RT – 200 °C Upto 300 mm

Laboratory Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard ISO/IEC 17025: 2005

Discipline Electrical Testing **Issue Date** 02.04.2015

Certificate Number T-0071 **Valid Until** 30.03.2017

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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
<u>Location: 1</u>				
	Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Heat Shock Test	IS 10810 (Part 14) IS 692 Cl. 24.1.k.6 IS 694 Cl. 10.3.c.5 IS 1554 (Part 1 & 2) Cl. 15.1.d.6, 18.1.d.6 IS 1596 IS 2465 Cl. 12.1.e.5 IS 4289 (Part 2) Cl. 18.1.c.4 IS 7098 (Part 1 & 2) Cl. 15.1.e.6, 19.1.6.f, 19.1.g.2.4 IS 8783 (Part 1 to 4) Cl. 3.3.9 IS 9968 (Part 1 & 2) Cl. 22.1.c.11 IEC 60227 Cl. 3 IEC 60811 (Part 509) BS EN 60811 (Part 509) IEC 60840 Cl. 12.5.8 IEC 60502-1 & 2 Cl. 18.9, 19.11	Qualitative RT – 200°C 1 to 25 mm

Laboratory	Electrical Research and Development Association, ERDA Road, Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat		
Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Electrical Testing	Issue Date	02.04.2015
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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
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Location: 1

Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Hot deformation Test / Pressure Test at high temperature	IS 10810 (Part 15) IS 692 Cl. 24.1.k.4 IS 694 Cl. 10.3.c.6 IS 1554 (Part 1 & 2) Cl. 15.1.d.4,18.1.d.4 IS 1596 IS 2465 Cl. 12.1.e.4 IS 7098 (Part 1,2 & 3) Cl.15.1.e.5, 19.1.6.d,19.1.g.2.5 IS 8783 (Part 1 to 4) Cl. 3.3.8 IS 9968 (Part 1 & 2) Cl. 22.1.c.9 IEC 60227 Cl. 3 IEC 60502 (Part 1 & 2) Cl. 18.7, 19.9 IEC 60811 (Part 508) BS EN 60811 (Part 508) IEC 60840 Cl. 12.5.6 BS 7846 Cl. 11.1.5 BS 6724 Cl. 11.1.5 BS 7211 Cl. 11.1	RT – 200°C Upto 150 mm
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Laboratory Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat
 Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
 Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard ISO/IEC 17025: 2005

Discipline Electrical Testing **Issue Date** 02.04.2015

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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
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Location: 1

	Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Thermal Stability Test	IS 10810 (Part 60) IS 692 Cl. 24.1.k.7 IS 694 Cl. 10.3.c.7 IS 1554 (Part 1 & 2) Cl. 15.1.d.7,18.1.d.7 IS 1596 IS 4289 (Part 2) Cl. 18.1.c.6 IS 7098 (Part 1 & 2) Cl.15.1.e.7, 19.1.6.g,19.1.g.2.7 IS 9968 (Part 1 & 2) Cl. 22.1.c.12 IEC 60227 Cl. 3 IEC 60502 (Part 1 & 2) Cl.19.19 IEC 60811 (Part 405) BS EN 60811 (Part 405)	RT – 200 °C
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Laboratory **Electrical Research and Development Association, ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat**
 Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
 Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard **ISO/IEC 17025: 2005**

Discipline **Electrical Testing** **Issue Date** **02.04.2015**

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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
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Location: 1

	Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Water Absorption Test (Gravimetric)	IS 10810 (Part 33) IS 1554 (Part 1 & 2) Cl. 18.1.d.8 IS 1596 IS 7098 (Part 1 & 2) Cl.15.1.d.5, 19.1.3.f IS 8783 (Part 1 to 4) Cl. 3.3.6 IS 9968 (Part 1 & 2) IS 14494 IS 14255 Cl. 10.1.c.5 IEC 60502 (Part 1 & 2) Cl. 18.13,19.15 IEC 60811 (Part 402) BS EN 60811 (Part 402) BS 7846 Cl. 6.1.3 BS 6724 Cl. 6.1.3 BS 7211 Cl. 7.1	RT – 300°C Upto 150 mm Upto 180 gm
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Laboratory Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat
 Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
 Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard ISO/IEC 17025: 2005

Discipline Electrical Testing **Issue Date** 02.04.2015

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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
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Location: 1

	Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Tear Resistance Test	IS 10810 (Part 17) IS 4289 (Part 1 & 2) Cl. 17.1.f.4 IS 9968 (Part 1 & 2) Cl. 21.1.3.g, 22.1.c.7 IS 14494 Cl. 25.1.d.6 BS 7846 Cl. 11.1.6 BS 6724 Cl. 11.1.6 BS 6708 Cl. 6.3 BS 7211 Cl. 11.1	Upto 10000 N Upto 150 mm
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Laboratory Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat
 Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
 Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard ISO/IEC 17025: 2005

Discipline Electrical Testing **Issue Date** 02.04.2015

Certificate Number T-0071 **Valid Until** 30.03.2017

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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
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Location: 1

	Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Hot set Test	IS 10810 (Part 30) IS 1596 IS 7098 (Part 1 & 2) Cl.15.1.d.3, 19.1.3.d,19.1.b.4 IS 8783 (Part 1 to 4) Cl. 3.3.7 IS 9857 Cl. 10.1.c.5 IS 9968 (Part 1 & 2) Cl. 21.1.3.e, 22.1.c.5 IS 14494 Cl. 25.1.d.4 IS 14255 Cl. 10.1.c.3 IEC 60245 Cl. 4 IEC 60502 (Part 1 & 2) Cl. 18.11, 19.13 IEC 60811 (Part 507) BS EN 60811 (Part 507) IEC 60840 Cl. 12.5.10 BS 7846 Cl. 6.1.4 BS 6724 Cl. 6.1.4 BS 6708 BS 7211 Cl. 7.1	RT – 250°C Upto 150 mm
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Laboratory **Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat**
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard **ISO/IEC 17025: 2005**

Discipline **Electrical Testing** **Issue Date** **02.04.2015**

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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
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Location: 1

Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Ageing in Air Bomb / Oxygen Bomb	IS 10810 (Part 56)	RT – 200°C
		IS 10810 (Part 16)	Upto 150 mm
		IS 2465	Upto 10000 N
		Cl. 12.1.f.2&3	Upto 35 g/cm ²
		IS 4289 (Part 1 & 2)	
		Cl. 17.1.e.2&3,	
		IS 9857 Cl. 10.1.c.3	
		IS 9968 (Part 1 & 2) Cl. 21.1.3.c & d & 22.1.c.4	
		IS 14494	
		Cl. 25.1.d.3	
		IEC 60245	
		Cl. 4	
		IEC 60811 (Part 412)	
BS EN 60811 (Part 412)			
IEC 60840			
Cl. table 5 c			

Laboratory **Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat**
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard **ISO/IEC 17025: 2005**

Discipline **Electrical Testing** **Issue Date** **02.04.2015**

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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
<u>Location: 1</u>				
	Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Oil Resistance Test	IS 10810 (Part 31) IS 2465 Cl. 12.1.m IS 4289 (Part 1 & 2) Cl. 17.1.f.3, IS 9857 Cl. 10.1.c.4 IS 9968 (Part 1 & 2) Cl. 21.1.3.f, 22.1.c.6 IS 14494 Cl. 25.1.d.5 IEC 60245 Cl. 4 IEC 60811 (Part 404) BS EN 60811 (Part 404)	RT-200°C Upto 150 mm Upto 10000 N
		Vicat softening point	IS 10810 (Part 22) IS 14255 Cl. 10.1.d.4	RT-250°C
		Melt flow index Test	IS 10810 (Part 23) IS 14255 Cl. 10.1.d.2	RT-250°C Upto 180 g
		Environmental Stress Cracking	IS 10810 (Part 29) IS 14255 Cl. 10.1.d.5	Qualitative RT-200°C
		Bleeding & Blooming	IS 10810 (Part 19) IS 6944	Qualitative RT-200°C Upto 25 mm

Laboratory

**Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat**
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard**ISO/IEC 17025: 2005****Discipline****Electrical Testing****Issue Date 02.04.2015****Certificate Number****T-0071****Valid Until 30.03.2017****Last Amended on****-****Page 63 of 315**

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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Location: 1

**Paper Insulated
Lead Sheathed
Cables, PVC**

Effect of lubricating oil,
break fluid, diesel, petrol

IS 2465 Cl. 12.1.n

RT-200°C
Upto 150 mm
Upto 5000 N

**Insulated armored /
unarmored cables,
PVC Insulated (HD)
armored /
unarmored Electric
cables, PE Insulated
cables, Cables for
Motor Vehicle,
Flexible cables for
lifts and other
flexible connections,
XLPE Insulated
armored /
unarmored cable,
HR PVC Winding
wires for
submersible motor,
Welding cables,
Elastomer- Rubber
insulated cables,
Elastomer Insulated
Cables for use in
mines, Aerial
Bunched Cable**

Tests on Cable

High voltage
(Water immersion Test)

IS 10810 (Part 45)
IS 694
IS 1554 (Part 1 & 2)
Cl. 15.1.f
IS 1596
IS 4289 (Part 1 & 2)
Cl. 17.1.g,18.1.d
IS 8783 (Part 1 to 4)
Cl. 4.5
IS 9857
Cl. 10.1.d
IS 9968 (Part 1 & 2)
Cl. 21.1.6
IS 14494
Cl. 25.1.k
IEC 60811 (Part 301 & 302)

Upto 20 kV AC
Upto 1.5 kV DC

Laboratory Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat
 Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
 Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard ISO/IEC 17025: 2005

Discipline Electrical Testing **Issue Date** 02.04.2015

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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
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Location: 1

Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Insulation Resistance Test	IS 10810 (Part 43) IS 692 IS 694 Cl. 10.3.e.3 IS 1554 (Part 1 & 2) Cl. 15.1.e,18.1.e IS 1596 IS 4289 (Part 1 & 2) Cl. 17.1.h,18.1.e IS 8783 (Part 1 to 4) Cl. 3.3.1 IS 7098 (Part 1 & 2) Cl.15.1.f, 19.1.11 IS 9968 (Part 1 & 2) Cl. 21.1.5,22.1.d IS 14494 Cl. 25.1.e IS 14255 Cl. 10.1.d.f IEC 60227 Cl. 2.4 IEC 60245 Cl. 2.4 IEC 60502 (Part 1 & 2) Cl. 17.1.2/,20.3 IEC 60811 (Part 301 & 302) BS EN 60811 (Part 301 & 302) BS 7846 Cl. 6.1.5,18.7 BS 6724 Cl. 6.1.5,18.7 BS 6708 Cl. 6.3 BS 7211 Cl. 17.2	10 ⁶ to 10 ¹⁵ Ω, 0 to 150 mm. RT-100°C
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Laboratory	Electrical Research and Development Association, ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat		
Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Electrical Testing	Issue Date	02.04.2015
Certificate Number	T-0071	Valid Until	30.03.2017
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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
<u>Location: 1</u>				
	Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	High Voltage Test at R T	IS 10810 (Part 45) IS 692 IS 694 Cl. 10.3.e.2 IS 1554 (Part 1 & 2) Cl. 15.1.g,18.1.m IS 1596 IS 2465 Cl. 12.1.g IS 7098 (Part 1 & 2) Cl.15.1.g IS 9968 (Part 1 & 2) Cl. 22.2.2 IS 14494 Cl. 25.1.k IS 14255 Cl. 10.1.g IEC 60227 Cl. 2.3 IEC 60245 Cl. 2.3 IEC 60502 (Part 1 & 2) Cl.15.3, 18.2.9 BS EN 60811 (Part 301 & 302) BS 7846 Cl. 16.3 BS 6724 Cl. 16.3 BS 6708 Cl. 6.13.3 BS 7211 Cl. 17.3	Upto 20 kV

Laboratory Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat
 Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
 Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard ISO/IEC 17025: 2005

Discipline Electrical Testing **Issue Date** 02.04.2015

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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
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Location: 1

	Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Flammability Test	IS 10810 (Part 53) IS 692 IS 694 Cl. 10.3.e.5 IS 1554 (Part 1 & 2) Cl. 15.1.h,18.1.n IS 1596 IS 4289 (Part 1 & 2) Cl. 17.1.k,18.1.g IS 7098 (Part 1,2 &3) Cl.15.1.h, 19.1.15,19.1.h IS 9857 Cl. 10.1.f IS 9968 (Part 1 & 2) Cl. 21.1.7,22.1.n IS 14494 Cl. 25.1.n IEC 60227 Cl. 3 IEC 60245 Cl. 5 IEC 60502 (Part 1 & 2) Cl. 18.14, 19.16 IEC 60332 (Part 1 & 2) BS 4066 BS 7846 Cl. 17.2 BS 6724 Cl. 17.2 BS 6708 Cl. 6.13.5 BS 7211 Cl. 16.5	Upto 300 mm
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Laboratory Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

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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
<u>Location: 1</u>				
	Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Flammability Test on bunched cables	IEC 60332-3 IEEE 383 IS 10810 (Part 62) IS 1554 (Part 1 & 2) Cl. 15.1.1.c, 18.1.1.c IS 7098 (Part 1 & 2) Cl. 15.1.1.c, 19.1.1.c BS 4066 IEC 60502-1 Cl. 18.14 BS 7846 Cl. 18.5 BS 6724 Cl. 18.5 BS 7211 Cl. 17.5	Upto 3 m
		Oxygen Index Test Temperature Index Test	IS 10810 (Part 58 & 64) ASTM D 2863 IS 694 Cl. 10.3.c.11,12 IS 1554 (Part 1 & 2) Cl. 15.1.1.ag, 18.1.1.ag IS 7098 (Part 1 & 2) Cl. 15.1.1.ag, 19.1.1.af	Upto 100 % 0.1 %
		Smoke density Test	ASTM D 2843	0 to 100 % 1 %
		Fire Resistance Test Cat C, W, Z	IEC 60331 (Part 11 & 21) BS 6387 BS 7846 Cl. 17.4.2 BS 6724 Cl. 17.4.2	3 A Upto 1000 V

Laboratory	Electrical Research and Development Association, ERDA Road, Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat		
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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
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Location: 1

Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Flame retardant Test Swedish chimney Test	IS 10810-61 IS 694 IS 1554 (Part 1 & 2) Cl. 15.1.1.b,18.1.1.b IS 7098 (Part 1 & 2) Cl.15.1.1.b, 19.1.1.b	Upto 99.9 hr 300 mm, 1 mm
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Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard **ISO/IEC 17025: 2005**

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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
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Location: 1

Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Smoke density of electric cables under fire conditions (Smoke emission – 3 M3 chamber)	IS 10810-63 IEC 61034 (Part 1 & 2) BS 6724 Cl. 17.3 BS 7846 Cl. 17.3 BS 7211 Cl. 16.6	0 to 100 % 1 %
	Toxicity index Test	NES 713	Qualitative
	Determination of the amount of halogen acid gas evolution Corrosive & halogen acid gas	IS 10810-59 IEC 60754 (Part 1) IS 694 Cl. 10.3.c.13 IS 1554 (Part 1 & 2) Cl. 15.1.1.f,18.1.1.e IS 7098 (Part 1 & 2) Cl.15.1.1.f,19.1.1.e BS 7846 Cl. 18.5 BS 6724 Cl. 8.2 BS 7211 Cl. 7.4	Upto 1000 ml 0.5 ml

Laboratory **Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat**
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

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Location: 1

Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Cold Impact Test	IS 10810 (Part 21) IS 694 Cl. 10.3.c.9 IS 1554 (Part 1 & 2) Cl. 15.4.b,18.4 IS 7098 (Part 1 & 2) Cl.15.4.b,19.4 IEC 60502 (Part 1 & 2) Cl. 18.8,19.10 IEC 60811 (Part 506) IEC 60840 Cl. table 5 a BS 7846 Cl. 11.1.3&4 BS 6724 Cl. 11.1.3&4 BS 7211 Cl. 11.1	Rt to -40°C
	Cold bend Test	IS 10810 (Part 20) IS 694 Cl. 10.3.c.8 IS 1554 (Part 1 & 2) Cl. 15.4.a, IS 7098 (Part 1 & 2) Cl.15.4.a IEC 60227 Cl. 3.2 IEC 60502 (Part 1 & 2) Cl. 18.8,19.10 IEC 60811 (Part 504) IEC 60840 Cl. table 5 a BS 7846 Cl. 11.1.3&4 BS 6724 Cl. 11.1.3&4 BS 7211 Cl. 11.1	Rt to -40°C Upto 25 mm

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Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

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Location: 1

Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Cold Elongation Test	IEC 811-1-4 IEC 60227 Cl. 3 IEC 60502 (Part 1 & 2) Cl. 18.8,19.10 IEC 60811 (Part 505) IEC 60840 Cl. table 5 a BS 7846 Cl. 11.1.3&4 BS 6724 Cl. 11.1.3&4 BS 7211 Cl. 11.1	RT to – 40°C Upto 150 mm, Upto 5000 N
	Additional Ageing Test	IS 694 Cl. 10.e.6 IS 1596	RT-200°C Rt to –40°C Upto 10 kV
	Water Absorption Test (Electrical)	IS 10810 (Part 28) IS 9968 Cl. 22.1.m IS 14494 Cl. 25.1.m IEC 60502 (Part 1 & 2) Cl. 18.13, 19.15 NEMA WC 53, 70	RT-100°C DF Upto 10 ⁻⁵
	Capacitance Test	IS 10810 (Part 28) IS 2465 Cl. 12.1.h	RT-100°C DF Upto 10 ⁻⁵
	Flexing Test	IS 10810- 57 IEC 60227 Cl. 3.1 IS 694 Cl.10.3.e.7	Qualitative Upto 10 kV

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Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

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Location: 1

Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Determination of pH & conductivity	IEC 60754 (Part 2) IEC 60840	Upto 1000 ml 0.5 ml 1 pH to 14 pH 2 μ Siemens to 2 Siemens
	Static flexibility Test	IS 10810- 54 IS 4289 (Part 1 & 2) IS 9857 Cl. 10.1.e IEC 60245 Cl. 3.2 IEC 60227 Cl. 3.5	0 to 1000 mm
	Bending Test	IS 10810-50 IEC 60227 Cl. 3.2 IS 14255 Cl. 11.4	0 to 300 mm
	Durability & Legibility of marking	IEC 60227 Cl. 1.8	Qualitative
	Compatibility Test	BS EN 60811 (Part 401) IEC 60840 Cl. 12.5.4 BS 7846 Cl. 18.2 BS 6724 Cl. 18.2 BS 7211 Cl. 17.4 IS 7098 (Part 2 & 3) Cl. 19.1.7	RT – 200°C Upto 150 mm, Upto 5000 N
	Non Contamination Test	IS 7098-3 Cl. 19.1.b.6	Upto 7X
	Transfer Impedance	IEC 60227 Cl.	> 250 Ω at 30 MHz.

Laboratory

**Electrical Research and Development Association, ERDA Road,
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Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

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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
<u>Location: 1</u>				
	Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Wear Resistance	IEC 60245-2 Cl. 3.3	Upto 10 kV
		Effect of heat on flexibility	IS 2465 Cl. 12.1.k	Upto 10 kV
		Snatch Test	IEC 60227 Cl. 3.3	Upto 500 g
		Persulphate Test	IS 10810-4 IS 9968 (Part 1 & 2) Cl. 21.1.1, 22.1.a.5 IS 694 Cl. 10.2.q IS 2465 Cl. 12.1.b	Upto 150 mm Upto 180 g
		Ozone Resistance Test	IS 2465 Cl. 12.1.j IS 9968 (Part 1 & 2) Cl. 4.1.7 of 6380 IS 14494 Cl. 25.1.d.7 IEC 60811 (Part 403) BS EN 60811 (Part 403) IEC 60502 (Part 1 & 2) Cl. 18.10,19.12 IEC 60840 Cl.22.5.9	-

Laboratory **Electrical Research and Development Association, ERDA Road, Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat**
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
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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
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Location: 1

Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Carbon black content Test	IS 10810 (Part 32) IS 7098 (Part 1,2 &3) Cl. 19.1.6.h,19.1.g.3.1 IS 14255 Cl. 10.1.d.3 IEC 60502 (Part 1 & 2) Cl. 18.15,19.17 IEC 60840 Cl. 12.5.12	Upto 180 g Upto 1100°C
	Volume Resistivity of semi conducting screen	IS 7098 (Part 3) IEC 60502 (Part 2) Cl. 18.2.10 IEC 60840 Cl. 12.4.9 IS 7098 (Part 2)	10 ⁶ -10 ¹⁵ Ω 0 to 150 mm RT-100°C
	Abrasion Test	BS 7846 Cl. 18.4 BS 6724 Cl. 18.4	Upto 1000 g
	Armour wires for Cables (Round, formed, Strips)	IS 692 Cl. 24.1.h IS 1554 (Part 1 & 2) Cl. 15.1.b IS 7098 (Part 1,2 &3) Cl. 19.1.2,19.1.f IS 9968 (Part 1 & 2) Cl. 22.1.b IS 14494 Cl. 25.1.b IEC 60840 Cl. 10.8 BS 6724 Cl. 10.3 BS 7846 Cl. 10.3	

Laboratory **Electrical Research and Development Association, ERDA Road, Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat**
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

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<u>Location: 1</u>				
	Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Dimensions	IS 692 Cl. 24.1.h.1 IS 1554 (Part 1 & 2) Cl. 15.1.b.1,18.1.b IS 7098 (Part 1,2 &3) Cl. 19.1.2,19.1.f.1 IS 9968 (Part 2) Cl. 22.1.b.1 IS 14494 Cl. 25.1.b.1 IS 3975 Cl. 7 IS 10810 (Part 36) IEC 60840 Cl. 10.8 BS 6724 Cl. 10.3.a BS 7846 Cl. 10.3.a BS 6708 Cl. 6.4	Upto 150 mm Upto 25 mm
		Tensile Strength Test	IS 692 Cl. 24.1.h.2.1 IS 1554 (Part 1 & 2) Cl. 15.1.b.2.1,18.1.b IS 7098 (Part 1,2 & 3) Cl. 19.1.2,19.1.f.2 IS 9968 (Part 2) Cl. 22.1.b.2 IS 14494 Cl. 25.1.b.2 IS 3975 Cl. 8 IS 10810 (Part 37)	Upto 10 kN, Upto 25 mm, Upto 150 mm Upto 180 g
		Elongation	IS 692 Cl. 24.1.h.2.2 IS 1554 (Part 1 & 2) Cl. 15.1.b.2.2,18.1.b IS 7098 (Part 1,2 &3) Cl. 19.1.2,19.1.f.2 IS 9968 (Part 2) Cl. 22.1.b.2 IS 14494 Cl. 25.1.b.2 IS 3975 Cl. 8 IS 10810 (Part 37)	Upto 300 mm

Laboratory **Electrical Research and Development Association, ERDA Road, Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat**
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
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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
<u>Location: 1</u>				
	Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Torsion Test	IS 692 Cl. 24.1.h.2.3 IS 1554 (Part 1 & 2) Cl. 15.1.b.2.3,18.1.b IS 9968 (Part 2) Cl. 22.1.b.3 IS 3975 Cl. 8.2 IS 10810 (Part 38)	Upto 300 mm Upto 99999 turns
		Winding Test	IS 692 Cl. 24.1.h.2.4 IS 1554 (Part 1 & 2) Cl. 15.1.b.2.4,18.1.b IS 9968 (Part 1 & 2) Cl. 22.1.b.4 IS 3975 Cl. 8.3 IS 10810 (Part 39)	1 to 25 mm
		Electrical Resistance Test / Conductance Test of armour	IS 692 Cl. 24.1.h.2.7 IS 1554 (Part 1 & 2) Cl. 15.1.b.2.7,18.1.b IS 7098 (Part 1,2 & 3) Cl. 19.1.2,19.1.f.4 IS 14494 Cl. 25.1.b.5 IS 3975 Cl. 8.4 IS 10810 (Part 42)	200 mΩ to 2000 Ω

Laboratory **Electrical Research and Development Association, ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat**
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
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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
<u>Location: 1</u>				
	Paper Insulated Lead Sheathed Cables, PVC Insulated armored / unarmored cables, PVC Insulated (HD) armored / unarmored Electric cables, PE Insulated cables, Cables for Motor Vehicle, Flexible cables for lifts and other flexible connections, XLPE Insulated armored / unarmored cable, HR PVC Winding wires for submersible motor, Welding cables, Elastomer- Rubber insulated cables, Elastomer Insulated Cables for use in mines, Aerial Bunched Cable	Wrapping Test	IS 3975 Cl. 8.3 IS 7098 (Part 1,2 & 3) Cl. 19.1.2,19.1.f.3 BS 6724 Cl. 10.3.c BS 7846 Cl. 10.3.c BS 7211	1 to 25 mm Upto 300 mm
		Mass of Zinc coating	IS 692 Cl. 24.1.h.2.6 IS 1554 (Part 1 & 2) Cl. 15.1.b.2.6,18.1.b IS 9968 (Part 1 & 2) Cl. 22.1.b.5 IS 14494 Cl. 25.1.b.4 IS 3975 Cl. 9.1 IS 10810 (Part 41) BS 6724 Cl. 10.3.b BS 7846 Cl. 10.3.b	Upto 100 ml 0.5 ml
		Uniformity of Zinc coating	IS 692 Cl. 24.1.h.2.5 IS 1554 (Part 1 & 2) Cl. 15.1.b.2.5,18.1.b IS 3975 Cl. 9..2 IS 10810 (Part 40)	Upto 100 ml 0.5 ml

Laboratory

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 Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
 Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

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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
<u>Location: 1</u>				
5.	Enameled winding wires	Dimensions	IS 13778 (Part 2) Cl.3 IS 13730 Cl.4 IEC 60317 Cl.4 IEC 60851(Part 2) Cl.3	0 to 25 mm
		Elongation	IS 13778 (Part 3) Cl.3 IS 13730 Cl.6 IEC 60317 Cl.6 IEC 60851 (Part 3) Cl.3	Upto 300 mm
		Springiness Test	IS 13778 (Part 3) Cl.4 IS 13730 Cl.7 IEC 60317 Cl.7 IEC 60851 (Part 3) Cl.4	Upto 72°, Upto 2000 g
		Flexibility and adherence Test: Mandrel winding Jerk, Peel, Stretch	IS 13778 (Part 3) Cl.5 IS 13730 Cl.8 IEC 60317 Cl.8 IEC 60851 (Part 3) Cl.5	1 to 25 mm 25 to 200 N Upto 5000 N
		Resistance to abrasion Test	IS 13778 (Part 3) Cl.6 IS 13730 Cl.11 IEC 60317 Cl.11 IEC 60851 (Part 3) Cl.6	Upto 5 N

Laboratory	Electrical Research and Development Association, ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat		
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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
<u>Location: 1</u>				
	Enameled winding wires	Heat Shock Test	IS 13778 (Part 6) Cl.3 IS 13730 Cl.9 IEC 60317 Cl.9 IEC 60851 (Part 6) Cl.3	RT-200°C Upto 25 mm
		Cut through Test	IS 13778 (Part 6) Cl.4 IS 13730 Cl.10 IEC 60317 Cl.10 IEC 60851 (Part 6) Cl.5	Rt to 300 °C 0 to 125 V 0 to 25 mA,
		Break down voltage Test	IS 13778 (Part 5) Cl.4 IS 13730 Cl.13 IEC 60317 Cl.13 IEC 60851 (Part 5) Cl.4	Upto 20 kV
		Continuity of insulation Test	IS 13778 (Part 5) Cl.5 IS 13730 Cl.14 IEC 60317 Cl.14 IEC 60851 (Part 5) Cl.5	Upto 3000 V DC
		Thermal Endurance Test Temperature Index Test	IS 13778 (Part 6) Cl.5 IS 13730 Cl.15 IEC 60317 Cl.15 IEC 60851 (Part 6) Cl.5	RT –300°C, Upto 20 kV

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Discipline **Electrical Testing** **Issue Date** **02.04.2015**

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Location: 1

Enameled winding wires	Electrical Resistance	IS 13778 (Part 5) Cl.3 IS 13730 Cl.5 IEC 60317 Cl.5 IEC 60851 (Part 5) Cl.3	200 mΩ to 2000 Ω,
	Resistance to transformer oil	IS 13778 (Part 4) Cl.6 IS 13730 Cl.20 IEC 60317 Cl.20 IEC 60851 (Part 4) Cl.6	Upto 50 kV
	Resistance to refrigerants	IS 13778 (Part 4) Cl.4 IS 13730 Cl.16 IEC 60317 Cl.16 IEC 60851 (Part 4) Cl.4	RT: 200°C Upto 150 mm Upto 180 g
	Resistance to solvent	IS 13778 (Part 4) Cl.3 IS 13730 Cl.12 IEC 60317 Cl.12 IEC 60851 (Part 4) Cl.3	-
	Resistance to hydrolysis	IS 13778 (Part 4) Cl.6 IS 13730 Cl.20 IEC 60317 Cl.20 IEC 60851 (Part 4) Cl.6	Upto 50 kV

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Location: 1

	Enameled winding wires	Solderability	IS 13778 (Part 4) Cl.5 IS 13730 Cl.17 IEC 60317 Cl.17 IEC 60851 (Part 4) Cl.5	Upto 300 °C
		Tan delta Test	IS 13778 (Part 5) Cl.6 IS 13730 Cl.19 IEC 60317 Cl.19 IEC 60851 (Part 5) Cl.6	RT: 300°C DF: Upto 10 ⁻⁵

IV. ELECTRICAL MATERIALS

Solid Insulating Materials

1.	Rubber Hand gloves	Thickness	IS 4770-91 Cl.6.1.1.a IS 13774 Cl.5.1.4 IEC / EN 60903 5.1.4	0 to 25 mm
		Tensile Strength & Elongation	IS 3400 (Part 1) IS 4770 Cl.6.1.1.b&c IS 13774 Cl.5.2.1 IEC / EN 60903 Cl.5.2.1	Upto 10000 N Upto 150 mm

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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
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Location: 1

Rubber Hand gloves	Tension Set	IS 3400 (Part 13) IS 4770 Cl.6.1.1.d IS 13774 Cl.5.2.2 IEC / EN 60903 Cl.5.2.2	Upto 10000 N Upto 150 mm
	Tensile stress at 200% Elongation	IS 3400 (Part 1) IS 4770 Cl.6.1.1.e IS 13774 Cl.5.2.1 IEC / EN 60903 Cl.5.2.1	Upto 10000 N Upto 150 mm
	Tear Strength	IS 3400 (Part 17) IS 4770 Cl.6.1.1.f IS 13774 Cl.6.2.4 IEC / EN 60903 Cl.6.2.4	Upto 10000 N Upto 150 mm
	Ageing in Oven	IS 3400 (Part 4) IS 4770 Cl.6.1.1.g IS 13774 Cl.8.5 IEC / EN 60903 Cl.8.5	RT: 200°C Upto 150 mm, Upto 10000 N

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<u>Location: 1</u>				
	Rubber Hand gloves	Puncture Resistance	IS 4770-91 Cl.6.1.1.h IS 13774 Cl.6.1 IEC / EN 60903 Cl.6.1	Upto 10000 N Upto 150 mm
		Moisture Absorption	IS 4770-91 Cl.6.1.1.j IS 13774 Cl. 6.1.1.j IEC / EN 60903 Cl. 6.1.1.j	RT: 200°C Upto 150 mm Upto 180gm
		Proof Voltage and Leakage Current	IS 4770: 91 Cl.6.1.1.n IS 13774 Cl. 10.3 & 8.4.2 IEC/EN 60903 Cl.10.3 & 8.4.2	Upto 50 kV
		Break Down Voltage Test	IS 4770: 91 Cl.6.1.1.p IS 13774 Cl. 6.1.1.p IEC/EN 60903 Cl. 6.1.1.p	Upto 50 kV
2.	Pre Compressed Board	Electric strength	IEC 60641-2: 2004 Cl. 20	0.5 kV to 100 kV/mm

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<u>Location: 1</u>				
3.	Press Board	Electric strength	IS 1576: 1992 Cl. 5.5	0.5 kV to 50 kV
4.	Insulating Paper	Dissipation factor	IS 9335 (Part 2): 1998 Cl. 22 IEC 60554-2: 2001 Cl. 25	0.001 to 0.1
		Electric strength	IS 9335 (Part 2): 1998 Cl. 21/ IEC 60554-2: 2001 Cl. 24	0.5 kV to 15 kV/mm
5.	Pressure sensitive adhesive tape	Tensile strength	IS 7809 (Part 2): 1977 Cl. 9 IEC 60454-2: 2007 Cl. 8	0.1 N to 300 N/ mm of width per mm thickness
		Electric strength at RT	IS 7809 (Part 2): 1977 Cl. 12 IEC 60454-2: 2007 Cl. 17	0.5 kV to 100 kV/mm
		Electric strength after humid conditioning	IS 7809 (Part 2): 1977 Cl. 13 IEC 60454-2: 2007 Cl. 18	0.5 kV to 70 kV/mm

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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
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Location: 1**Liquid dielectric materials**

6.	Transformer Oil	Appearance	IS 335: 1993 Cl. 9.1.i IS 12463: 1988 Cl. 8.1.i IS 1866: 2000 Cl. 7.1	Qualitative
		Density at 29.5 °C	IS 1448 (Part 16): 1990 IS 335: 1993 Cl. 9.1.ii IS 12463: 1988 Cl. 8.1.ii IS 1866: 2000 Cl.7.11	0.80 g/cm ³ to 0.90 g/cm ³ , 0.0005 g/cm ³
		Kinematic Viscosity at 27 °C	IS 1448 (Part 25): 1976 IS 335: 1993 Cl. 9.1.iii IS 12463: 1988 Cl. 8.1.iii IS 1866: 2000 Cl. 7.12	2: 2000 cSt, 1 cSt
		Interfacial Tension	IS 6104: 1971 IS 335: 1993 Cl. 9.1.iv IS 12463: 1988 Cl. 8.1.iv IS 1866: 2000 Cl. 7.7	1 mN/m to 90 mN/m, 1 mN/m

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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
<u>Location: 1</u>				
	Transformer Oil	Flash Point	IS 1448 (Part 21): 2012 IS 335: 1993 Cl.9.1.v IS 12463: 1988 Cl. 8.1.v IS 1866: 2000 Cl.7.9	Ambient (-)350°C/0.5°C
		Pour Point	IS 1448 (Part 10): 1970 IS 335: 1993 Cl. 9.1.vi IS 12463: 1988 Cl. 8.1.vi IS 1866: 2000 Cl. 7.10	Ambient to (-)50 °C, 1°C
		Neutralization Value	IS 1448 (Part 2): 2007 IS 335: 1993 Cl. 9.1.vii IS 12463: 1988 Cl. 8.1.vii IS 1866: 2000 Cl. 7.4	0.0001 mg KOH to 10 mg KOH/g of oil , 0.0001 mg KOH/ g of oil
		Electric Strength	IS 6792: 1992 IS 335: 1993 Cl. 9.1.ix IS 12463: 1988 Cl. 8.1.ix IS 1866: 2000 Cl. 7.2	1 kV to 100 kV, 1 kV

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Location: 1

Transformer Oil	Dielectric Dissipation Factor	IS 6262: 1971 IS 335: 1993 Cl. 9.1.x IS 12463: 1988 Cl. 8.1.x IS 1866: 2000 Cl. 7.6.1	0.0001 to 1.000, (±) 3 % of rdg., (±) 0.2 % of F.S.
	Specific Resistance (Resistivity)	IS 6103: 1971 IS 335: 1993 Cl. 9.1.xi IS 12463: 1988 Cl. 8.1.xi IS 1866: 2000 Cl. 7.6.2	1 x 10 ⁹ Ωcm to 10 ¹⁵ Ωcm / (±) 2 % of rdg. (±) 0.2 % of F.S.
	Corrosive Sulphur	IS 335: 1993 Cl. 9.1.viii IS 12463: 1988 Cl. 8.1.viii	Qualitative
	Oxidation Stability	IS 335: 1993 Cl. 9.1.xii IS 12463: 1988 Cl. 8.1.xii IS 1866: 2000 Cl. 7.13	Qualitative
	Ageing Characteristics	IS 12177: 1987 IS 335: 1993 Cl.9.1.xiii	Qualitative

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Location: 1

Transformer Oil	Presence of oxidation Inhibitor	IS 13631: 1992 IS 335: 1993 Cl. 9.1.xiv IS 12463: 1988 Cl. 8.1.xiv	0.02 % to 1.0 %, 0.02 %
	Water Content	IS 13567: 1992 IS 335: 1993 Cl. 9.1.xv IS 12463: 1988 Cl. 8.1.xv IS 1866: 2000 Cl. 7.3	1 mg/kg to 2000 mg/kg 0.1 mg/kg
	Sediments & Sludge	IS 1866: 2000 Cl. 7.5 IS 335: 1993 IS 12463: 1988	0.0001 % to 5.0 % / 0.0001 %
	Oxidation Stability by rotating bomb	IS 12958: 1990 IS 12463: 1988 Cl.8.1.xiii	1 min to 1000 min, 1 min

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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
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Location: 1

Transformer Oil	Dissolved Gas Analysis H ₂ O ₂ N ₂ CH ₄ C ₂ H ₄ C ₂ H ₆ C ₂ H ₂ C ₃ H ₆ + C ₃ H ₈ CO ₂ CO	IS 9434: 1992 IEC 60567: 2011 IS 10593: 2006 IS 1866: 2000 IEC 60599: 2007 ASTM D 3612: 2002	1 μl/l to 10 ⁶ μl/l Detection limit : 0.1 μl/l
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7. Varnish	Electric strength	IS 10026 (Part 2): 1999 Cl. 20	0.5 kV to 130 kV/mm
	Volume resistivity	IS 10026 (Part 2): 1999 Cl. 19	10 ¹¹ Ωcm to 10 ¹⁵ Ωcm
	Resistance to tracking	IS 10026 (Part 2): 1999 Cl. 21 IEC 60112: 2003 with Amd. 1 2009 Cl. 8 IS 2824: 2007 Cl. 8	100 V to 600 V

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Location: 1

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
8.	Magnetic materials Electrical & Magnetic Steel Sheets & Materials	Specific Total Loss / Core Loss Measurement & Including Accelerated Ageing Test	IS 649 (Sec II): 1997 IS 648: 2006 Cl. 7.1.2 IS 648: 2006 Cl. 7.1.2.3 IS 3024: 2006 Cl. 8.1 IS 3024: 2006 Cl. 14.4 IS 15391: 2003 Cl. 9.3 IEC 60404 (Part 2): 2008 Cl. 4 IEC 60404 (Part 8 & 4): 2013 Cl. 7.1.3, 8.3.1 & 8.4.2.1 IEC 60404 (Part 8 & 4): 2013 Cl. 8.3.1 IEC 60404 (Part 8 & 7): 2008 Cl. 7.1.3, 8.3.1 & 8.4.2 IEC 60404 (Part 8 & 7): 2008 Cl. 8.3.1 ASTM A 343: 2014	0.001 T up to 2 T

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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
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Location: 1

Electrical & Magnetic Steel Sheets & Materials	Magnetic Polarization / A.C. Magnetization / A.C. Permeability	IS 3024: 2006 Cl. 8.2	1 A/m up to 30,000 A/m	
		IS 648: 2006 Cl. 7.1.1		
		IS 649 (Sec II): 1997		
		IS 15391: 2003 Cl. 9.2		
		IEC 60404 (Part 2): 2008 Cl. 5		
		IEC 60404 (Part 8 & 7): 2008 Cl. 7.1.2, 8.3.1 & 8.4.2		
		IEC 60404 (Part 8 & 4): 2013 Cl. 7.1.2, 8.3.1 & 8.4.2.1		
		ASTM A 343: 2014		
		IS 649 (Sec IV): 1997		D.C: 0.001 Upto 2 V Current-0.001 Upto 1.0 A Pressure 10 psi Upto 1000 psi
		IS 3024: 2006 Cl. 9.0		
IS 648: 2006 Cl. 7.2.6				
IEC 60404 (Part 8 & 7): 2008 Cl. 7.3.5, 8.3.3.4 & 8.4.4.4				
		IEC 60404 (Part 11): 2012		
		ASTM A 717: 2012		

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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
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Location: 1

Electrical & Magnetic Steel Sheets & Materials

Stacking Factor / Lamination Factor

IS 649 (Sec VII): 1997
IS 3024: 2006 Cl. 10.1
IS 648: 2006 Cl. 9.1
IEC 60404 (Part 8 & 7): 2008 Cl. 7.3.2, 8.3.3.1 & 8.4.4.1
IEC 60404 (Part 8 & 4): 2013 Cl. 7.3.2, 8.3.3.1 & 8.4.4.1
IEC 60404 (Part 13): 1995
ASTM A 719 : 2014

0.01 kN to 15 kN

Lamination Thickness / Measurement of Thickness / Thickness Tolerance

IS 649 (Sec X): 1997
IS 3024: 2006 Cl. 11.1
IS 648: 2006 Cl. 8.1
IEC 60404 (Part 8 & 7): 2008 Cl. 7.2.1 & 8.4.3.1
IEC 60404 (Part 8 & 4): 2013 Cl. 7.2.1 & 8.4.3.1 of

0.001 to 25 mm

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Location: 1

Electrical & Magnetic Steel Sheets & Materials	Electrical Resistivity	IS 649 (Sec V): 1997 ASTM A 712 : 2014	1 to 100 $\mu\Omega\text{cm}$
	Anisotropy of losses	IS 648: 2006 Cl. 7.1.2.4 IEC 60404 (Part 8 & 4): 2013 Cl. 7.1.4 & 8.4.2.2	0.001 T to 2 T (Qualitative)
	Thermal Effect on Coating	IS 649: 1997 Cl. 67 IS 648: 2006 Cl. 7.2.7	1 °C to 400 °C (Qualitative)
	Resistance to Solvents & Cleanliness	IS 649 : 1997 Cl. 68 IS 648: 2006 Cl. 7.2.8	Qualitative
	Ductility / Bend Test / Number of Bends	IS 649 (Sec VII): 1997 IS 648: 2006 Cl. 9.2 IS 3024: 2006 Cl. 10.2 IEC 60404 (Part 8 & 4): 2013 Cl. 7.3.3, 8.3.3.2 & 8.4.4.2 IEC 60404 (Part 8 & 7): 2008 Cl. 7.3.3, 8.3.3.2 & 8.4.4.2	Qualitative 1 mm of strip thickness & 5 mm radius
Adherence Test	IS 649: 1997 Cl. 68.7 IS 648: 2006 Cl. 6.3.2 IEC 60404 (Part 8 & 4): 2013 Cl. 6.4	Qualitative 1 mm of strip thickness & 5 mm radius	

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Location: 1

	Electrical & Magnetic Steel Sheets & Materials	Specific total loss / Specific core loss Measurement using single sheet core loss Tester & including Accelerated Ageing Test using single sheet core loss Tester	IS 649 (Sec II): 1997 Cl. 6.1.2.15 IS 649: 1997 IS 3024: 2006 Cl. 14.3 IEC 60404 (Part 3): 2010 Cl. 4.0 IEC 60404 (Part 8 & 7): 2008 Cl. 8.3.1	0.001 T to 2 T
		Peak value of Magnetic Polarization / Magnetic Polarization using single sheet core loss Tester	IS 649 : 1997 Cl. 6.1.2.15 IS 3024: 2006 Cl. 14.3 IEC 60404 (Part 3): 2010 Cl. 5.0 IEC 60404 (Part 8 & 7): 2008 Cl. 8.3.1	1 A/m to 30,000 A/m
9.	Conductors Metals, Alloys & Products	Resistance measurement	IS 5484: 1997 Cl. 9 IS 2121 (Part 1): 1981 Cl. 4.1 & 7.5 IS 9997: 1991 Cl. 8 ASTM B-193: 2008	2 mΩ to 20 kΩ
10.	Aluminum stranded Conductors	Resistance Test	IS 398 (Part 1): 1996 Cl. 12.5 & Table 1 IS 398 (Part 2): 1996 Cl. 13.6 & Table 1 IS 398 (Part 4): 1994 Cl. 12.4 & Table 1 IS 398 (Part 5): 1992 Cl. 13.8 & Table 1	2 m Ω to 20 kΩ

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Location: 1

V. DOMESTIC ELECTRICAL APPLIANCES

1.	Electric Iron, Steam Iron, Electric Immersion Water Heater, Room heater, Electric Radiator, Elect. Ceiling type Fans & Regulators, Elect. Table type Fans & Regulators, Stationary Storage Type Water Heater, Thermostat for Use With Water Heater, Mineral Filled Sheathed Heating Elements Domestic Electric Food Mixers, Domestic Electric Cloth Washing Machine Electric Instantaneous Water Heater, Microwave oven Household and similar Electrical Appliances- Safety (General Requirement)	Marking / Marking & Instructions	IS 302-2-3: 2007 Cl.7 IS 6290: 1986 Cl.7 IS 302-2-201: 2008 Cl.7 IS 302-2-30: 2007 Cl.7 IS 369: 1992 Cl.8 IS 374: 1979 Cl. 9 IS 555: 1967 Cl. 9 IS 302-2-21: 2011 Cl.7 IS 3017: 1985 Cl.7 IS 4159: 2002 Cl. 7 IS 4250: 1980 Cl. 7 IS 302-2-7: 2010 Cl. 7 IS 302-2-4: 1993 Cl. 7 IS 8978: 1992 Cl. 8 IS 302-2-35: 2011 Cl. 7 IS 11676: 1995 Cl. 8 IS 302-2-25: 1994 Cl. 7 IEC 60335-1 ED.5.0 2010-05 Cl. 7	Qualitative
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Laboratory Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard ISO/IEC 17025: 2005

Discipline Electrical Testing **Issue Date** 02.04.2015

Certificate Number T-0071 **Valid Until** 30.03.2017

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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
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Location: 1

Electric Iron, Steam Iron, Electric Immersion Water Heater, Room heater, Electric Radiator, Elect. Ceiling type Fans & Regulators, Elect. Table type Fans & Regulators, Stationary Storage Type Water Heater, Thermostat for Use With Water Heater, Mineral Filled Sheathed Heating Elements Domestic Electric Food Mixers, Domestic Electric Cloth Washing Machine Electric Instantaneous Water Heater, Microwave oven Household and similar Electrical Appliances-Safety (General Requirement)	Protection against electric Shock / Protection against access to live parts	IS 302-2-3: 2007 Cl.8 IS 6290: 1986 Cl.8 IS 302-2-201: 2008 Cl.8 IS 302-2-30: 2007 Cl. 8 IS 374: 1979 Cl. 10.11 IS 555: 1967 Cl. 10.11 IS 302-2-21: 2011 Cl.8 IS 3017: 1985 Cl.8 IS 4159: 2002 Cl. 8 IS 4250: 1980 Cl. 8 IS 302-2-7: 2010 Cl. 8 IS 302-2-4: 1993 Cl. 8 IS 302-2-35: 2011 Cl. 8 IS 302-2-25: 1994 Cl. 8 IEC 60335-1 ED.5.0 2010-05 Cl. 8	40V to 50 V, Upto 75 N
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Laboratory**Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat****Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat****Accreditation Standard ISO/IEC 17025: 2005****Discipline Electrical Testing****Issue Date 02.04.2015****Certificate Number T-0071****Valid Until 30.03.2017****Last Amended on -****Page 97 of 315**

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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Location: 1

2.	Elect. Ceiling type Fans & Regulators, Elect. Table type Fans & Regulators, Domestic Electric Food Mixers, Domestic Electric Cloth Washing Machine Microwave Oven Household and similar Electrical Appliances-Safety (General Requirement)	Starting of Motor operated appliances	IS 374: 1979 Cl. 10.8 IS 555: 1967 Cl. 10.8 IS 4250: 1980 Cl. 9 IS 302-2-7: 2010 Cl. 9 IS 302-2-4: 1993 Cl. 9 IS 302-2-25: 1994 Cl. 9 IEC 60335-1 ED.5.0 2010-05 Cl. 9	Upto 5000 W Upto 270 V, Upto 30 A
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Laboratory **Electrical Research and Development Association, ERDA Road, Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat**
 Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
 Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard **ISO/IEC 17025: 2005**

Discipline **Electrical Testing** **Issue Date** **02.04.2015**

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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
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Location: 1

3.	Electric Iron, Steam Iron, Electric Immersion Water Heater, Room heater, Elect. Ceiling type Fans & Regulators, Elect. Table type Fans & Regulators, Stationary Storage Type Water Heater, Mineral Filled Sheathed Heating Elements Domestic Electric Food Mixers, Domestic Electric Cloth Washing Machine Electric Instantaneous Water, Microwave oven Household and similar Electrical Appliances-Safety (General Requirement)	Input and current / Power Input and current	IS 302-2-3: 2007 Cl.10 IS 6290: 1986 Cl.10 IS 302-2-201: 2008 Cl.10 IS 302-2-30: 2007 Cl. 10 IS 374: 1979 Cl. 10.9 IS 555: 1967 Cl. 10.9 IS 302-2-21: 2011 Cl.10 IS 4159: 2002 Cl. 10 IS 4250: 1980 Cl. 10 IS 302-2-7: 2010 Cl. 10 IS 302-2-4: 1993 Cl. 10 IS 302-2-35: 2011 Cl. 10 IS 302-2-25: 1994 Cl. 10 IEC 60335-1 ED.5.0 2010-05 Cl. 10	Up to 5000 W Upto 440V, 30A
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Laboratory **Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat**
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard **ISO/IEC 17025: 2005**

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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
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Location: 1

4.	Electric Iron, Steam Iron, Electric Immersion Water Heater, Room heater, Elect. Ceiling type Fans & Regulators, Elect. Table type Fans & Regulators, Stationary Storage Type Water Heater, Thermostat for Use With Water Heater, Mineral Filled Sheathed Heating Elements Domestic Electric Food Mixers, Domestic Electric Cloth Washing Machine Electric Instantaneous Water, Microwave oven Household and similar Electrical Appliances-Safety (General Requirement)	Temperature rise / Heating	IS 302-2-3: 2007 Cl.11 IS 6290: 1986 Cl.11 IS 302-2-201: 2008 Cl.11 IS 302-2-30: 2007 Cl. 11 IS 374: 1979 Cl. 10.4 IS 555: 1967 Cl. 10.4 IS 302-2-21: 2011 Cl.11 IS 3017: 1985 Cl.11 IS 4159: 2002 Cl. 11 IS 4250: 1980 Cl. 11 IS 302-2-7: 2010 Cl. 11 IS 302-2-4: 1993 Cl. 11 IS 302-2-35: 2011 Cl. 11 IS 302-2-25: 1994 Cl. 11 IEC 60335-1 ED.5.0 2010-05 Cl. 11	Upto 5000 W Upto 440V, 30A Temp. upto 400 °C
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Laboratory	Electrical Research and Development Association, ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat		
Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Electrical Testing	Issue Date	02.04.2015
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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
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Location: 1

5.	Stationary Storage Type Water Heater, Thermostat for Use With Water Heater, Mineral Filled Sheathed Heating Elements Domestic Electric Cloth Washing Machine	Operation under over Load conditions of appliances with heating elements	IS 302-2-21: 2011 Cl.12 IS 3017: 1985 Cl.102 IS 4159: 2002 Cl. 12 IS 302-2-4: 1993 Cl. 12	Upto 5000 W Upto 440 V, 30 A
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Laboratory **Electrical Research and Development Association, ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat**
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard **ISO/IEC 17025: 2005**

Discipline **Electrical Testing** **Issue Date** **02.04.2015**

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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
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Location: 1

6.	Electric Iron, Steam Iron, Electric Immersion Water Heater, Room heater, Elect. Ceiling type Fans & Regulators, Elect. Table type Fans & Regulators, Stationary Storage Type Water Heater, Thermostat for Use With Water Heater, Mineral Filled Sheathed Heating Elements Domestic Electric Food Mixers, Domestic Electric Cloth Washing Machine Electric Instantaneous Water, Microwave oven Household and similar Electrical Appliances-Safety (General Requirement)	Electrical Insulation and Leakage current at operating temperature / Leakage current and electric strength at operating temperature	IS 302-2-3: 2007 Cl.13 IS 6290: 1986 Cl.13 IS 302-2-201: 2008 Cl.13 IS 302-2-30: 2007 Cl. 13 IS 374: 1979 Cl. 10.7 IS 555: 1967 Cl. 10.5 IS 302-2-21: 2011 Cl.13 IS 3017: 1985 Cl.13 IS 4159: 2002 Cl. 13 IS 4250: 1980 Cl. 13 IS 302-2-7: 2010 Cl. 13 IS 302-2-4: 1993 Cl. 13 IS 302-2-35: 2011 Cl. 13 IS 302-2-25: 1994 Cl. 13 IEC 60335-1 ED.5.0 2010-05 Cl. 13	Upto 5000 W Upto 440 V,30A Upto 2 mA
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Laboratory **Electrical Research and Development Association, ERDA Road, Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat**
 Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
 Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

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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
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Location: 1

Electric Iron, Steam Iron, Electric Immersion Water Heater, Room heater, Elect. Ceiling type Fans & Regulators, Elect. Table type Fans & Regulators, Stationary Storage Type Water Heater, Thermostat for Use With Water Heater, Mineral Filled Sheathed Heating Elements Domestic Electric Food Mixers, Domestic Electric Cloth Washing Machine Electric Instantaneous Water, Microwave oven Household and similar Electrical Appliances-Safety (General Requirement)	Moisture Resistance	IS 302-2-3: 2007	0 to 99 % RH
		Cl.15	
		IS 6290: 1986	0 to 60 °C,
		Cl.15	
		IS 302-2-201: 2008	
		Cl.15	
		IS 302-2-30: 2007	
		Cl. 15	
		IS 374: 1979	
		Cl. 10.12	
		IS 555: 1967	
		Cl. 10.1	
		IS 302-2-21: 2011	
		Cl.15	
		IS 3017: 1985	
		Cl.15	
IS 4159: 2002			
Cl. 15			
IS 4250: 1980			
Cl. 15			
IS 302-2-7: 2010			
Cl. 15			
IS 302-2-4: 1993			
Cl. 15			
IS 302-2-35: 2011			
Cl. 15			
IS 302-2-25: 1994			
Cl.15			
IEC 60335-1 ED.5.0 2010-05			
Cl. 15			

Laboratory **Electrical Research and Development Association, ERDA Road,
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Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

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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
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Location: 1

Electric Iron, Steam Iron, Electric Immersion Water Heater, Room heater, Elect. Ceiling type Fans & Regulators, Elect. Table type Fans & Regulators, Stationary Storage Type Water Heater, Thermostat for Use With Water Heater, Mineral Filled Sheathed Heating Elements Domestic Electric Food Mixers, Domestic Electric Cloth Washing Machine Electric Instantaneous Water, Microwave oven Household and similar Electrical Appliances-Safety (General Requirement)	Insulation Resistance and electric strength (After humidity treatment) / Leakage current Test and electric strength	IS 302-2-3: 2007 Cl.16 IS 6290: 1986 Cl.16 IS 302-2-201: 2008 Cl.16 IS 302-2-30: 2007 Cl. 16 IS 302-2-21: 2011 Cl.16 IS 3017: 1985 Cl.16 IS 4159: 2002 Cl. 16 IS 4250: 1980 Cl. 16 IS 302-2-7: 2010 Cl. 16 IS 302-2-4: 1993 Cl. 16 IS 302-2-35: 2011 Cl. 16 IS 302-2-25: 1994 Cl. 16 IEC 60335-1 ED.5.0 2010-05 Cl. 16	Upto 1000 MΩ Upto 5 kV
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Laboratory **Electrical Research and Development Association, ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat**
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

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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
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Location: 1

7.	Domestic Electric Cloth Washing Machine, Microwave oven, Household and similar Electrical Appliances-Safety (General Requirement)	OverLoad protection / OverLoad protection of transformers and associated circuits	IS 302-2-7: 2010 Cl. 17 IS 302-2-4: 1993 Cl. 17 IS 302-2-25: 1994 Cl. 17 IEC 60335-1 ED.5.0 2010-05 Cl. 17	0 to 270 V, 30 A, Upto 5 kW
8.	Electric Iron, Steam Iron, Electric Immersion Water Heater, Electric Radiator, Stationary Storage Type Water Heater, Thermostat for Use With Water Heater, Mineral Filled Sheathed Heating Elements Domestic Electric Food Mixers, Domestic Electric Cloth Washing Machine, Electric Instantaneous Water, Household and similar Electrical Appliances-Safety (General Requirement)	Endurance	IS 302-2-3: 2007 Cl.18 IS 6290: 1986 Cl.18 IS 368: 1992 Cl.10 IS 369: 1992 Cl.12 IS 2082: 1993 Cl.23 IS 3017: 1985 Cl.18 IS 4159: 2002 Cl. 18 IS 4250: 1980 Cl. 18 IS 302-2-7: 2010 Cl. 18 IS 302-2-4: 1993 Cl. 18 IS 8978: 1992 Cl. 12 IEC 60335-1 ED.5.0 2010-05 Cl. 18	0 to 440 V, 30 A, Upto 5 kW

Laboratory **Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat**
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard **ISO/IEC 17025: 2005**

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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
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Location: 1

9.	Electric Iron, Steam Iron, Electric Immersion Water Heater, Room heater, Stationary Storage Type Water Heater, Mineral Filled Sheathed Heating Elements Domestic Electric Food Mixers, Domestic Electric Cloth Washing Machine Electric Instantaneous Water Heater, Microwave oven Household and similar Electrical Appliances-Safety (General Requirement)	Abnormal operation	IS 302-2-3: 2007 Cl.19 IS 6290: 1986 Cl.19 IS 302-2-201: 2008 Cl.19 IS 302-2-30: 2007 Cl. 19 IS 302-2-21: 2011 Cl.19 IS 4159: 2002 Cl. 19 IS 4250: 1980 Cl. 19 IS 302-2-7: 2010 Cl. 19 IS 302-2-4: 1993 Cl. 19 IS 302-2-35: 2011 Cl. 19 IS 302-2-25: 1994 Cl. 18 IEC 60335-1 ED.5.0 2010-05 Cl. 19	Upto 440 V, 30 A, Up to 5 kW
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Laboratory **Electrical Research and Development Association, ERDA Road, Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat**
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

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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
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Location: 1

Electric Iron, Steam Iron, Electric Immersion Water Heater, Room heater, Stationary Storage Type Water Heater, Mineral Filled Sheathed Heating Elements Domestic Electric Food Mixers, Domestic Electric Cloth Washing Machine Electric Instantaneous Water Heater, Microwave oven Household and similar Electrical Appliances-Safety (General Requirement)	Stability & mechanical hazards	IS 302-2-3: 2007 Cl.20 IS 6290: 1986 Cl.20 IS 302-2-201: 2008 Cl.20 IS 302-2-30: 2007 Cl.20 IS 302-2-7: 2010 Cl. 20 IS 302-2-4: 1993 Cl. 20 IS 4159: 2002 Cl. 20 IS 4250: 1980 Cl. 20 IS 302-2-35: 2011 Cl. 20 IS 302-2-25: 1994 Cl. 20 IEC 60335-1 ED.5.0 2010-05 Cl. 20	Qualitative
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Laboratory Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

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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
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Location: 1

10.	Electric Iron, Steam Iron, Electric Immersion Water Heater, Room heater, Elect. Ceiling type Fans & Regulators, Elect. Table type Fans & Regulators, Stationary Storage Type Water Heater, Thermostat for Use With Water Heater, Mineral Filled Sheathed Heating Elements Domestic Electric Food Mixers, Electric Instantaneous Water Heater, Household and similar Electrical Appliances-Safety (General Requirement)	Mechanical Strength	IS 302-2-3: 2007 Cl.21 IS 6290: 1986 Cl.21 IS 302-2-201: 2008 Cl.21 IS 302-2-30: 2007 Cl. 21 IS 374: 1979 Cl. 10.13 IS 302-2-21: 2011 Cl.21 IS 3017: 1985 Cl.21 IS 4159: 2002 Cl. 21 IS 4250: 1980 Cl. 21 IS 302-2-7: 2010 Cl. 21 IS 302-2-4: 1993 Cl. 21 IS 302-2-35: 2011 Cl. 21 IEC 60335-1 ED.5.0 2010-05 Cl. 21	Up to 6.0 Nm Torque & 1.0 Nm for Spring hammer
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Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat**
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard **ISO/IEC 17025: 2005**

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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
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Location: 1

Electric Iron, Steam Iron, Electric Immersion Water Heater, Room heater, Elect. Ceiling type Fans & Regulators, Elect. Table type Fans & Regulators, Stationary Storage Type Water Heater, Thermostat for Use With Water Heater, Mineral Filled Sheathed Heating Elements Domestic Electric Food Mixers, Electric Instantaneous Water Heater, Household and similar Electrical Appliances-Safety (General Requirement)	Construction	IS 302-2-3: 2007 Cl.22 IS 6290: 1986 Cl.22 IS 302-2-201: 2008 Cl.22 IS 302-2-30: 2007 Cl. 22 IS 302-2-21: 2011 Cl.22 IS 3017: 1985 Cl.22 IS 4159: 2002 Cl. 22 IS 4250: 1980 Cl. 22 IS 302-2-7: 2010 Cl. 22 IS 302-2-4: 1993 Cl. 22 IEC 60335-1 ED.5.0 2010-05 Cl. 22	Qualitative Upto 30 kg/cm ²
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Laboratory	Electrical Research and Development Association, ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat		
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Discipline	Electrical Testing	Issue Date	02.04.2015
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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
Location: 1				
11.	Electric Iron, Steam Iron, Electric Immersion Water Heater, Room heater, Stationary Storage Type Water Heater, Thermostat for Use With Water Heater, Mineral Filled Sheathed Heating Elements Domestic Electric Food Mixers, Electric Instantaneous Water Heater, Domestic Electric Cloth Washing Machine Microwave oven Household and similar Electrical Appliances-Safety (General Requirement)	Internal wiring	IS 302-2-3: 2007 Cl.23 IS 6290: 1986 Cl. 23 IS 302-2-201: 2008 Cl. 23 IS 302-2-30: 2007 Cl.23 IS 302-2-21: 2011 Cl.23 IS 3017-198, Cl.23 IS 4159: 2002 Cl. 23 IS 4250: 1980 Cl. 23 IS 302-2-35: 2011 Cl. 23 IS 302-2-7: 2010 Cl. 23 IS 302-2-4: 1993 Cl. 23 IS 302-2-25: 1994 Cl. 23 IEC 60335-1 ED.5.0 2010-05 Cl. 23	Qualitative

Laboratory Electrical Research and Development Association, ERDA Road,
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 Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
 Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

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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
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Location: 1

Electric Iron, Steam Iron, Electric Immersion Water Heater, Room heater, Stationary Storage Type Water Heater, Thermostat for Use With Water Heater, Mineral Filled Sheathed Heating Elements Domestic Electric Food Mixers, Electric Instantaneous Water Heater, Domestic Electric Cloth Washing Machine Microwave oven Household and similar Electrical Appliances-Safety (General Requirement)	Components	IS 302-2-3: 2007 Cl.24 IS 6290: 1986 Cl. 24 IS 302-2-201: 2008 Cl.24 IS 302-2-30: 2007 Cl.24 IS 302-2-21: 2011 Cl.24 IS 4250: 1980 Cl. 24 IS 302-2-35: 2011 Cl.24 IS 3017-198, Cl.24 IS 4159: 2002 Cl. 24 IS 302-2-7: 2010 Cl. 24 IS 302-2-4: 1993 Cl. 24 IS 302-2-25: 1994 Cl. 24 IEC 60335-1 ED.5.0 2010-05 Cl. 24	Qualitative
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Laboratory **Electrical Research and Development Association, ERDA Road, Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat**
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

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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
	Electric Iron, Steam Iron, Electric Immersion Water Heater, Room heater, Stationary Storage Type Water Heater, Thermostat for Use With Water Heater, Mineral Filled Sheathed Heating Elements, Domestic Electric Food Mixers, Electric Instantaneous Water Heater, Domestic Electric Cloth Washing Machine, Microwave oven Household and similar Electrical Appliances-Safety (General Requirement)	Supply connection & external flexible cables & cords / Supply connection & external flexible cords	IS 302-2-3: 2007 Cl.25 IS 6290: 1986 Cl.25 IS 302-2-201: 2008 Cl.25 IS 302-2-30: 2007 Cl.25 IS 555: 1967 Cl. 10.14 IS 302-2-21: 2011 Cl.25 IS 4250: 1980 Cl. 25 IS 302-2-7: 2010 Cl. 25 IS 302-2-4: 1993 Cl. 25 IS 302-2-35: 2011 Cl. 25 IS 4159: 2002 Cl. 25 IS 302-2-25: 1994 Cl. 25 IEC 60335-1 ED.5.0 2010-05 Cl. 25	0.1mm to 1000 mm Upto 6.0 Nm Torque

Location: 1

Prachi Kukreti
Convenor

N. Venkateswaran
Program Manager

Laboratory **Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat**
 Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
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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
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Location: 1

	Electric Iron, Steam Iron, Electric Immersion Water Heater, Room heater, Stationary Storage Type Water Heater, Thermostat for Use With Water Heater, Mineral Filled Sheathed Heating Elements Domestic Electric Food Mixers, Electric Instantaneous Water Heater, Domestic Electric Cloth Washing Machine Microwave oven Household and similar Electrical Appliances-Safety (General Requirement)	Terminals for external conductors	IS 302-2-3: 2007 Cl.26 IS 6290: 1986 Cl. 26 IS 302-2-201: 2008 Cl.26 IS 302-2-30: 2007 Cl.26 IS 302-2-21: 2011 Cl.26 IS 3017: 1985 Cl.26 IS 4159: 2002 Cl. 26 IS 302-2-35: 2011 Cl. 26 IS 4250: 1980 Cl. 26 IS 302-2-7: 2010 Cl. 26 IS 302-2-4: 1993 Cl. 26 IS 302-2-25: 1994 Cl. 26 IEC 60335-1 ED.5.0 2010-05 Cl. 26	Upto 6.0 Nm Torque
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Laboratory

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Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard

ISO/IEC 17025: 2005

Discipline

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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
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Location: 1

**Electric Iron,
Steam Iron,
Electric Immersion
Water Heater,
Room heater,
Stationary Storage
Type Water Heater,
Thermostat for Use
With Water Heater,
Mineral Filled
Sheathed Heating
Elements
Domestic Electric
Food Mixers,
Electric
Instantaneous Water
Heater,
Domestic Electric
Cloth Washing
Machine
Microwave oven
Household and
similar Electrical
Appliances-Safety
(General
Requirement)**

Provision for Earthing

IS 302-2-3: 2007
Cl.27
IS 6290: 1986
Cl. 27
IS 302-2-201: 2008
Cl.27
IS 302-2-30: 2007
Cl. 27
IS 374: 1979
Cl. 10.10
IS 555: 1967
Cl. 10.10
IS 302-2-21: 2011
Cl.27
IS 4159: 2002
Cl. 27
IS 4250: 1980
Cl. 27
IS 302-2-7: 2010
Cl. 27
IS 302-2-4: 1993
Cl. 27
IS 302-2-35: 2011
Cl. 27
IS 302-2-25: 1994
Cl. 27
IEC 60335-1 ED.5.0 2010-05
Cl. 27

0.001 V to 20 V
High Current Source
Upto 50A

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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
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Location: 1

Electric Iron, Steam Iron, Electric Immersion Water Heater, Room heater, Elect. Ceiling type Fans & Regulators, Elect. Table type Fans & Regulators, Stationary Storage Type Water Heater, Thermostat for Use With Water Heater, Mineral Filled Sheathed Heating Elements Domestic Electric Food Mixers, Domestic Electric Cloth Washing Machine Electric Instantaneous Water Heater, Microwave oven Household and similar Electrical Appliances-Safety (General Requirement)	Resistance to heat, fire and tracking / Resistance to heat and fire	IS 302-2-3: 2007 Cl.30 IS 6290: 1986 Cl. 30 IS 302-2-201: 2008 Cl.30 IS 302-2-30: 2007 Cl.30 IS 302-2-21: 2011 Cl.30 IS 3017: 1985 Cl.30 IS 4159: 2002 Cl. 30 IS 4250: 1980 Cl. 30 IS 302-2-7: 2010 Cl. 30 IS 302-2-4: 1993 Cl. 30 IS 302-2-35: 2011 Cl. 30 IS 302-2-25: 1994 Cl. 30 IEC 60335-1 ED.5.0 2010-05 Cl. 30	Upto 300°C & 175 V Upto 960°C
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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
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Location: 1

	Electric Iron, Steam Iron	Measurement of Temperature distribution	IS 366: 1991 Cl.12 IS 6290: 1986 Cl.103	Upto 400° C
		Measurement of Thermostatic Stability	IS 366: 1991 Cl.16	Upto 400° C
		Measurement of initial overswing temperature and heating – up excess temperature	IS 366: 1991 Cl.13 IS 6290: 1986 Cl.104	Upto 400° C
		Measurement of cyclic fluctuation of temperature	IS 366: 1991 Cl.14 IS 6290: 1986 Cl.105	Upto 400° C
24.	Steam Iron	Measurement of temperature drop under Load	IS 6290: 1986 Cl.106	Upto 400° C
		Measurement of heating-up time under steaming operation	IS 6290: 1986 Cl.107	99 hr, 99 min, 99 s, Upto 400° C
		Measurement of steaming time and steaming rate	IS 6290: 1986 Cl.108	99 Hr, 99 min, 99 s,

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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
<u>Location: 1</u>				
25.	Electric Instantaneous Water	Operation of flow switch	IS 8978: 1992 Cl. 11	Upto 270 V, 30A,
26.	Microwave oven	Usable Cavity Volume	IS 11676: 1995 Cl. 12	0 to 270 V, Upto 5 kW
		Microwave Power Output	IS 11676: 1995 Cl. 13	0 to 270 V, Upto 5 kW
		Efficiency	IS 11676: 1995 Cl. 14	0 to 270 V, Upto 5 kW
		Uniform Heating	IS 11676: 1995 Cl. 15	0 to 270 V, Upto 5 kW
		Heating Performance	IS 11676: 1995 Cl. 16	0 to 270 V, Upto 5 kW
		Cooking Performance	IS 11676: 1995 Cl. 17	0 to 270 V, Upto 5 kW
		Defrosting Performance	IS 11676: 1995 Cl. 18	0 to 270 V, Upto 5 kW
27.	Household Refrigerator (Direct cool and Frost free)	Pull down performance	AS/NZS 4474.1: 2007 Cl. 2.12 Amd. 1, 2	Upto 720 l Temp. Sensors:- (-)20°C to (+)50°C / 0.1°C Test Room:- (+)10°C to (+)43°C/ 0.1°C

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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
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Location: 1

	Household Refrigerator (Direct cool and Frost free)	Determination of Tested Energy consumption Test (Et)	AS/NZS 4474.1: 2007 Cl. 2.16 Amd. 1, 2	Upto 720 l Power Analyzer:- 0 to 9,99,999 / 0.001 kWh Temp. Sensors:- (-)20°C to (+)50°C /0.1°C Test Room:- (+)10°C to (+)43°C/0.1°C
		Determination of Gross and Storage Volume	AS/NZS 4474.1: 2007 Cl. 2.6 Amd. 1, 2	Digital Vernier 0 to 150 mm / 0.02 mm Digital Vernier 0 to 300mm/ 0.02mm Scale:- 0 to 300 mm /1 mm Scale: 0 to 1000 mm/ 1 mm
28.	Household Refrigerator (Direct Cool)	Rated Energy Consumption Test	IS 1476 (Part 1): 2000 Cl. 14.9 Amd. 1, 2	Upto 500 l Power Analyzer:- 0 to 9,99,999 /0.001 kWh Temp. Sensors:- (-)20°C to (+)50°C /0.1°C Test Room:- (+)10°C to (+)43°C/0.1°C
		No-Load Performance Test	IS 1476 (Part 1): 2000 Cl. 14.5 Amd. 1, 2	Upto 500 l Temp. Sensors:- (-)20°C to (+)50°C /0.1°C Test Room:- +10°C to +43°C / 0.1°C

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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
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Location: 1

	Household Refrigerator (Direct Cool)	Determination of Gross and Storage Volume	IS 1476 (Part 1): 2000 Cl. 8 Amd. 1, 2	Digital Vernier 0 to 150 mm / 0.02 mm Digital Vernier 0 to 300mm/ 0.02mm Scale:- 0 to 300 mm / 1 mm Scale: 0 to 1000 mm/ 1 mm
29.	Household Refrigerator (Frost Free)	Determination of Gross and Storage Volume	IS 15750: 2006 Cl. 6 Amd. 1	Digital Vernier 0 to 150 mm / 0.02mm Digital Vernier 0 to 300 mm/ 0.02mm Scale:- 0 to 300 mm / 1 mm Scale: 0 to 1000 mm/ 1 mm
		Energy consumption Test	IS 15750: 2006 Cl. 14 Amd. 1	Upto 720 1 Power Analyzer:- 0 to 9,99,999 / 0.001 kWh Temp. Sensors:- (-)20°C to (+)50°C /0.1°C Test Room:- (+)10°C to (+)43°C/0.1°C
		Pull down Test	IS 15750: 2006 Cl. 16 Amd. 1	Upto 720 1 Temp. Sensors:- (-)20°C to (+)50°C /0.1°C Test Room:- (+)10°C to (+)43°C/ 0.1°C

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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
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Location: 1

	Plugs & Socket outlet Domestic switch Switch socket-outlets	Making and Breaking capacity	IS 1293: 2005 Cl.20 IEC 60884 Cl. 20 IS 3854: 1997 Cl.18 IEC 60669 Cl. 18 IS 15787: 2008 Cl.20	50 A, 275 V AC
		Normal operation (Endurance)	IS 1293: 2005 Cl.21 IEC 60884 Cl. 21 IS 3854: 1997 Cl.19.1 IEC 60669 Cl. 19.1 IS 15787: 2008 Cl.21	Upto 250 V, 45A
3.	Domestic switch	Normal ope. for fluorescent lamp circuit	IS 3854: 1997 Cl.19.2 IEC 60669 Cl. 19.2	Upto 250 V
		Mechanism	IS 3854: 1997 Cl.14 IEC 60669 Cl. 14	Upto 250 V

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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
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Location: 1

8.	Flexible Pliable Non metallic Conduits for Electrical Installation	Dimensional Check	IS 9537 (Part 1 & 3) Cl.7 IS 14930 Cl.101.1.a	Upto 150 mm
		Bending Test	IS 9537 (Part 1 & 3) Cl.9.2 IS 14930 Cl.10.4	RT to (-)40 °C
		Resistance to Heat	IS 9537 (Part 1 & 3) Cl.10 IS 14930 Cl.12.2	RT to 200 °C
		Resistance to Burning	IS 9537 (Part 1 & 3) Cl.11 IS 14930 Cl.12.1	Upto 300 mm
		Resistance to Impact	IS 9537 (Part 1 & 3) Cl.9.4 IS 14930 Cl.10.3	RT to 200 °C
		Electric Characteristic	IS 9537 (Part 1 & 3) Cl.12 IS 14930 Cl.11	Upto 20 kV 10 ⁶ Ω to 10 ¹⁵ Ω
		Compression Test	IS 9537 (Part 1 & 3) Cl.9.3 IS 14930 Cl.10.2	Upto 5000 N
		Collapse Test	IS 9537 (Part 1 & 3) Cl.9.5 IS 14930 Cl.10.6	Qualitative
		Flexing Test	IS 14930 Cl.10.5	Qualitative
		Tensile Test	IS 14930 Cl.10.7	Upto 10000 N Upto 150 mm
		Resistance to corrosion	IS: 9537-Pt.1,Pt-3 Cl.No.13.4 IS: 14930 Cl.No.14.2	Qualitative

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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
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Location: 1

VII. BATTERIES

1.	Multipurpose Dry Batteries Heavy Duty Dry Batteries Alkaline Manganese Dioxide cells Lead acid battery Nickel Cadmium Batteries	Checking of dimensions and terminals /Verification of Dimensions	IS 8144: 1997 Cl. 5, 7 IS 9128: 1999 Cl. 5,7 IS 15063: 2001 Cl. 5, 8 IS 1651: 1991 Cl. 12.4 IS 10918: 1984 Cl. 10.3	0.01 mm to 1000 mm
		Checking of marking /Verification of Marking/Qualitative(Visual Examination)	IS 8144: 1997 Cl. 9 IS 9128: 1999 Cl. 9 IS 15063: 2001 Cl. 9 IS 1651: 1991 Cl. 8, 12.3 IEC 60896-11 Cl. 21 IS 10918: 1984 Cl. 10.4	Qualitative

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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
<u>Location: 1</u>				
	Multipurpose Dry Batteries	Materials and construction / Verification of	IS 8144: 1997 Cl. 6	Qualitative
	Heavy Duty Dry Batteries	Constructional requirement	IS 9128: 1999 Cl. 6	
	Alkaline Manganese Dioxide cells		IS 15063: 2001 Cl. 6	
	Lead acid battery		IS 1651: 1991 Cl. 6, 12.2	
	Nickel Cadmium Batteries		IS 10918: 1984 Cl. 3	
2.	Multipurpose Dry Batteries	Initial life Test	IS 8144: 1997 Cl. 10.4	Upto R20 Size
	Heavy Duty Dry Batteries		IS 9128: 1999 Cl. 10.4	
	Alkaline Manganese Dioxide cells		IS 15063: 2001 Cl. 11	
		Delayed life Test	IS 8144: 1997 Cl. 10.5	Upto R20 Size
			IS 9128: 1999 IS 15063: 2001 Cl. 13	
		Resistance to leakage of electrolyte	IS 8144: 1997 Cl. 10.7	Upto R20 Size
			IS 9128: 1999 Cl. 10.7	
			IS 15063: 2001 Cl. 12	

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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
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Location: 1

3.	Multipurpose Dry Batteries Heavy Duty Dry Batteries	Accelerated acceptance Test	IS 8144: 1997 Cl. 10.1 IS 9128: 1999 Cl. 12	Upto R20 Size
		Delayed life Under dry heat conditions	IS 8144: 1997 Cl. 10.6 IS 9128: 1999 Cl. 10.6	40 (±) 2 ° C, 40 (±)10 % R.H.
4.	Lead acid battery Nickel Cadmium Batteries	Test for Capacity – Test for voltage during discharge / C1 & C10 rate/Capacity Test at other discharge rate	IS 1651: 1991 Cl. 12.5, 12.10 IEC 60896-11 Cl. 14 IS 10918: 1984 Cl. 10.7	Upto 1000 AH, 72 V
		Endurance Test	IS 1651: 1991 Cl. 12.8 IS 10918: 1984 Cl. 10.1.1.h IS 13369: 1992 Cl. 11.7 IS 15549: 2005 Cl. 12.10	Upto 1000 AH
		Charge retention Test / Charge acceptance	IEC 60896-11 Cl. 18 IS 10918: 1984 Cl. 10.8	Upto 1000 AH, 72V

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Location: 1

5.	Nickel Cadmium Batteries	Storage	IS 10918: 1984 Cl. 10.12	Upto 1000 AH
		Polarity and absence of short circuit	IS 10918: 1984 Cl. 10.5	Qualitative
		Air Pressure Test	IS 10918: 1984 Cl. 10.6	Upto 10 kg/cm ²
		Cranking ability	IS 10918: 1984 Cl. 10.1.1.g	Upto 1000 AH
		Discharge performance at low temperature	IS 10918: 1984 Cl. 10.9	Upto 1000AH
		Environmental Tests	IS 10918: 1984 Cl. 10.1.1.h	Upto 1000 AH
		Insulation Resistance	IS 10918: 1984 Cl. 10.11	Upto 1000 M Ω
		Dielectric	IS 10918: 1984 Cl. 10.1.1.q	0 to 5 kV
		High temperature float charge	IS 10918: 1984 Cl. 10.1.1.r	Upto 1000 AH

**Prachi Kukreti
Convenor**

**N. Venkateswaran
Program Manager**

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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
<u>Location: 1</u>				
6.	Lead acid battery	Checking of dimensions and terminals /Verification of Dimensions	IS 13369: 1992 Cl. 11.4 IS 15549: 2005 Cl. 10.1.1.b	0.01 mm to 1000 mm
		Checking of marking /Verification of Marking/Qualitative(Visual Examination)	IS 13369: 1992 Cl. 11.4 IS 15549: 2005 Cl. 8	Qualitative
		Verification of Constructional requirement	IS 13369: 1992 Cl. 11.2	Qualitative
		Test for Capacity – Test for voltage during discharge / C1 & C10 rate/Capacity Test at other discharge rate	IS 13369: 1992 Cl. 11.5 IS 15549: 2005 Cl. 12.1, 12.2	Upto 1000 AH, 72V
		Ampere-hour and watt-hour efficiency Tests	IS 13369: 1992 Cl. 11.8 IS 15549: 2005 Cl. 12.4, 12.5	Upto 1000 AH, 72V
		Test for loss of capacity on storage	IS 13369: 1992 Cl. 11.6	Upto 1000 AH, 72V
		Charge retention Test	IS 15549: 2005 Cl. 12.6	Upto 1000 AH, 72V
		Short-circuit current and internal Resistance Test	IEC 60896-11 Cl. 19	Upto 2000 AH

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Location: 1

	Lead acid battery	Test for floating battery operation	IEC 60896-11 Cl. 15	Upto 1000 AH
		Endurance Test in discharge-charge cycles	IEC 60896-11 Cl. 16	Upto 1000 AH
		Endurance Test in overcharge	IEC 60896-11 Cl. 17	Upto 1000 AH
		Ampere-hour and watt-hour efficiency Tests	IS 1651: 1991 Cl. 12.9	Upto 1000 AH, 72V
		Test for loss of capacity on storage	IS 1651: 1991 Cl. 12.7	Upto 1000 AH, 72V

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Location: 1

VIII. ROTATING ELECTRICAL MACHINES

1.	3-Ph Induction motor 1-Ph small AC & universal motor DC motor Squirrel cage induction motor for centrifugal and agricultural purpose Submersible pumpset Single speed 3 ph induction motor for Driving lifts Centrifugal self priming pump Regenerative self priming pump Monoset pump for agricultural purpose Submersible Motors Jet Centrifugal pump combination 3-Ph Energy Efficient induction motor AC Generator Upto 20 kVa, 50/60 Hz Openwell submersible pumpset Rotating Electrical machines Horizontal centrifugal pump for rural, agricultural and General purpose 1-Ph Induction motor for Agricultural Purpose Energy Efficient Induction Motors - Three Phase Squirrel Cage	Marking/Rating plate	IS 325: 1996 Cl. 20 IS 996: 2009 Cl. 16 IS 9079: 2002 Cl. 16 IS 9283: 2013 Cl. 15 IS 6595-1: 2002 Cl. 13 IS 6595-2: 1999 Cl. 13 IS 8418: 1999 Cl.17 IS 8472: 1998 Cl. 17.1 IS 8034: 2002 Cl. 16 IS 14220: 1994 Cl. 11 IS 8151: 1976 Cl. 18 IS 7538: 1996 Cl. 20.1 IS 12225: 1997 Cl. 12 IS 12615: 2011 Cl. 18 IS 14582: 1998 Cl. 15.1 IS 13364-1: 1992 Cl. 18 IEC 60034-1: 2010 Cl. 10.2 C 390-98 Cl. 8	Qualitative
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Location: 1

2.	3-Ph Induction motor 1-Ph small AC & universal motor Squirrel cage induction motor for centrifugal and agricultural purpose Single speed 3 ph induction motor for Driving lifts Submersible Motors Rotating Electrical machines AC Generator Upto 20 kVa, 50/60 Hz 1-Ph Induction motor for Agricultural purpose 3 Ph Energy Efficient induction motor	Terminal Marking	IS 325: 1996 Cl. 19.1.1 IS 7538: 1996 Cl. 19.1.1 IS 996: 2009 Cl. 14 IS 8151: 1976 Cl. 8 IEC 60034-8: 2014 IS 9283: 2013 Cl. 13 IS 13364-1: 2004 Cl. 17 IS 14582: 1998 Cl. 14 IS 12615: 2011 Cl. 16 IS/IEC 60034-8	Qualitative
3.	Submersible pumpset	Submersible Cable	IS 8034: 2002 Cl. 8	0.001 mm to 5000 mm
		Typical Installation	IS 8034: 2002 Cl. 11	0.001 mm to 300 mm

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<u>Location: 1</u>				
4.	3-Ph Induction motor 1-Ph small AC & universal motor Squirrel cage induction motor for centrifugal and agricultural purpose Openwell submersible pumpset Single speed 3 ph induction motor for Driving lifts 3-Ph Energy Efficient induction motor Rotating Electrical machines AC Generator Upto 20 kVA, 50/60 Hz Submersible pumpset	Earthing	IS 325: 1996 Cl. 11 IS 7538: 1996 Cl. 11 IS 996: 2009 Cl. 9.5 IS 8151: 1976 Cl. IS 14220: 1994 Cl. 7.4.4 IS 12615: 2011 Cl. 10 IEC 60034-1: 2010 Cl. 11.1 IS 13364-1: 2004 Cl. 10 IS 9283: 1995 Cl. 5.2.1 IS/IEC 60034-1 Cl. 11.1	Qualitative

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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
<u>Location: 1</u>				
5.	3-Ph Induction motor DC motor Monoset pump for agricultural purpose Squirrel cage induction motor for centrifugal and agricultural purpose Submersible pumpset Submersible Motors Single speed 3 ph induction motor for Driving lifts Jet Centrifugal pump Combination 3-Ph Energy Efficient induction motor Openwell submersible pumpset AC Generator Upto 20 kVa, 50/60 Hz Rotating Electrical machines 1-Ph Induction motor for Agricultural purpose Poly phase Induction motor & Generator Energy Efficient Induction Motors - Three Phase Squirrel Cage	Measurement of Stator Resistance	IS 325: 1996 Cl. 22.3.1 (b) IS 9079: 2002 Cl. 11.2 IS 9283: 2013 Cl. 16.1 (c) IS 12615: 2011 Cl. 21.1 (b) IS 7538: 1996 Cl. 22.3.1(b) IS 12225: 1997 Cl. 5.2.1 IS 8034: 2002 Cl. 7.0 IS 14220: 1994 Cl. 7.4.6.2 IS 8151: 1976 Cl. 14 IS 14582: 1998 Cl. 16.2 (a) IS 13364-1: 1992 Cl. 20.4.1(a) IEC 60034-1: 2010 Cl. 9.1 IEC 60034-2-1: 2014 Cl. 57 IEE 112: 2004 Cl. 6.8.1.1 C 390-98 Cl. 5 IS/IEC 60034-1 Cl. 9.1	0.000001 to 2000 Ω Induction motor 0.018 kW to 110 kW, 50/60 Hz Submersible motor 0.37 kW to 110 kW, 50/60 Hz Generator 0.37 kVA to 20 kVA

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Location: 1

3-Ph Induction motor DC motor Monoset pump for agricultural purpose Squirrel cage induction motor for centrifugal and agricultural purpose Submersible pumpset Submersible Motors Single speed 3 ph induction motor for Driving lifts Jet Centrifugal pump Combination 3-Ph Energy Efficient induction motor Openwell submersible pumpset AC Generator Upto 20 kVa, 50/60 Hz Rotating Electrical machines 1-Ph Induction motor for Agricultural purpose Poly phase Induction motor & Generator Energy Efficient Induction Motors - Three Phase Squirrel Cage	No Load Test at Rated Voltage	IS 325: 1996 Cl. 22.3.1 (C) IS 996: 2009 Cl. 17.3 (a) IS 9079: 2002 Cl. 11.2 IS 9283: 2013 Cl. 16.1 (d) IS 12615: 2011 Cl. 21.1 (c) IS 7538: 1996 Cl. 22.3.1(c) IS 12225: 1997 Cl. 5.2.1 IS 8034: 2002 Cl. 7.0 IS 14220: 1994 Cl. 7.4.6.2 IS 8151: 1976 Cl. 14 IS 8472: 1998 Cl. 14.1.2 IS 14582: 1998 Cl. 16.2 (b) IS 13364-1: 1992 Cl. 20.4.1(c) IEC 60034-1: 2010 Cl. 9.1 IEC60034- 2-1: 2014 Cl. 6.1.3.2.4 IEEE 112: 2004 Cl. 6.8.1.2 C 390-98 Cl. 5 IS/IEC 60034-1 Cl. 9.1	Induction motor 0.018 kW to 150 kW, 50/60 Hz Submersible motor 0.37 kW to 150 kW, 50/60 Hz Generator 0.37 kVa to 20 kVa, 50/60 Hz
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Location: 1

6.	3-Ph Induction motor Monoset pump for agricultural purpose Submersible Motors Squirrel cage induction motor for centrifugal and agricultural purpose Submersible pumpset Single speed 3 ph induction motor for Driving lifts Jet Centrifugal pump Combination 3-Ph Energy Efficient induction motor Rotating Electrical machines Openwell submersible pumpset	Reduced voltage Running up Test	IS 325: 1996 Cl. 22.3.1 (e) IS 8151: 1976 Cl. 14 IS 9079: 2002 Cl. 11.2 IS 9283: 2013 Cl. 16.1 (e) IS 12615: 2011 Cl. 21.1 (d) IS 7538: 1996 Cl. 22.3.1(d) IS 12225: 1997 Cl. 5.2.1 IS 8034: 2002 Cl. 7.0 IS 14220: 1994 Cl. 7.4.6.2	Induction motor 0.018 kW to 110 kW, 50/60 Hz Submersible motor 0.37 kW to 110 kW, 50/60 Hz
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<u>Location: 1</u>				
7.	3-Ph Induction motor 1-Ph small AC & universal motor Submersible Motors Squirrel cage induction motor for centrifugal and agricultural purpose Single speed 3 ph induction motor for Driving lifts 3-Ph Energy Efficient induction motor Rotating Electrical machines 1-Ph Induction motor for Agricultural Purpose Poly phase Induction motor & Generator Energy Efficiency Test method for 3 ph induction motors	Full Load Test/ Load Test/ Determination of Efficiency	IS 325: 1996 Cl.22.3.1 (g) IS 12615: 2011 Cl. 21.1 (f) IS 996: 2009 Cl. 17.3 (d) IS 14582: 1998 Cl. 16.2 (e) IS 9283: 2013 Cl. 16.1 (g) IS 7538: 1996 Cl. 22.3.1(f) IS 8151: 1976 Cl. 14 IEC 60034-2-1: 2014 Cl.6 & 7 IEEE 112: 2004 Cl. 6 C 390 98 Cl. 5	Induction motor 0.018 kW to 110 kW, 50/60 Hz Submersible motor 0.37 kW to 110 kW, 50/60 Hz Generator 0.37 kW to 20 kVa, 50/60 Hz DC motor 0.18 to 10 kW
8.	1-Ph small AC & universal motor Single speed 3 ph induction motor for Driving lifts 1-Ph Induction motor for Agricultural Purpose	Break away starting current at rated voltage & frequency	IS 996: 2009 Cl. 17.3 (c) IS 8151: 1976 Cl. 11 & 16 IS 14582: 1998 Cl. 16.2 (f)	Induction motor 0.018 kW to 110 kW, 50/60 Hz

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Location: 1

9.	3-Ph Induction motor 1-Ph small AC & universal motor Submersible pumpset Single speed 3 ph induction motor for Driving lifts Submersible Motors Squirrel cage induction motor for centrifugal and agricultural purpose Energy Efficient Induction Motors – Three Phase Squirrel Cage Rotating Electrical machines 1-Ph Induction motor for Agricultural purpose	Momentary overload Test	IS 325: 1996 Cl.22.3.1 (j) IS 7538: 1996 Cl. 22.3.1(k) IS 996: 2009 Cl. 17.3 (f) IS 9283: 2013 Cl. 16.1 (m) IS 8151: 1976 Cl. 14 IS 12615: 2011 Cl. 21.1 (h) IS 8034: 2002 Cl. 7.0 IS 14582: 1998 Cl. 16.2 (j) IEC 60034-1: 2010 Cl. 9.4 IS/IEC 60034-1 Cl. 9.4	Submersible motor 0.37 kW to 110 kW, 50/60 Hz Induction motors 0.018 kW to 110 kW, 50/60 Hz
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Location: 1

10.	3-Ph Induction motor 1-Ph small AC & universal motor Monoset pump for agricultural purpose Submersible Motors Increased safety motor Squirrel cage induction motor for centrifugal and agricultural purpose Submersible pumpset Single speed 3 ph induction motor for Driving lifts Regenerative self priming pump Jet Centrifugal pump Combination 3-Ph Energy Efficient induction motor Openwell submersible pumpset Rotating Electrical machines 1-Ph Induction motor for Agricultural Purpose Poly phase Induction motor & Generator Energy Efficient Induction Motors - Three Phase Squirrel Cage	Temperature Rise Test at Rated Voltage	IS 325: 1996 Cl. 22.3.1 (h) IS 8151: 1976 Cl. 12 IS 996: 2009 Cl. 17.3 (e) IS 8472: 1998 Cl. 14.1.2.1.1 IS 9079: 2002 Cl. 11.2 .3 IS 12615: 2011 Cl. 21.1 (g) IS 9283: 2013 Cl. 16.1 (j) IS 12225: 1997 Cl. 5.2.1 IS 14220: 1994 Cl. 7.4.6.3.1 IS 7538: 1996 Cl. 22.3.1(h) IS 14582: 1998 Cl. 16.2 (g) IS 8034: 2002 Cl. 7.0 IEC 60034-1: 2010 Cl. 8.6.2 IEEE 112: 2004 Cl. 5.8 C 390-98 Cl. 5	Submersible motor 0.37 kW to 110 kW, 50/60 Hz Induction motors 0.018 kW to 110 kW , 50/60 Hz Generator 0.37 kW to 20 kVA, 50/60 Hz
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<u>Location: 1</u>				
11.	Monoset pump for agricultural purpose Submersible Motors Regenerative self priming pump Submersible pumpset Squirrel cage induction motor for centrifugal and agricultural purpose Openwell submersible pumpset 1-Ph Induction motor for Agricultural purpose	Temperature Rise Test at Reduced Voltage/ at limiting value of voltage and frequency variation.	IS 8472: 1998 Cl. 14.1.2.1.2 IS 9079: 2002 Cl. 11.2 .3 IS 14220: 1994 Cl. 7.4.6.3.2 IS 9283: 2013 Cl. 16.1 (k) IS 14582: 1998 Cl. 16.2 (h) IS 8034: 2002 Cl. 7.0 IS 7538: 1996 Cl. 22.3.1(j) IS 12615: 2011 Cl. 21.2 (d)	Submersible motor 0.37 kW to 110 kW, 50/60 Hz Induction motors 0.018 kW to 110 kW, 50/60 Hz
12.	3-Ph Induction motor 1-Ph small AC & universal motor Monoset pump for agricultural purpose Squirrel cage induction motor for centrifugal and agricultural purpose Submersible pumpset Submersible Motors Single speed 3 ph induction motor for Driving lifts Regenerative self priming pump Jet Centrifugal pump Combination	Locked Rotor Test	IS 325: 1996 Cl. 22.3.1 (f) IS 8151: 1976 Cl. 11 & 16 IS 996: 2009 Cl. 17.3 (b) IS 8472: 1998 Cl. 14.1.2 IS 9079: 2002 Cl. 11.2 IS 12615: 2011 Cl. 21.1 (e) IS 9283: 2013 Cl. 16.1 (f) IS 12225: 1997 Cl. 5.2.1 IS 7538: 1996 Cl. 22.3.1(e) IS 14220: 1994 Cl. 7.4.6.2	Induction motor 0.018 kW to 110 kW, 50/60 Hz Submersible motor 0.37 kW to 110 kW, 50/60 Hz Generator 0.37 kVA to 20 kVA, 50/60 Hz

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<u>Location: 1</u>				
	3-Ph Energy Efficient induction motor Openwell submersible pumpset Rotating Electrical machines 1-Ph Induction motor for Agricultural Purpose Poly phase Induction motor & Generator	Locked Rotor Test	IS 8034: 2002 Cl. 7.0 IS 14582: 1998 Cl. 16.2 (d) IEC 60034-12: 2007 Cl. 6.0 IEEE 112: 2004 Cl. 7.2	Induction motor 0.018 kW to 110 kW, 50/60 Hz Submersible motor 0.37 kW to 110 kW, 50/60 Hz Generator 0.37 kVA to 20 kVA, 50/60 Hz
13.	Squirrel cage induction motor for centrifugal and agricultural purpose	Test for efficiency at reduced voltage	IS 7538: 1996 Cl. 22.3.1(g)	Induction motor 0.018 kW to 110 kW, 50/60 Hz
14.	3-Ph Induction motor 1-Ph small AC & universal motor Monoset pump for agricultural purpose Squirrel cage induction motor for centrifugal and agricultural purpose Submersible pumpset Submersible Motors Single speed 3 ph induction motor for Driving lifts Regenerative self priming pump	High Voltage Test/ High Potential Test/Withstand voltage Test	IS 325: 1996 Cl. 22.3.1(m) IS 8151: 1976 Cl. 14.4 IS 996: 2009 Cl. 17.3 (h) IS 8472: 1998 Cl. 14.1.2 IS 9079: 2002 Cl. 11.2 IS 12615: 2011 Cl. 21.1 (k) IS 13364-1: 1992 Cl. 20.4.1(k) IS 9283: 2013 Cl. 16.1 (b) IS 7538: 1996 Cl. 22.3.1(n) IS 14220: 1994 Cl. 7.4.6.5 IS 12225: 1997 Cl. 5.2.1 IS 8034: 2002 Cl. 7.0	Induction motor 0.018 kW to 110 kW, 50/60 Hz Submersible motor 0.37 kW to 110 kW, 50/60 Hz Generator 0.37 kVA to 20 kVA, 50/60 Hz DC motor 0.018 kW to 10 kW

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<u>Location: 1</u>				
	Jet Centrifugal pump Combination 3-Ph Energy Efficient induction motor Open well submersible pump set AC Generator Upto 20 kVa, 50/60 Hz Rotating Electrical machines 1-Ph Induction motor for Agricultural Purpose Poly phase induction motors & generator DC Motor	High Voltage Test/ High Potential Test/Withstand voltage Test	IEC 60034-1: 2010 Cl. 9.2 IS 14582: 1998 Cl. 16.2 (m) IEEE 112: 2004 Cl. 8.2	Induction motor 0.018 kW to 110 kW, 50/60 Hz Submersible motor 0.37 kW to 110 kW, 50/60 Hz Generator 0.37 kVA to 20 kVA, 50/60 Hz DC motor 0.018 kW to 10 kW

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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
<u>Location: 1</u>				
15.	3-Ph Induction motor 1-Ph small AC & universal motor Monoset pump for agricultural purpose Squirrel cage induction motor for centrifugal and agricultural purpose Submersible pumpset Submersible Motors Single speed 3 ph induction motor for Driving lifts Regenerating self priming pump DC motor Jet Centrifugal pump Combination Energy Efficient Induction Motors Three Phase Squirrel Cage Openwell submersible pumpset Small size spark ignition Engine 1-Ph Induction motor for Agricultural Purpose Polyphase Induction motors & Generator	Insulation Resistance Test	IS 325: 1996 Cl. 22.3.1(k) IS 8151: 1976 Cl. 14.5 IS 996: 2009 Cl. 17.3 (g) IS 8472: 1998 Cl. 14.1.2 IS 9079: 2002 Cl. 11.2 IS 9283: 2013 Cl. 16.1 (a) IS 12615: 2011 Cl. 21.1 (j) IS 7538: 1996 Cl. 22.3.1(m) IS 12225: 1997 Cl. 5.2.1 IS 8034: 2002 Cl. 7.0 IS 14220: 1994 Cl. 7.4.6.5 IS 13364-1: 1992 Cl. 20.4.1(j) IS 14582: 1998 Cl. 16.2 (k) IEEE 112: 2004 Cl. 8.1	0.01 to 200 MΩ Induction motor 0.018 kW to 110 kW, 50/60 Hz Submersible motor 0.37 kW to 110 kW, 50/60 Hz Generator 0.37 kVA to 20 kVA, 50/60 Hz

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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
<u>Location: 1</u>				
16.	3-Ph Induction motor 1-Ph small AC & universal motor Energy Efficient Induction Motors - Three Phase Squirrel Cage Rotating Electrical machines Squirrel cage induction motor for centrifugal and agricultural purpose Single speed 3 ph induction motor for Driving lifts AC Generator Upto 20 kVA, 50/60 Hz Submersible Motors Polyphase Induction motors & Generator	Vibration Test	IS 325: 1996 Cl. 22.3.1 (n) IS 7538: 1996 Cl. 22.3.1 (p) IS 996: 2009 Cl. 17.3 (m) IS 8151: 1976 Cl. 15 IS 12615: 2011 Cl. 21.2 (a) IS 13364-1: 1992 Cl. 13 IEC 60034-14: 2010 Cl. 6, 7 & 8 IEEE 112: 2004 Cl. 8.6	Induction motor 0.018 kW to 110 kW, 50/60 Hz Submersible motor 0.37 kW to 110 kW, 50/60 Hz Generator 0.37 kVA to 20 kVA, 50/60 Hz
17.	Submersible motor	Performance characteristic	IS 9283: 2013 Cl. 16.1 (h)	Submersible motor 0.37 kW to 110 kW, 50/60 Hz

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Location: 1

18.	Centrifugal self priming pump Regenerative self priming pump Horizontal centrifugal pump for rural, agricultural and General purpose Monoset pump for agricultural purpose Jet Centrifugal pump Combination Submersible pumpset Openwell submersible pumpset	Pump Performance Test	IS 8418: 1999 Cl. 12.2 IS 8472: 1998 Cl. 13,16 IS 5120: 1977 Cl. 13 IS 9079: 2002 Cl. 10 IS 6595-1: 2004 Cl. 10 & 11 IS 6595-2: 1999 Cl. 10 & 11 IS 12225: 1997 Cl. 8.2,9,10 IS 8034: 2002 Cl. 15 IS 14220: 1994 Cl. 10	Submersible motor 0.37 kW to 110 kW, 50/60 Hz
19.	Centrifugal self priming pump Regenerative self priming pump Monoset pump for agricultural purpose Submersible pumpset Jet Centrifugal pump Combination Openwell submersible pumpset Horizontal centrifugal pump for rural, agricultural and General purpose	Hydrostatic Test	IS 8418: 1999 Cl. 13.2 IS 14220: 1994 Cl. 7.5 IS 8472: 1998 Cl. 13.3 IS 8034: 2002 Cl. 9.1 IS 9079: 2002 Cl. 12.2 IS 6595-1: 2002 Cl. 9.1 IS 6595-2: 1999 Cl. 9.1 IS 12225: 1997 Cl. 9.3	Submersible motor 0.37 kW to 110 kW, 50/60 Hz 0.1 kg/cm ² to 80 kg/cm ²

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Location: 1

20.	Centrifugal self priming pump Regenerative self priming pump Monoset pump for agricultural purpose Horizontal centrifugal pump for rural, agricultural and General purpose Submersible pumpset	Direction of Rotation	IS 8418: 1999 Cl. 7 IS 8472: 1998 Cl. 9 IS 8034: 2002 Cl. 10 IS 9079: 2002 Cl. 7 IS 6595-1: 2002 Cl. 7 IS 6595-2: 1999 Cl. IS/IEC 60034-8	Qualitative
21.	3-Ph Induction motor 1-Ph small AC & universal motor Squirrel cage induction motor for centrifugal and agricultural purpose Regenerative self priming pump Energy Efficient Induction Motors - Three Phase Squirrel Cage	Pull up & Pull out Torque Test	IS 325: 1996 Cl. 13.2 IS 8472: 1998 Cl. 14.1.2 IS 996: 2009 Cl. 17.3 (b) IS 12615: 2011 Cl.11.2 IS/IEC 60034-1 Cl. 9.5 IEC 60034-1 Cl. 9.5	Induction Motors 0.18 to 37 kW
22.	1-Ph small AC & universal motor	Moisture Proofness	IS 996: 2009 Cl. 17.3 (j)	Range 20 °C to 60 °C 20 % RH to 100 % RH size 600 x 600 x 600 mm
		Method of Cooling	IS 996: 2009 Cl. 11	Induction motor 0.018 kW to 110 kW, 50/60 Hz

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<u>Location: 1</u>				
23.	1-Ph small AC & universal motor Submersible motor Submersible pumpset	Leakage Current Test	IS 996: 2009 Cl. 17.3 (k) IS 9283: 2013 Cl. 16.1 (n) IS 8034: 2002 Cl. 7 IS 14220: 1994 Cl. 7.4.6.2	Induction motor 0.018 kW to 110 kW, 50/60 Hz Submersible motor 0.37 kW to 110 kW, 50/60 Hz
24.	Rotating Electrical machines	Commutation Test	IS/IEC 60034-1: 2007 Cl. 9.10 IEC 60034-1: 2010 Cl. 9.10	Qualitative
25.	3-Ph Induction motor 1-Ph small AC & universal motor 3-Ph Energy Efficient induction motor Rotating Electrical machine for Dimension Test Squirrel cage induction motor for centrifugal and agricultural purpose Submersible motor Single speed 3 ph induction motor for Driving lifts	Dimension Test	IS 325: 1996 Cl. 22.3.1 (a) IS 7538: 1996 Cl. 22.3.1(a) IS 996: 2009 Cl. 7.2 IS 12615: 2011 Cl. 21.1 (a) IS 928: 1995 Cl. 7.1 IEC 60072-1: 1991 IS 8151: 1976 Cl. 7 IEC 60072-2: 1990 IEC 60072-3: 1994	0.001 mm to 1000 mm

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<u>Location: 1</u>				
26.	Centrifugal self priming pump Regenerative self priming pump	Priming Test	IS 8418: 1999 Cl. 12.2 IS 8472: 1998 Cl. 13.5,16.2	0.01s to 99 hr 59 min 59 s
27.	Openwell submersible pumpset Submersible pumpset Submersible motor	Balancing of rotor	IS 14220: 1994 Cl. 7.3 & 7.4.5 IS 8034: 2002 Cl. 6.2 IS 9283: 2013 Cl. 5.6	0.001 kg to 50 kg
28.	Centrifugal self priming pump Regenerative self priming pump Monoset pump for agricultural purpose Submersible motor Horizontal centrifugal pump for rural, agricultural and General purpose Submersible pumpset Openwell submersible pumpset Jet Centrifugal pump Combination	Constructional Details/ Constructional Features/ Constructional Requirements	IS 8418: 1999 Cl. 6 IS 8034: 2002 Cl. 6.0 IS 8472: 1998 Cl. 8 IS 9079: 2002 Cl. 6 IS 14220: 1994 Cl. 6.1 IS 9283: 2013 Cl. 5 IS 12225: 1997 Cl. 6 IS 996: 2009 Cl. 9 IS 6595-1: 2002 Cl. 6 IS 6595-2: 1999 Cl. 6	Qualitative

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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
<u>Location: 1</u>				
29.	Horizontal centrifugal pump for rural, agricultural and General purpose Centrifugal self priming pump Monoset pump for agricultural purpose	General requirement	IS 8418: 1999 Cl. 13 IS 9079: 2002 Cl. 12 IS 6595-1: 2002 Cl. 9 IS 6595 -2: 1999 Cl. 9	Qualitative 0.01 kg to 50 kg
30.	Horizontal centrifugal pump for rural, agricultural and General purpose Monoset pump for agricultural purpose Openwell submersible pumpset Centrifugal self priming pump	Design features/ Guarantee of Performance	IS 6595-1: 2002 Cl. 8 IS 6595-2: 1999 Cl. 8 IS 9079: 2002 Cl. 9 IS 14220: 1994 Cl. 7 IS 8418: 1999 Cl. 11	Qualitative
31.	Submersible pumpset Submersible motor	Measurement of Shaft Extension Voltage & Frequency variation	IS 8034: 2002 Cl. 6.0 IS 9283: 2013 Cl. 7.2.2 IS 8034: 2002 Cl. 7 IS 9283: 2013 Cl. 6.2	0.001 mm to 1 mm 0.37 kW to 110 kW, 50/60 Hz

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Location: 1

32.	AC Generator Upto 20 kVA, 50/60 Hz	Phase sequence Test	IS 13364-1: 1992 Cl. 20.4.1(b) IS/IEC 60034-1 Cl. 9.1	0.37 kVA to 20 kVA, 50/60 Hz
		Regulation Test	IS 13364-1: 1992 Cl. 20.4.1(c)	0.37 kVA to 20 kVA, 50/60 Hz
		Measurement of open circuit characteristics	IS 13364-1: 1992 Cl. 20.4.1(d)	0.37 kVA to 20 kVA, 50/60 Hz
		Measurement of short circuit characteristics	IS 13364-1: 1992 Cl. 20.4.1(e)	0.37 kVA to 20 kVA, 50/60 Hz
		Efficiency Test	IS 13364-1: 1992 Cl. 20.4.1 (f)	Generator 0.37 kVA to 20 kVA, 50/60 Hz
		Temperature rise Test/ Thermal performance and Tests	IS 13364-1: 1992 Cl. 20.4.1(g) IS/IEC 60034-1: 2007 Cl. 8	Generator 0.37 kVA to 20 kVA, 50/60 Hz DC motor 0.018 kW to 10 kW
		Deviation of voltage waveform from sinusoidal	IS 13364-1: 1992 Cl. 20.4.1(m)	0.37 kVA to 20 kVA, 50/60 Hz
		Momentary over current Test	IS 13364-1: 1992 Cl. 20.4.1(n)	0.37 kVA to 20 kVA, 50/60 Hz

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Location: 1

33.	AC Generator Upto 20 kVA, 50/60 Hz Submersible motor Squirrel cage induction motor for centrifugal and agricultural purpose 3-Ph Energy Efficient induction motor Polyphase Induction motors & Generator	Overspeed Test	IS 13364-1: 1992 Cl. 20.4.1(h) IS 7538: 1996 Cl. 22.3.1(s) IS 12615: 2011 Cl. 21.2 (e) IEEE 112: 2004 Cl. 8.7 of IS/IEC 60034-1 Cl. 9.7	Generator 0.37 kVA to 20 kVA, 50/60 Hz Induction motor 0.018 kW to 110 kW, 50/60 Hz Submersible motor 0.37 kW to 110 kW, 50/60 Hz
34.	DC Motor Poly phase Induction motor & Generator	Determination of efficiency	IEC 60034-2-1: 2014 Cl. 6 & 7 IS 15999-2-1: 2011 Cl. 7 & 8	DC motors 0.018 HP to 10 HP Induction motor 0.018 kW to 110 kW, 50/60 Hz Generator 0.37 kVA to 20 kVA, 50/60 Hz
35.	Poly phase Induction motor & Generator	Test for speed-Torque & Speed – current curves	IEEE 112: 2004 Cl. 7.3	Induction motor 0.018 kW to 110 kW, 50/60 Hz Generator 0.37 kVA to 20 kVA, 50/60 Hz

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Location: 1

36.	Motor operated water pump	Construction	UL 778 Cl. 5	Qualitative
		Protection against injury to persons	UL 778 Cl. 25, 26, 27, 28, 29, 30	Pump 0.37 kW to 110 kW, 50/60 Hz
		Starting current Test	UL 778 Cl. 33	Pump 0.37 kW to 110 kW, 50/60 Hz
		Input Test	UL 778 Cl. 34	Pump 0.37 kW to 110 kW, 50/60 Hz
		Temperature Test	UL 778 Cl. 35	Pump 0.37 kW to 110 kW, 50/60 Hz
		Dielectric voltage withstand Test	UL 778 Cl. 36	0.25 to 2.5 kV, Pump 0.37 kW to 110 kW, 50/60 Hz
		Resistance to moisture Test	UL 778 Cl. 38	Pump 0.37 kW to 110 kW, 50/60 Hz

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<u>Location: 1</u>				
	Motor operated water pump	Submersion Test	UL 778 Cl. 39	Pump 0.37 kW to 110 kW , 50/60 Hz
		Flooding Test	UL 778 Cl. 40	Pump 0.37 kW to 110 kW , 50/60 Hz
		Insulation Resistance Test	UL 778 Cl. 41	0.01 to 200 MΩ Pump 0.37 kW to 110 kW , 50/60 Hz
		Operation Test	UL 778 Cl. 47	Pump 0.37 kW to 110 kW , 50/60 Hz
		Abnormal operation	UL 778 Cl. 48	Pump 0.37 kW to 110 kW , 50/60 Hz
		Performance of Markings	UL 778 Cl. 49	Pump 0.37 kW to 110 kW , 50/60 Hz
37.	Power Transformer Part-18: Measurement of Frequency Response	Frequency Response Measurement	IEC 60076-18	Voltage: 230 V to 800 kV Power: 100 kW to 1000 MW

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Location: 1**IX. SWITCHGEAR EQUIPMENT**

1.	ACBs & MCCBs	Test of rated service short circuit breaking capacity	IS/IEC 60947-2: 2003 Cl. 8.3.4.1 IEC 60947-2: 2013 Cl. 8.3.4.1 IS/IEC 60947-1: 2007 Cl. 8.3 IEC 60947-1: 2011 Cl. 8.3	0.5 kA to 50 kA, 100 V to 525 V
		Test of ultimate short circuit breaking capacity	IS/IEC 60947-2: 2003 Cl. 8.3.5.2 IEC 60947-2: 2013 Cl. 8.3.5.2 IS/IEC 60947-1: 2007 Cl. 8.3 IEC 60947-1: 2011 Cl. 8.3	0.5 kA to 50 kA, 100 V to 525 V
		Test Of Rated Short Circuit Breaking Capacity At Maximum Short Time Withstand Current	IS/IEC 60947-2: 2003 Cl. .8.3.6.4 IEC 60947-2: 2013 Cl. .8.3.6.4 IS/IEC 60947-1: 2007 Cl. 8.3 IEC 60947-1: 2011 Cl. 8.3	0.5 kA to 50 kA 1 s, 100 V to 525 V

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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
<u>Location: 1</u>				
	ACBs & MCCBs	Verification Of Operational Capability	IS/IEC 60947-2: 2003 Cl. 8.3.4.2 IEC 60947-2: 2013 Cl. 8.3.4.2 IS/IEC 60947-1: 2007 Cl. 8.3. IEC 60947-1: 2011 Cl. 8.3	0.5 kA to 50 kA, 100 V to 525 V
2.	ACBs , MCCBs, Switch disconnecter	Test of rated short time withstand current	IS/IEC 60947-2: 2003 Cl. 8.3.6.2 IEC 60947-2: 2013 Cl. 8.3.6.2 IS/IEC 60947 -3: 1999 Cl. 8.3.5.1 IEC 60947-3: 2012 Cl. 8.3.5.1 IEC 60947-7-1: 2009 Cl. 8.4.6 IS/IEC 60947-1: 2007 Cl. 8.3 IEC 60947-1: 2011 Cl. 8.3	0.3 kA to 40 kA for 3 s or 0.5 kA to 50 kA for 1 s
3.	ACBs	Overload Performance	IS/IEC 60947-2: 2003 Cl. 8.3.3.4 IEC 60947-2: 2013 Cl. 8.3.3.4 IS/IEC 60947-1: 2007 Cl. 8.3 IEC 60947-1: 2011 Cl. 8.3	0.5 kA to 50 kA, 100 V to 525 V

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<u>Location: 1</u>				
4.	Switch Disconnecter	Short Circuit Making Capacity Test	IS/IEC 60947 -3: 1999 Cl. 8.3.5.2 IEC 60947-3: 2012 Cl. 8.3.5.2 IS/IEC 60947-1: 2007 Cl. 8.3 IEC 60947-1: 2011 Cl. 8.3	200 A to 50 kA, 100 V to 525 V
5.	SFUs, FSUs, Switch Disconnecter , Switch Disconnecter Fuse	Fuse Protected Short-Circuit Withstand	IS/IEC 60947 -3: 1999 Cl. 8.3.6.2 a IEC 60947-3: 2012 Cl. 8.3.6.2 a IS/IEC 60947-1: 2007 Cl. 8.3 IEC 60947-1: 2011 Cl. 8.3	0.5 kA to 50 kA, 100 V to 525 V
6.	SFUs, FSUs, Switch Disconnecter, Switch Disconnecter Fuse	Fuse Protected Short-Circuit Making	IEC 60947-3: 2012 Cl. 8.3.6.2 b IS/IEC 60947 -3: 1999 Cl. 8.3.6.2 b IS/IEC 60947-1: 2007 Cl. 8.3 IS/IEC 60947-1: 2011 Cl. 8.3	0.5 kA to 50 kA, 100V to 525 V
7.	Starters, Contactors, Combination starters	Performance Under Short-Circuit Conditions	IS/IEC 60947-4-1: 2000 Cl. 9.3.4 IEC 60947-4-1: 2012 Cl. 9.3.4 IS/IEC 60947-1: 2007 Cl. 8.3. IEC 60947-1: 2011 Cl. 8.3.	0.5 kA to 50 kA, 100 V to 525 V

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Location: 1

8.	RCCBs	Verification of the coordination at the rated conditional short-circuit current (inc)	IS 12640 (Part 1): 2008 Cl. 9.11.2.4 a IEC 61008-1: 2013 Cl. 9.11.2.4 a	0.5 kA to 25 kA, 100 V to 525 V
		Verification of the rated making and breaking capacity (im)	IS 12640 (Part 1): 2008 Cl. 9.11.2.2 IEC 61008-1: 2013 Cl. 9.11.2.2	0.5 kA to 25 kA, 100 V to 525 V
		Verification of the coordination at the rated making and breaking capacity (Im)	IS 12640 (Part 1): 2008 Cl. 9.11.2.4 b IEC 61008-1: 2013 Cl. 9.11.2.4 b	0.5 kA to 25 kA, 100 V to 525 V
		Verification Of The Coordination At The Rated Conditional Residual Short-Circuit Current (IΔC)	IS 12640(Part 1): 2008 Cl. 9.11.2.4 c IEC 61008-1: 2013 Cl. 9.11.2.4 c	0.5 kA to 25 kA, 100 V to 525 V
		Verification of the Suitability Of An RCCB for use in it Systems	IEC 61008-1: 2013 Cl. 9.11.2.3 c	0.5 kA to 25 kA, 100 V to 525 V

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<u>Location: 1</u>				
9.	RCBOs, RCCBs	Verification Of The Rated Residual Making And Breaking Capacity (I Δ M)	IS 12640 (Part 2): 2008 Cl. 9.12.13 IEC 61009-1: 2013 Cl. 9.12.13 IS 12640 (Part 1): 2008 Cl. 9.11.2.3 IEC 61008-1: 2013 Cl. 9.11.2.3 a b	0.5 kA to 25 kA, 100 V to 525 V
10.	MCBs	Test At Reduced Short-Circuit Currents	IS/IEC 60898-1: 2002 Cl. 9.12.11.2.1 IEC 60898 -1: 2003 Cl. 9.12.11.2.1	0.5 kA to 2500 A, 100 V to 525 V
		Verification Of Circuit Breaker for The Use In It System	IS/IEC 60898-1: 2002 Cl. 9.12.11.2.2 IEC 60898 -1: 2003 Cl. 9.12.11.2.2	500 A to 2500 A, 100 V to 525 V
11.	MCBs, RCBOs	Test At 1500 A	IS/IEC 60898-1: 2002 Cl. 9.12.11.3 IEC 60898 -1: 2003 Cl. 9.12.11.3 IEC 60898 -2: 2003 Cl. 9.12.11.3 IS 12640 (Part 2): 2008 Cl. 9.12.11.3 IEC 61009-1: 2013 Cl. 9.12.11.3	500 A to 1500 A, 100 V to 525 V

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Location: 1

	MCBs, RCBOs	Test At Service Short-Circuit Capacity (ICS)	IS/IEC 60898-1: 2002 Cl. 9.12.11.4.2 IEC 60898 -1: 2003 Cl. 9.12.11.4 2 IEC 60898 -2: 2003 Cl. 9.12.11.4 2 IS 12640 (Part 2): 2008 Cl. 9.12.11.4 b IEC 61009-1: 2013 Cl. 9.12.11.4 b	2.5 kA to 25 kA, 100 V to 525 V
		Test At Rated Short-Circuit Capacity (ICN)	IS/IEC 60898-1: 2002 Cl. 9.12.11.4 3 IEC 60898 -1: 2003 Cl. 9.12.11.4 3 IEC 60898 -2: 2003 Cl. 9.12.11.4 3 IS 12640 (Part 2): 2008 Cl. 9.12.11.4 c IEC 61009-1: 2013 Cl. 9.12.11.4 c	2.5 kA to 25 kA, 100 V to 525 V
12.	SFUs, FSUs	Verification of The Rated Fused Short-Circuit Current	IS 10027: 2000 Cl. 7.5 IS/IEC 60947 -3: 1999 Cl. 8.3.6.2 a IEC 60947-3: 2012 Cl. 8.3.6.2 a	0.5 kA to 50 kA, 100 V to 525 V

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Location: 1

13.	Enclosed distribution fuse boards & cut outs	Verification Of Short-Circuit Strength	IS 2675: 1983 Cl. 8.4	0.5 kA to 40 kA for 3 s or 0.5 kA to 50 kA for 1s
14.	Panel, Busduct	Testing Under Conditions Of Arcing Due To Internal Fault	IEC 61641/TR: 2008 Cl. 8	0.5 kA to 40 kA for 3 s or 0.5 kA to 50 kA for 1s 100 V to 525 V
15.	HRC Fuse	Verification Of The Breaking Capacity	IS 13703 (Part 1): 1993 Cl. 8.5 IEC 60269-1: 2014 Cl. 8.5	200 A to 80 kA, 100 V to 525 V
		Verification Of The Cut-Off Current Characteristic	IS 13703 (Part 1): 1993 Cl. 8.6 IEC 60269-1: 2014 Cl. 8.6	200 A to 80 kA, 100 V to 525 V
		Verification Of The I ² T Characteristics And Overcurrent Discrimination	IS 13703 (Part 1): 1993 Cl. 8.7 IEC 60269-1 : 2014 Cl. 8.7	200 A to 80 kA, 100 V to 525 V

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16.	LT Panel, LTDB, LT BUSDUCT	Verification Of The Short-Circuit Withstand Strength	IS 8623 (Part 1): 1993 Cl. 8.2.3 IS 8623 (Part 2): 1993 Cl. 8.2.3 IS 8623 (Part 3): 1993 Cl. 8.1.1 c) IEC 61439 -1: 2011 Cl. 10.11 IEC 61439 -2: 2011 Cl. 10.11 IEC 61439 -3: 2012 Cl. 10.11	0.5 kA to 40 kA for 3 s or 0.5 kA to 50 kA for 1s, 100 V to 525 V
		Verification Of The Effectiveness Of The Protective Circuit	IS 8623 (Part 1): 1993 Cl. 8.2.4 IS 8623 (Part 2): 1993 Cl. 8.2.4 IS 8623 (Part 3): 1993 Cl. 8.2.4 IEC 61439 -1: 2011 Cl. 10.11.5.6 IEC 61439 -2: 2011 Cl. 10.11.5.6 IEC 61439 -3: 2012 Cl. 10.11.5.6	0.5 kA to 40 kA for 3 s or 0.5 kA to 50 kA for 1s, 100 V to 525 V
17.	HT Panels, HT Breakers, HT Panel with breakers	Short-Time And Peak Withstand Current Tests	IS 13118: 1991 Cl. 6.5 IEC 62271-1: 2011 Cl. 6.6 IEC 62271-100: 2012 Cl. 6.6 IEC 62271-200: 2011 Cl. 6.6	0.5 kA to 40 kA for 3 s or 0.5 kA to 50 kA for 1s

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<u>Location: 1</u>				
18.	AB Switch, Isolators, Earth Switch	Short Time Withstand Current And Peak Withstand Current Tests	IS 9920 (Part 4): 1985 Cl. 3.4 IS 9920 (Part 1): 2002 Cl. 6.6 IS 9921 (Part 2): 1982 Cl. 4 IS 9921 (Part 4): 1985 Cl. 3.3	0.5 kA to 40 kA for 3 s or 0.5 kA to 50 kA for 1s
19.	HT Connectors, HT bus duct	Short-Time Current Tests	IS 5561: 1970 Cl. 13 IS 8084: 1976 Cl. 7.1.3	0.5 kA to 40 kA for 3 s or 0.5 kA to 50 kA for 1 s
20.	AB Switch	Rated Peak Withstand Current And The Rated Short-Time Current Tests	IS 9920 (Part 4): 1985 Cl. 3.4 IS 9920 (Part 1): 2002 Cl. 6.6 IEC 62271-1: 2011 Cl. 6.6 IEC 62271-102: 2012 Cl. 6.6 IEC 62271-103: 2011 Cl. 6.6	0.5 kA to 40 kA for 3 s or 0.5 kA to 50 kA for 1 s
21.	Rewirable Fuses	Test for Breaking Capacity	IS 2086: 1993 Cl. 9.9 IS 8187: 1976 Cl. 7.13	2 kA to 4 kA, 100 V to 525 V

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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
<u>Location: 1</u>				
22.	Portable Equipment for Earthing & Short Circuiting	Short-Circuit Current Test	IEC 61230: 2008 Cl. 5.7	0.5 kA to 40 kA for 3 s or 0.5 kA to 50 kA for 1 s, 100 V to 525 V
23.	Distribution Pillers	Verification Of The Short-Circuit Strength	IS 5039: 1983 Cl. 8.4	0.5 kA to 40 kA for 3 s or 0.5 kA to 50 kA for 1 s
24.	Automatic Transfer Switching Equipment	Performance Under Short Circuit Conditions	IEC 60947-6-1: 2013 Cl. 9.3.4	0.5 kA to 50 kA, 100 V to 525 V
25.	Earthing Truck	Short Time Withstand Current And Peak Withstand Current Tests	IEC 62271-1: 2011 Cl. 6.6 IEC 62271-102 : 2013 Cl. 6.6	0.5 kA to 40 kA for 3 s or 0.5 kA to 50 kA for 1 s
26.	Transformer	Demonstration Of Ability To Withstand Short Circuit	IS 2026 (Part 5): 2011 Cl. 4 IS 11171: 1985 Cl. 20 IEC 60076-5 (2006) Cl. 4 IS 3151: 1982 Cl. 6.2 IS1180 (Part 1): 2014 Cl. 17 IS1180 (Part 1): 1989 Cl. 18 IS1180 (Part 2): 1989 Cl. 18	1 kVa to 1600 kVa 11 kV/433V, 1 kVa to 500 kVa 22/0.433 kV, 1 kVa to 500 kVa 33/0.433 kV, 100 V to 525 V

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<u>Location: 1</u>				
27.	Current Transformer, Inductive Voltage Transformers	Short-Time Current Tests	IS 2705 (Part 1): 1992 Cl. 9.6 IEC 61869-2: 2012 Cl. 7.2.201 IEC 61869-3: 2011 Cl. 7.2.301	0.5 kA to 40 kA for 3 s or 0.5 kA to 50 kA for 1 s
28.	HT Bushing	Verification Of Thermal Short Time Current Withstand	IEC 60137: 2008 Cl. 8.8	0.5 kA to 40 kA for 3 s or 0.5 kA to 50 kA for 1 s
29.	OLTC	Short Time Current Tests	IEC 60214 – 1(Sec I): 2014 Cl. 5.2.4 IEC 60214-1(Sec II): 2004 Cl. 5.2.4 IS 8468: 1977 Cl. 8.7	0.5 kA to 40 kA for 3 s or 0.5 kA to 50 kA for 1 s
30.	ACBs, MCCBs, Combination Starters	Verification Of Overload Releases	IS/IEC 60947-2: 2003 Cl. 8.3.5.1 & 8.3.3.7 IEC 60947-2: 2013 Cl. 8.3.5.1 & 8.3.3.7 IS/IEC 60947-1: 2007 IEC 60947-1: 2011 Cl. 8.3.3 IS/IEC 60947-4-1: 2000 Cl. 9.3.5 IEC 60947-4-1: 2012 Cl. 9.3.5	10 A to 2000 A

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<u>Location: 1</u>				
31.	MCBs	Verification of the circuit breaker after short circuit Tests	IS/IEC 60898-1: 2002 Cl. 9.12.12 IEC 60898 -1: 2003 Cl. 9.12.12	10 A to 2000 A, 3 ph
		Verification after the short circuit Tests at rated short circuit capacity	IS/IEC 60898-1: 2002 Cl. 9.12.12 2 IEC 60898 -1: 2003 Cl. 9.12.12 2	10A to 2000A, 3 ph
32.	ACBs, MCCBs, SFU, FSU, Switch Disconnecter, Switch disconnecter fuse	Verification Of Temperature Rise	IS/IEC 60947-2: 2003 Cl. 8.3.2.5 IEC 60947-2: 2013 Cl. 8.3.2.5 IS/IEC 60947-1: 2007 Cl. 8.3.3.3 IEC 60947-1: 2011 Cl. 8.3.3.3 IS/IEC 60947 -3: 1999 Cl. 8.3.3.6 IEC 60947-3: 2012 Cl. 8.3.3.6	10 A to 2000 A, 3 ph

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<u>Location: 1</u>				
33.	MCBs, Starters, Contactors, Combination Starters, RCCBs	Verification Of Temperature Rise	IS/IEC 60947-4-1: 2000 Cl.9.3.3.3 IEC 60947-4-1: 2012 Cl.9.3.3.3 IS/IEC 60947-5-1: 2003 Cl.8.3.3.3 IEC 60947-5-1(2009-07) Cl.8.3.3.3 IS 12640 (Part 1): 2008 Cl. 9.8 IEC 61008-1: 2013 Cl. 9.8 IS/IEC 60898-1: 2002 Cl. 9.8 IEC 60898 -1: 2003 Cl. 9.8	10A to 2000A, 3 ph
34.	Rewirable Fuses, HRC Fuses, LT Panel, LTDB, LT Switchgear, LT BUSDUCT	Insulation Resistance Measurement	IS 2086: 1993 Cl.9.7 IS 8187: 1976 Cl. 7.10 IS 8623 (Part 1): 1993 Cl. 8.3.4 IEC 61439 -1: 2011 Cl. 11.9 IS 8623 (Part 2): 1993 Cl. 8.3.4 IEC 61439 -2: 2011 IS 8623 (Part 3): 1993 Cl. 8.1.2 b) IEC 61439 -3: 2012 Cl. 11.9 IS 13703 (Part 1): 1993 Cl. 8.2.5.2 IEC 60269-1: 2014 Cl. 8.2.5.2	0.25 kV to 5.0 kV, 10 MΩ to 1000 GΩ

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Location: 1

35.	RCBOs, HRC Fuse, LT Panel, LTDB, HT Panel, HT Breakers, Air break switches, Isolators, Rewirable fuses, HRC Fuses MCCBs, SFUs, FSUs, Switch disconnecter, Switch disconnecter fuse, Distribution pillers, Enclosed distribution fuse boards & cut outs	Verification Of Temperature Rise	IS 12640 (Part 2): 2008 Cl. 9.8 IEC 61009-1: 2013 Cl. 9.8 IS 10027: 2000 Cl. 7.2 IS 2675: 1983 Cl. 8.2 IS 13703 (Part 1): 1993 Cl. 8.3 IEC 60269-1: 2014 Cl. 8.3 IS 8623 (Part 1): 1993 Cl. 8.2.1 IEC 61439 -1: 2011 Cl. 10.10 IS 8623 (Part 2): 1993 Cl. 8.2.1 IEC 61439 -2: 2011 Cl. 10.10 IS 8623 (Part 3): 1993 Cl. 8.1.1 a IEC 61439 -3: 2012 Cl. 10.10 IS 3427: 1997 Cl. 6.3 IS 13118: 1991 Cl. 6.3 IEC 62271-1: 2011 Cl. 6.5 IEC 62271-100: 2012 Cl. 6.5 IEC 62271-102: 2013 Cl. 6.5 IEC 62271-200: 2011 Cl. 6.5 IS 9921(Part 2): 1982 Cl. 3.9 IS 9921(Part 4): 1985 Cl. 3.2 IS 9920 (Part 2): 2001 Cl. 6.3 IS 9920 (Part 4): 1985 Cl. 3.2 IS 2086: 1993 Cl. 9.6 IS 8187: 1976 Cl. 7.11 IS 5039: 1983 Cl. 8.2 IS/IEC 60947 -3: 1999 Cl. 8.3.3.6 IEC 60947-3: 2012 Cl. 8.3.3.6 IS/IEC 60947-1: 2007 Cl. 8.3.3.3 IEC 60947-1: 2011 Cl. 8.3.3.3 IS/IEC 60947-2: 2003 Cl. 8.3.2.5 IEC 60947-2: 2013 Cl. 8.3.2.5	6 A to 2000 A, 3 ph
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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
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Location: 1

36.	ACBs, MCCBs, SFUs, FSUs, Switch disconnecter, Switch disconnecter fuse, Starters, Contactors, Combination Starters, RCCBs, MCBs, RCBOs, LT Panel, LTDB, Busduct, HT Switchgear, AB switches, Isolators, Fuses, Enclosed distribution fuse board & cut outs, Distribution pillars	Verification of dielectric withstand	IS/IEC 60947 -3: 1999 Cl. 8.3.3.4 IEC 60947-3: 2012 IS/IEC 60947-1: 2007 Cl. 8.3.3.4.1. Item 4 IEC 60947-1: 2011 Cl. 8.3.3.4.1 Item 4) IS/IEC 60947-2: 2003 Cl. 8.3.3.5 IEC 60947-2: 2013 Cl. 8.3.3.5 IS/IEC 60947-4-1: 2000 Cl. 9.3.3.4 IEC 60947-4-1: 2012 Cl. 9.3.3.4 IS/IEC 60947-5-1: 2003 Cl. 8.3.3.4 IEC 60947-5-1(2009-07) Cl. 8.3.3.4 IS 12640(Part 1): 2008 Cl. 9.7 IEC 61008-1: 2013 Cl. 9.7 IS/IEC 60898-1: 2002 Cl. 9.7 IEC 60898 -1: 2003 Cl. 9.7 IS 12640(Part 2): 2008 Cl. 9.7 IEC 61009-1: 2013 Cl. 9.7	0.5 kV to 100 kV, 2mA to 100 mA,
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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
<u>Location: 1</u>				
37.	HT Switchgear, HT Breakers, AB switches, Isolators	Measurement of the resistance of the main circuit	IEC 62271-1: 2011 Cl. 6.4 IEC 62271-100: 2012 Cl. 6.4 IEC 62271-102: 2013 Cl. 6.4 IEC 62271-200: 2011 Cl. 6.4 IS 13118: 1991 Cl. 6.4 IS 9921(Part 4): 1985 Cl. 3.2.5 IS 9920(Part 2): 2001 Cl. 6.4 IS 9920 (Part 4): 1985 Cl. 4.2	10 μΩ to 5Ω, 30 A to 200 A DC
38.	ACB, MCCB,MCB,SFU, FSU, Switch disconnecter, Switch disconnector fuse, Starters, Contactors, Combination Starters	Leakage Current Measurement	IS/IEC 60947-2: 2003 Cl. 8.3.3.2 IV) IEC 60947-2: 2013 Cl. 8.3.3.2 IV) IS/IEC 60947 -3: 1999 Cl. 8.3.3.5 IEC 60947-3: 2012 Cl. 8.3.3.5 IS/IEC 60947-1: 2007 Cl. 7.2.7 IEC 60947-1: 2011 Cl. 7.2.7 IS/IEC 60947-4-1: 2000 Cl. 9.3.4.2.3 IEC 60947-4-1: 2012 Cl. 9.3.4.2.3 IS/IEC 60898-1: 2002 Cl. 9.12.12	0.2mA to 20 mA 20V to 750V

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Location: 1

39.	Piercing Conductor	Over Current Test	NFC 33-004: 1998 Cl.5.3.3.2 NFC 33-20: 1998	0.5 kA to 40 kA for 3 s or 0.5 kA to 50 kA for 1s
40.	Switchgear Products	Temperature- rise limits	IS/IEC 60947-1: 2007 Cl. 8.3.3.3 IS/IEC 60947-2: 2003 Cl.8.3.3.3,8.3.2.5,8.3.3.6,8.3.4.4,8.3.6.3,8.3.7.2,8.3.8.6) IS/ IEC 60947-3: 1999 Cl.8.3.3.1,8.3.4.4,8.3.5.5,8.3.6.5,8.3.7.4 IS/IEC 60947-4-1: 2000 Cl. 9.3.3.3 IS/IEC60947-5-1: 2003 Cl. 8.3.3.3,J8.3.3.3 IEC 60947-1 : 2014 Cl. 8.3.3.3 IEC60947-2:2013 Cl.8.3.3.3,8.3.2.5,8.3.3.6,8.3.4.4,8.3.6.3,8.3.7.2,8.3.8.6 IEC60947-3: 2012 Cl.8.3.3.1,8.3.4.4,8.3.5.5,8.3.6.5,8.3.7.4 IEC 60947-4-1: 2012 Cl. 9.3.3.3	1A to 20000 A AC, 10 V

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Location: 1

Switchgear
Products

Temperature- rise limits

IEC 60947-5-1: 2009
Cl. 8.3.3.3, J8.3.3.3
IEC 60947-6-1: 2013
Cl. 9.3.3.3,
Annexure D
IEC 60947-7-1: 2009
Cl. 8.4.5
IEC 60947-7-2: 2009
Cl. 8.4.5
IS 8623 (Part 1): 1993/
IEC 60439-1: 2004
Cl. 8.2.1
IS 8623 (Part 2): 1993/
IEC 60439-2: 2005
Cl. 8.2.1
IS 8623 (Part 3): 1993/
IEC 60439-3: 2001
Cl. 8.1.1a
IEC 61439-1: 2011
Cl. 9.2, 10.10
IEC 61439-2: 2011
Cl. 9.2, 10, 10.10
IEC 61439-3: 2012
Cl. 9.2, 10
IEC 61439-6: 2012
Cl. 9, 9.2, 10, 10.10
IEC 61439-4: 2012
Cl. 9, 10

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<u>Location: 1</u>				
	Switchgear Products	Temperature- rise limits	IS 13703 (Part 1 & 2): 1993 Cl. 8.3 IEC 60269- 1: 2014 Cl. 8.3 IEC 60269-2: 2013 Cl. 8.3 IS/IEC 60898-1: 2002 Cl. 9.8 IS/IEC 60898-2: 2003 Cl. 9.8 IEC 60898-1: 2003 Cl. 9.8 IS 12640 (Part 1): 2008/ IEC 61008-1:2006 Cl. 9.8 IS 12640 (Part 2): 2008/ IEC 61009-1: 2006 Cl. 9.8 IEC 61008-1: 2013 Cl. 8.4 IEC 61009-1: 2013 Cl. 8.4 IS 9921 (Part 4): 1985 Cl. 3.2 IS 9920 (Part 1): 2002 Cl. 6.5 IS 9920 (Part 2): 2001 Cl. 6.3	1A to 20000 A AC, 10 V

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Location: 1

**Switchgear
Products**

Temperature- rise limits

IS 9920 (Part 4): 1985
Cl. 3.2
IS 3231 (Part 2/Sec I to II) : 1987
Cl. 12.5,5.0,4.0
IS 3231 (Part 3/Sec I to V) : 1987
Cl. 5.0,6.0
Cl. 6.4
IS 9385 (Part 1): 1979
Cl. 6.4
IS 9385 (Part 2): 1980
Cl. 7.4
IS 2086: 1993
Cl. 9.6
IS 10027: 2000
Cl. 7.2
IEC 60255-1: 2009
Cl. 6.4
IEC 60255-27: 2013
Cl. 10.5.4
IEC 60255-12: 1980
Cl. 6.0
IEC 60255-13: 1980
Cl. 6.0
IEC 60255-16: 1982
Cl. 5.0
IEC 62271-1: 2011
Cl. 6.5
IEC 62271-100: 2012
Cl. 6.5

1A to 20000 A AC, 10 V

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Location: 1

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Switchgear Products	Temperature- rise limits	IEC 62271-102: 2013 Cl. 6.5 IEC 62271-103: 2011 Cl. 6.5 IEC 62271-200: 2011 Cl. 6.5 IS 8468 :1977 Cl. 8.5 IS 13118: 1991 Cl. 6.3 IS 3427: 1997 Cl. 6.3 IS 4007 (Part 1): 1982 Cl. 8.13 IS 5561 : 1970 Cl. 12 IS 2675: 1983 Cl. 8.2 IS 13032: 1991 Cl. 9.2 IS 2099: 1986 Cl. 11.7 IS 5039: 1983 Cl. 8.2 IS 8084: 1976 Cl. 7.1.2 IEC 60137: 2008 Cl. 8.7 IEC 60214-1: 2014 Cl. 5.2.2	1A to 20000 A AC, 10 V

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Location: 1

Switchgear Products

Dielectric Strength - Power Frequency withstand Test/
Auxiliary circuit insulation Test

IS/IEC 60947-1: 2007
Cl. 8.3.3.4.1
IS/IEC 60947-2: 2003
Cl.8.3.3.2,8.3.5.3,8.3.6.5,8.3.7.3,8.3.7.7,8.3.8.5,8.3.3.5,8.3.4.3,8.4.5
IS/IEC 60947-3: 1999
Cl.8.1.3.3,8.3.3.2,8.3.4.2,8.3.5.3,8.3.6.3,8.3.7.2
IS/IEC 60947-4-1: 2000
Cl. 9.3.3.4,9.3.6.3
IS/IEC 60947-5-1: 2003
Cl. 8.3.3.4,8.3.3.5.5 b
IEC 60947-1: 2014
Cl. 8.3.3.4.1
IEC 60947-2:2013
Cl.8.3.3.2,8.3.5.3,8.3.6.5,8.3.7.3,8.3.7.7,8.3.8.5,8.3.3.5,8.3.4.3,8.4.5
IEC60947-3: 2012
Cl.8.1.3.3,8.3.3.2,8.3.4.2,8.3.5.3,8.3.6.3,8.3.7.2
IEC 60947-4-1: 2012
Cl. 9.3.3.4,9.3.6.3
IEC 60947-5-1: 2009
Cl. 8.3.3.4,8.3.3.5.5 b

1 V to 100 kV,
100 mA

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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
<u>Location: 1</u>				
	Switchgear Products	Dielectric Strength - Power Frequency withstand Test/ Auxiliary circuit insulation Test	IEC 60947-6-1: 2013 Cl. 9.3.3.4,8.2.3,9.1.3 IEC 60947-7-1: 2009 Cl. 8.4.3 IEC 60947-7-2: 2009 Cl. 8.4.3 IS 8623 (Part 1): 1993/ IEC 60439-1 : 2004 Cl. 8.2.2 IS 8623 (Part 2): 1993 / IEC 60439-2: 2005 Cl. 8.2.2, 8.1.1 IS 8623 (Part 3): 1993/ IEC 60439-3: 2001 Cl. 8.1.1 b IEC 61439-1: 2011 Cl. 9.1, 10.9, 11.9 IEC 61439-2: 2011 Cl. 9,10,11, IEC 61439-3: 2012 Cl. 9,10,11, IEC 61439-6: 2012 Cl. 9,10,11, IEC 61439-4: 2012 Cl. 9,10,11, IS 13703 (Part 1 & 2): 1993 IEC 60269- 1 : 2014 Cl. 8.2	1V to 100 kV, 100 mA

Laboratory Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard ISO/IEC 17025: 2005

Discipline Electrical Testing **Issue Date** 02.04.2015

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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
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Location: 1

Switchgear Products	Dielectric Strength - Power Frequency withstand Test/ Auxiliary circuit insulation Test	IEC 60269-2: 2013 IS/IEC 60898-1: 2002 Cl. 9.7 IS/IEC 60898-2: 2003 Cl. 9.7 IEC 60898-1: 2003 Cl. 9.7 IS 12640 (Part 1): 2008/ IEC 61008-1: 2006 Cl.9.7 IS 12640 (Part 2): 2008/ IEC 61009-1: 2006 Cl.9.7 IEC 61008-1: 2013 Cl.9.7 IEC 61009-1: 2013 Cl.9.7 IS 3231 (Part 1/Sec I to III): 1986 Cl.5.0 IS 3231 (Part 2/Sec I to II): 1987 Cl.12.3,3.6 IS 3231 (Part 3/Sec 1 to 5) : 1987 Cl.10.0,11.0,12.0 IS 2086: 1993 Cl.9.8 IS 12083 (Part 1): 1986 Cl.5.0 IS 10027: 2000 Cl.7.3 IEC 60255-1: 2009 Cl.6.12.2.3	1 V to 100 kV, 100 mA
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Laboratory **Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat**
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard **ISO/IEC 17025: 2005**

Discipline **Electrical Testing** **Issue Date** **02.04.2015**

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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
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Location: 1

Switchgear Products	Dielectric Strength - Power Frequency withstand Test/ Auxiliary circuit insulation Test	IEC 60255-12: 1980 Cl.11.0 IEC 60255-13: 1980 Cl.12.0 IEC 60255-16: 1982 Cl.11.0 IEC 60255-27: 2013 Cl.10.5.3.2,10.5.3.3 IEC 62271-1: 2011 Cl.6.2,7.1,6.10.6,7.2.4 IEC 62271-100: 2012 Cl.6.2,7.1,7.2,10.2.102.3.1 IEC 62271-102: 2013 Cl.6.2 IEC 62271-200: 2011 Cl.6.2 IS 8468 :1977 Cl.8.10 IS 13118: 1991 Cl.6.1,7.1,7.2 IS 3427: 1997 Cl.6.1,7.1,7.2 IS 2675: 1983 Cl.8.3 IS 5039: 1983 Cl.8.3 IEC 60214-1: 2014 Cl.5.2.8, 7.2.5 IEC 61810-1: 2008 Cl.10 IEC61810-2: 2011 (GENERAL PROCEDURE) IS 12083-2: 1986 Cl.5.0
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Laboratory **Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat**
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard **ISO/IEC 17025: 2005**

Discipline **Electrical Testing** **Issue Date** **02.04.2015**

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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
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Location: 1

Switchgear Products	Impulse Test	IS/IEC 60947-1: 2007 Cl.8.3.3.4.1 IS/IEC 60947-2: 2003 Cl.8.3.3.2,8.4.5 IS/ IEC 60947-3: 1999: 1999 Cl.8.1.3.3,8.3.3.2 IS/IEC 60947-4-1: 2000 Cl.9.3.3.4 IS/ IEC 60947-5-1: 2003 Cl.8.3.3.4 IEC 60947-1: 2014 Cl.8.3.3.4.1 IEC 60947-2: 2013 Cl.8.3.3.2,8.4.5 IEC 60947-3: 2012 Cl.8.1.3.3,8.3.3.2 IEC 60947-4-1: 2012 Cl. 9.3.3.4 IEC 60947-5-1: 2009 8.3.3.4) IEC 60947-6-1: 2013 Cl. 9.3.3.4 IEC 60947-7-1: 2009 Cl. 8.4.3 IEC 60947-7-2: 2009 Cl. 8.4.3 IEC 61439-1: 2011 Cl. 9.1, 9.1.3, 10.9.3, 11.9	1 V to 24 kV
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Laboratory	Electrical Research and Development Association, ERDA Road, Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat		
Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Electrical Testing	Issue Date	02.04.2015
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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
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Location: 1

Switchgear Products	Impulse Test	IEC 61439-2: 2011 Cl. 9, 10, 10.9.3.2 IEC 61439-3: 2012 Cl. 9,10,11 IEC 61439-6: 2012 Cl. 9,10,11 IEC 61439-4: 2012 Cl. 9.9,11 IS/IEC 60898-1: 2002 Cl. 9.7.6 IEC 60898-1: 2003 Cl. 9.7.6 IS 12640 (Part 1): 2008/ IEC 61008-1: 2006 Cl. 9.7.7,9.20 IS 12640 (Part 2): 2008/ IEC 61009-1: 2006 Cl. 9.20 IEC 61008-1: 2013 Cl. 9.7.7,9.20 IEC 61009-1: 2013 Cl. 9.20 IS 3231 (Part 1/Sec I to III): 1986 Cl. 7.0 IS 3231 (Part 2/Sec I to II) : 1987 Cl. 12.4,3.6	1 V to 24 kV
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Laboratory **Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat**
 Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
 Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard **ISO/IEC 17025: 2005**

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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
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Location: 1

Switchgear Products	Impulse Test	IS 3231 (Part 3/Sec 1 to 5) : 1987 Cl. 10.0,11.0,12.0 IEC 60255-1: 2009 Cl. 6.12.2.3 IEC 60255-27: 2013 Cl.10.5.3.1 IEC 60255-12: 1980 Cl.11.0 IEC 60255-13: 1980 Cl.12.0 IEC 60255-16: 1982 Cl.11.0 IEC 62271-1: 2011 Cl.6.2 IEC 62271-100: 2012 Cl.6.2 IEC 62271-102: 2013 Cl.6.2 IEC 62271-103: 2011 Cl.6.2 IEC 62271-200: 2011 Cl. 6.2 IS 8468: 1977 Cl. 8.10 IS 3427: 1997 Cl. 6.1 IS 13118: 1991 Cl. 6.1 IS 4007 (Part 1): 1982 Cl. 8.6 IS 13032: 1991 Cl. 9.3 IEC 61810-1: 2008 IEC61810-2: 2011 (GENERAL PROCEDURE) IS 12083-2: 1986 Cl. 7.0	1 V to 24 kV
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Laboratory	Electrical Research and Development Association, ERDA Road, Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat		
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Discipline	Electrical Testing	Issue Date	02.04.2015
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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
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Location: 1

Switchgear Products	Mechanical Durability/ Endurance	IS/IEC 60947-1: 2007 Cl. 8.3.3.7.1,8.1.3 IS/IEC 60947-2: 2003 Cl. 8.3.3.3,8.4.1 IS/ IEC 60947-3: 1999 Cl. 8.3.4.1,8.1.3 IS/IEC 60947-4-1: 2000 Cl. 8.2.4.3.1 IEC 60947-1: 2014 Cl. 8.3.3.7.1,8.1.3 IEC 60947-2: 2013 Cl. 8.3.3.3,8.4.1 IEC 60947-3: 2012 Cl. 8.3.4.1,8.1.3 IEC 60947-4-1: 2012 Cl. 8.2.4.3 IEC 60947-5-1: 2009 Annexure C, Annexure K IEC 60947-6-1: 2013 Cl. 8.3.3.6.2 IS 8623 (Part 1): 1993/ IEC 60439-1: 2004 Cl. 8.2.6 IS 8623 (Part 2): 1993 / IEC 60439-2: 2005 Cl. 8.2.6	1 to 999999 Operation
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Laboratory	Electrical Research and Development Association, ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat		
Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Electrical Testing	Issue Date	02.04.2015
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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
<u>Location: 1</u>				
	Switchgear Products	Mechanical Durability/ Endurance	IS 8623 (Part 3): 1993/ IEC 60439-3: 2001 Cl. 8.2.6 IEC 61439-1: 2011 Cl. 10.13,11.8 IEC 61439-2: 2011 Cl. 10, 10.13, 11, 11.8, IEC 61439-3: 2012 Cl. 10, 10.13, 11 IEC 61439-6: 2012 Cl. 10, 10.13, 11 IEC 61439-4: 2012 Cl. 10, 11 IS/IEC 60898-1: 2003 Cl. 9.11 IS/IEC 60898-2: 2003 Cl. 9.11 IEC 60898-1: 2003 Cl. 9.11 IS 12640 (Part 1): 2008/ IEC 61008-1: 2006 Cl. 9.10 IS 12640 (Part 2): 2008/ IEC 61009-1: 2006 Cl. 9.10 IEC 61008-1: 2013 Cl. 9.10	1 to 999999 Operation

Laboratory Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard ISO/IEC 17025: 2005

Discipline Electrical Testing **Issue Date** 02.04.2015

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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
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Location: 1

**Switchgear
Products**

Mechanical Durability/
Endurance

IEC 61009-1: 2013
Cl. 9.10
IS 9921 (Part 4): 1985
Cl. 3.5
IS 9920 (Part 1): 2002
Cl. 6.102
IS 9920 (Part 2): 2001(6.102)
IS 9920 (Part 4): 1985
Cl. 3.5
IS 3231 (Part 2/Sec 1 to 2) : 1987
Cl. 9.0,6.0,12.7
IS 3231 (Part 3/Sec 1 to 5) : 1987
Cl. 7.0,8.0
IS 2086: 1993
Cl. 9.3
IS 10027: 2000
Cl. 7.7.1
IEC 60255-1: 2009
Cl. 6.11,6.13
IEC 60255-12: 1980
Cl. 7.0,16.0
IEC 60255-13: 1980
Cl. 7.0,18.0
IEC 60255-16: 1982
Cl. 7.0,17.0
IEC 62271-100: 2012
Cl. 6.101,7.101,10.2.102.2
IEC 62271-102: 2013
Cl. 6.102

1 to 999999 Operation

Laboratory**Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat****Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat****Accreditation Standard ISO/IEC 17025: 2005****Discipline Electrical Testing****Issue Date 02.04.2015****Certificate Number T-0071****Valid Until 30.03.2017****Last Amended on -****Page 198 of 315**

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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Location: 1**Switchgear
Products**Mechanical Durability/
EnduranceIEC 62271-103: 2011
Cl. 6.102
IEC 62271-200: 2011
Cl. 6.102
IS 8468 :1977
Cl. 8.9
IS 13118: 1991
Cl. 7.101
IS 3427: 1997
Cl. 6.102,7.102
IS 2086: 1993
Cl. 9.3
IEC 61810-1: 2008
Cl. 12
IEC61810-2: 2011
(General Procedure)

1 to 999999 Operation

Electrical Durability /
Endurance /
Conventional operational
performanceIS/IEC 60947-1: 2007
Cl. 8.3.3.6,8.3.3.7.2
IS/IEC60947-2: 2003
Cl. 8.3.3.3,8.3.4.2,8.3.8.4
IS/ IEC 60947-3: 1999
Cl. 8.3.4.1
IS/IEC 60947-4-1: 2000
Cl. 9.3.3.6
IS/ IEC 60947-5-1: 2003
Annexure C
IEC 60947-1: 2014
Cl. 8.3.3.6,8.3.3.7.2
IEC60947-2: 2013
Cl. 8.3.3.3,8.3.4.2,8.3.8.40.5A to 2kA AC,
110 to 750 V ac, 50 Hz &
0.5A to 300A dc,
10 V to 230V dc and
0.5A to 6.3kA ac,
110 V to 525V ac,
50 Hz &
10 A to 1000A dc,
10 V to 230V dc

Laboratory **Electrical Research and Development Association, ERDA Road,
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Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard **ISO/IEC 17025: 2005**

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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
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Location: 1

Switchgear Products	Electrical Durability / Endurance / Conventional operational performance	IEC 60947-3: 2012 Cl. 8.3.4.1 IEC 60947-4-1: 2012 Cl. 9.3.3.6 IEC 60947-5-1: 2009 Annexure C IEC60947-6-1:2013 Cl.8.3.3.6,8.2.4.2,9.3.3.6.2,9.3.3.6.3 IS/IEC 60898-1: 2002 Cl. 9.11 IS/IEC 60898-2: 2003 Cl. 9.11 IEC 60898-1: 2003 Cl. 9.11 IS 12640 (Part 1): 2008/ IEC 61008-1: 2006 Cl. 9.10 IS 12640 (Part 2): 2008/ IEC 61009-1: 2006 Cl. 9.10 IEC 61008-1: 2013 Cl. 9.10 IEC 61009-1: 2013 Cl. 9.10 IS 3231 (Part 2/Sec 1 to 2) : 1987 Cl. 12.8,7.0 IS 3231 (Part 3/Sec 1 to 5) : 1987 Cl. 9.0,10.0 IEC 60255-1: 2009 Cl. 6.11	0.5A to 2kA AC, 110 to 750 V ac, 50 Hz & 0.5A to 300A dc, 10 V to 230V dc and 0.5A to 6.3kA ac, 110 V to 525V ac, 50 Hz & 10 A to 1000A dc, 10 V to 230V dc
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Laboratory **Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat**
 Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
 Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

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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
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Location: 1

Switchgear Products

Electrical Durability / Endurance / Conventional operational performance

IEC 60255-27: 2013
 Cl. 10.5.4.4
 IEC 60255-12: 1980
 Cl. 9.0
 IEC 60255-13: 1980
 Cl. 10.0
 IEC 60255-16: 1982
 Cl. 10.0
 IS 12083 (Part 1): 1986
 Cl. 5.0
 IEC 61810-1: 2008
 Cl. 14
 IEC61810-2: 2011
 (General Procedure)

0.5A to 2kA AC,
 110 to 750 V ac, 50 Hz &
 0.5A to 300A dc,
 10 V to 230V dc and
 0.5A to 6.3kA ac,
 110 V to 525V ac,
 50 Hz &
 10 A to 1000A dc,
 10 V to 230V dc

Rated Making & Breaking Capacities under normal or abnormal conditions

IS/IEC 60947-1: 2007
 Cl. 8.3.3.5
 IS/IEC 60947-3: 1999
 Cl. 8.3.3.3
 IS/IEC 60947-4-1: 2000
 Cl. 9.3.3.5
 IS/IEC60947-5-1: 2003
 Cl. 8.3.3.5.2,8.3.3.5.3
 IEC 60947-1: 2014
 Cl. 8.3.3.5

0.5A to 2kA AC,
 110 to 750 V ac, 50 Hz &
 0.5A to 300A dc,
 10 V to 230V dc and
 0.5A to 6.3kA ac,
 110 V to 525V ac,
 50 Hz &
 10 A to 1000A dc,
 10 V to 230V dc

Laboratory **Electrical Research and Development Association, ERDA Road,
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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
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Location: 1

Switchgear Products	Rated Making & Breaking Capacities under normal or abnormal conditions	IEC 60947-3: 2012 Cl. 8.3.3.3 IEC 60947-4-1: 2012 Cl. 9.3.3.5 IEC 60947-5-1: 2009 Cl. 8.3.3.5.2,8.3.3.5.3 IEC60947-6-: 2013 Cl.8.3.3.5.3,5.3.5,8.2.4,9.3.3.5 IS 3231 (Part 2/Sec I to II): 1987 Cl. 7.0,12.8 IS 3231 (Part 3/Sec I to V): 1987 Cl. 8.0,9.0,10.0 IS 10027: 2000 Cl. 7.4 IEC 60255-1: 2009 Cl. 6.11 IEC 60255-27: 2013 Cl. 10.5.4.4 IEC 60255-12: 1980 Cl. 9.0 IEC 60255-13: 1980 Cl. 10.0 IEC 60255-16: 1982 Cl. 10.0 IEC 61810-1: 2008 Cl. 11 IEC61810-2: 2011 (General Procedure) IS 12083 (Part 1): 1986 Cl. 5.0	0.5A to 2kA AC, 110 to 750 V ac, 50 Hz & 0.5A to 300A dc, 10 V to 230V dc and 0.5A to 6.3kA ac, 110 V to 525V ac, 50 Hz & 10 A to 1000A dc, 10 V to 230V dc
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Laboratory **Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat**
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

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Discipline **Electrical Testing** **Issue Date** **02.04.2015**

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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
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Location: 1

Switchgear Products	Clearance & Creepage distances	IS/IEC 60947-1: 2007 Cl. 8.3.3.4.1 IS/IEC 60947-2: 2003 Cl. 8.3.3.2,8.4.6 IS/ IEC 60947-3: 1999 Cl. 8.3.3.2 IS/IEC 60947-4-1: 2000 Cl. 9.3.3.4 IS/ IEC 60947-5-1: 2003 Cl. 8.3.3.4, Annexure D, Cl. 7.1.3 IEC 60947-1: 2014 Cl. 8.3.3.4.1 IEC 60947-2: 2013 Cl. 8.3.3.2,8.4.6 IEC 60947-3: 2012 Cl. 8.3.3.2 IEC 60947-4-1: 2012 Cl. 9.3.3.4 IEC 60947-5-1: 2009 Cl. 8.3.3.4 Annexure D, Cl. 7.1.3 IEC 61810-1: 2008 Cl. 13 IEC61810-2: 2011 (GENERAL PROCEDURE)	0.01mm to 150 mm
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Laboratory **Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat**
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

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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
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Location: 1

Switchgear Products

Clearance & Creepage distances

IEC 60947-6-1: 2013
Cl. 8.3.3.4
IEC 60947-7-1: 2009
Cl. 8.4.2,
Annexure D
IEC 60947-7-2: 2009
Cl. 8.4.2,
Annexure D
IS 8623 (Part 1): 1993/
IEC 60439-1: 2004
Cl. 8.2.5
IS 8623 (Part 2): 1993/
IEC 60439-2: 2005
Cl. 8.2.5, 8.1.1
IS 8623 (Part 3): 1993/
IEC 60439-3: 2001
Cl. 8.1.1 e
IEC 61439-1: 2011
Cl. 10.4, 11.3, 10.4
IEC 61439-2: 2011
Cl. 10, 11
IEC 61439-3: 2012
Cl. 10, 11
IEC 61439-6: 2012
Cl. 10, 11
IEC 61439-4: 2012
Cl. 10, 11

0.01 mm to 150 mm

Laboratory	Electrical Research and Development Association, ERDA Road, Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat		
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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
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Location: 1

**Switchgear
Products**

Clearance & Creepage
distances

IS/IEC 60898-1: 2002
Cl. 8.1.3
IS/IEC 60898-2: 2003
Cl. 8.1.3
IEC 60898-1: 2003
Cl. 8.1.3
IS 12640 (Part 1): 2008/
IEC 61008-1: 2006
Cl. 8.1.3
IS 12640 (Part 2): 2008/
IEC 61009-1: 2006
Cl. 8.1.3
IEC 61008-1: 2013
Cl. 8.1.3
IEC 61009-1: 2013
Cl. 8.1.3
IEC 60255-27: 2013
Cl. 10.5.2.2
IS 4007 (Part 1): 1982
Cl. 8.4.2,8.4.3
IS 2675 : 1983
Cl. 8.5
IS 13032:1991
Cl. 9.5

0.01 mm to 150 mm

Laboratory **Electrical Research and Development Association, ERDA Road, Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat**
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard **ISO/IEC 17025: 2005**

Discipline **Electrical Testing** **Issue Date** **02.04.2015**

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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
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Location: 1

Switchgear Products	Marking & Dimension / Visual Examination	IS/IEC 60947-1: 2007 Cl. 5.2 IS/IEC 60947-2: 2003 Cl. 5.2 IS/ IEC 60947-3: 1999 Cl. 5.2 IS/IEC 60947-4-1: 2000 Cl. 6.2 IS/ IEC 60947-5-1: 2003 Cl. 5.2, Annexure K IEC 60947-1: 2007 Cl. 5.2 IEC 60947-2: 2013 Cl. 5.2 IEC 60947-3: 2012 Cl. 5.2 IEC 60947-4-1: 2012 Cl. 6.2 IEC 60947-5-1: 2009 Cl. 5.2, Annexure K IEC 60947-6-1: 2013 Cl. 5.2,6.2 IEC 60947-7-1: 2009 Cl. 5.1 IEC 60947-7-2: 2009 Cl. 5.1	0.01mm to 150 mm
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Laboratory Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
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Accreditation Standard ISO/IEC 17025: 2005

Discipline Electrical Testing **Issue Date** 02.04.2015

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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
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Location: 1

Switchgear Products	Marking & Dimension / Visual Examination	IS 8623 (Part 1): 1993/ IEC 60439-1 : 2004 Cl. 8.1.2 IS 8623 (Part 2): 1993/ IEC 60439-2: 2005 Cl. 8.2.8 IS 8623 (Part 3): 1993/ IEC 60439-3: 2001 Cl. 8.2.8 IEC 61439-1: 2011 Cl. 10.2, 10.2.7, IEC 61439-2: 2011 Cl. 10 IEC 61439-3: 2012 Cl. 10, 10.2.7 IEC 61439-6: 2012 Cl. 10 IEC 61439-4: 2012 Cl. 10 IS 13703 (Part 1 & 2): 1993 Cl. 6,8.1.4 IEC 60269- 1: 2014 Cl. 6,8.1.4 IEC 60269-2: 2013 Cl. 6,8.1.4 IS/IEC 60898-1: 2002 Cl. 6 IS/IEC 60898-2: 2003 Cl. 6	0.01 mm to 150 mm
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Laboratory	Electrical Research and Development Association, ERDA Road, Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat		
Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Electrical Testing	Issue Date	02.04.2015
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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
<u>Location: 1</u>				
	Switchgear Products	Marking & Dimension / Visual Examination	IEC 60898-1: 2003 Cl. 6 IS 12640 (Part 1): 2008/ IEC 61008-1: 2006 Cl. 6 IS 12640 (Part 2): 2008/ IEC 61009-1: 2006 Cl. 6 IEC 61008-1: 2013 Cl. 6 IEC 61009-1: 2013 Cl. 6 IS 3231 (Part 1/Sec I to III): 1986 Cl. 8.0 IS 3231 (Part 2/Sec I to II) : 1987 Cl. 10.0 IS 3231 (Part 3/Sec I to V) : 1987 Cl. 11.0,12.013.0,14.0 IS 12083 (Part 1): 1986 Cl. 8.0 IS 2086: 1993 Cl. 9.1, 9.2 IS 10027: 2000 Cl. 6.2 IEC 60255-1: 2009 Cl. 6.1,6.2,8.0 IEC 60255-27: 2013 Cl. 9.1	0.01 mm to 150 mm

Laboratory	Electrical Research and Development Association, ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat		
Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Electrical Testing	Issue Date	02.04.2015
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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
<u>Location: 1</u>				
	Switchgear Products	Marking & Dimension / Visual Examination	IEC 60255-12: 1980 Cl. 12.0 IEC 60255-13: 1980 Cl. 13.0 IEC 60255-16: 1982 Cl. 12.0 IEC 62271-1: 2011 Cl. 7.5 IEC 62271-100: 2012 Cl. 7.5 IEC 62271-102: 2013 Cl. 7.5 IEC 62271-200: 2011 Cl. 7.5 IS 13118: 1991 Cl. 7.102 IS 4007 (Part 1): 1982 Cl. 8.4 IS 5561: 1970 Cl. 8 IS 2675: 1983 Cl. 7 IEC 61810-1: 2008 Cl. 7 IEC61810-2: 2011 (General Procedure)	0.01mm to 150 mm
		Resistance to rusting	IS 13703 (Part 1 & 2): 1993 Cl. 8.11.2.3) IEC 60269-1 : 2014 Cl. 8.11.2.3	Qualitative

Laboratory	Electrical Research and Development Association, ERDA Road, Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat		
Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Electrical Testing	Issue Date	02.04.2015
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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
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Location: 1

**Switchgear
Products**

Resistance to rusting

IEC 60269-2: 2013
Cl. 8.11.2.3
IS/IEC 60898 - 1: 2002
Cl. 9.16
IS/IEC 60898 - 2: 2003
Cl. 9.16
IEC 60898-1: 2003
Cl. 9.16
IEC 61008-1: 2013
Cl. 9.25
IEC 61009-1: 2013
Cl. 9.25
IS 8187 : 1976
Cl. 7.18

Qualitative

Voltage Drop/ Effective of
protective circuit
verification of earthing
Contact Resistance
measurement

IEC 60947-7-1: 2009
Cl. 8.4.4,
Annexure D
IEC 60947-7-2: 2009
Cl. 8.4.4,
Annexure D
IS 8623 (Part 1): 1993/
IEC 60439-1: 2004
Cl. 8.2.4
IS 8623 (Part 2): 1993 /
IEC 60439-2: 2005 Cl. 8.2.4
IS 8623 (Part 3): 1993/
IEC 60439-3: 2001 Cl. 8.2.4
IEC 61439-1: 2011 Cl. 10.5

I = 1 A to 100 A DC
V = 1 V to 20 V DC
I = 1 A to 25 A ac
V = 1 V to 20 V ac
R = 10 μΩ to 1Ω

Laboratory Electrical Research and Development Association, ERDA Road,
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 Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard ISO/IEC 17025: 2005

Discipline Electrical Testing **Issue Date** 02.04.2015

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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
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Location: 1

**Switchgear
 Products**

Voltage Drop/ Effective of protective circuit verification of earthing
 Contact Resistance measurement

IEC 61439-2: 2011 Cl. 10
 IEC 61439-3: 2012 Cl. 10
 IEC 61439-6: 2012 Cl. 10
 IEC 61439-4: 2012 Cl. 10
 IS 13703 (Part 1 & 2): 1993 Cl. 8.3
 IEC 60269- 1: 2014 Cl. 8.3
 IEC 60269-2: 2013 Cl. 8.3
 IS/IEC 60898-1: 2002 Cl. 9.8
 IS/IEC 60898-2: 2003 Cl. 9.8
 IEC 60898-1: 2003 Cl. 9.8
 IS 9921 (Part 4): 1985
 Cl. 3.2.5,4.3
 IS 9920 (Part 1): 2002
 Cl. 6.4,7
 IS 9920 (Part 2): 2001Cl. 6.4,7
 IEC 60255-1: 2009
 Cl. 6.12.2.4,6.12.2.5
 IEC 62271-1: 2011 Cl. 6.4,7.3
 IEC62271-100: 2012
 Cl. 6.4,10.2.102.3.2,7.3
 IEC 62271-102: 2013
 Cl. 6.4,7.3
 IEC 62271-103: 2011 Cl. 6.4
 IEC 62271-200: 2011
 Cl. 6.4,7.3
 IS 13118 :1991 Cl. 6.4,7.3
 IS 3427: 1997 Cl. 6.4,7.3
 IS 5561 : 1970 Cl. 11

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Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

Accreditation Standard **ISO/IEC 17025: 2005**

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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
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Location: 1

Switchgear Products

Short Time Withstand Test / Non-operating current under over current conditions

IS/IEC 60947-1: 2007
Cl. 8.3.4
IS/IEC 60947-2: 2003
Cl.8.3.3.4,8.3.4.1,8.3.5.2,8.3.6.2,8.3.6.4,8.3.7.1,8.3.7.5,8.3.7.6,8.3.8.2,8.3.8.3
IS/ IEC 60947-3: 1999
Cl. 8.3.5
IS/IEC 60947-4-1: 2000
Cl. 9.3.4
IS/ IEC 60947-5-1: 2003
Cl. 8.3.4,5.3.6
IEC 60947-1: 2014 Cl. 8.3.4
IEC 60947-2: 2013
Cl.8.3.3.4,8.3.4.1,8.3.5.2,8.3.6.2,8.3.6.4,8.3.7.1,8.3.7.5,8.3.7.6,8.3.8.2,8.3.8.3
IEC 60947-3: 2012 Cl. 8.3.5
IEC 60947-4-1: 2012 Cl. 9.3.4
IEC 60947-5-1: 2009
Cl. 8.3.4,5.3.6
IEC 60947-6-1: 2013
Cl.8.3.4.3,9.3.4.4,9.3.4.3,9.3.4.2.3,9.3.4.2.2
IEC 60947-7-1: 2009
Cl. 8.4.6,
Annexure D
IEC 60947-7-2: 2009
Cl. 8.4.6,
Annexure D

Test current 1A to 30000 A, 10V

Laboratory **Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat**
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

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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
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Location: 1

**Switchgear
Products**

Short Time Withstand Test /
Non-operating current under
over current conditions

IS 8623 (Part 1): 1993/
IEC 60439-1: 2004 Cl. 8.2.3
IS 8623 (Part 2): 1993 /
IEC 60439-2: 2005 Cl. 8.2.3
IS 8623 (Part 3): 1993/
IEC 60439-3: 2001 Cl. 8.2.3
IEC 61439-1: 2011 Cl. 10.11
IEC 61439-2: 2011 Cl. 10
IEC 61439-3: 2012 Cl. 10
IEC 61439-6: 2012 Cl. 10
IEC 61439-4: 2012 Cl. 10
IS 12640 (Part 1): 2008/
IEC 61008-1: 2006 Cl. 9.11
IS 12640 (Part 2): 2008/
IEC 61009-1: 2006 Cl. 9.12
IEC 61008-1: 2013 Cl. 9.11
IEC 61009-1: 2013 Cl. 9.12
IS 10027: 2000 Cl. 7.5
IEC 60255-1: 2009 Cl. 6.4
IEC 60255-27: 2013
Cl. 10.5.4.1,10.5.4.3
IS 3427: 1997 Cl. 6.5
IS 2675: 1983 Cl. 8.4
IEC 61810-1: 2008 Cl. 11
IEC 61810-2: 2011
(General Procedure)

Test current 1A to
30000 A, 10V

Laboratory **Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat**
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

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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
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Location: 1

**Switchgear
Products**

Time Current
Characteristics /
Operating Limits/ Pick up/
Dropout/ Operating Time/
Verification of releases/
Over current operating
characteristics/
Limiting value of over
current

IS/IEC 60947-1: 2007
Cl. 8.3.3
IS/IEC 60947-2: 2003
Cl.8.3.3.1,8.3.3.7,8.3.3.8,8.3.4.3,8.
3.5.1,8.3.5.4,8.3.6.1,8.3.6.6,8.3.7.4
,8.3.7.8,8.3.8.1,8.3.8.7,8.4.2,8.4.3
IS/IEC60947-4-1: 2000
Cl.9.3.3.1,9.3.3.2,9.3.5,9.3.6.2
IS/ IEC 60947-5-1: 2003
Cl. 8.3.3.2
IEC 60947-1: 2014
Cl. 8.3.3
IEC60947-2: 2013
Cl.8.3.3.1,8.3.3.7,8.3.3.8,8.3.4.3,8.
3.5.1,8.3.5.4,8.3.6.1,8.3.6.6,8.
3.7.4,8.3.7.8,8.3.8.1,8.3.8.7,8.4.2,8
.4.3
IEC60947-4-1: 2012
Cl.9.3.3.1,9.3.3.2,9.3.5,9.3.6.2
IEC 60947-5-1: 2009
Cl. 8.3.3.2
IEC 60947-6-1: 2013
Cl. 8.3.3
IS 13703 (Part 1 & 2): 1993 Cl.
8.4.3
IEC 60269- 1: 2014
Cl. 8.4.3
IEC 60269-2: 2013 Cl. 8.7.4

Test current 1A to
30000 A, 10V

Laboratory **Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat**
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Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

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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
<u>Location: 1</u>				
	Switchgear Products	Time Current Characteristics / Operating Limits/ Pick up/ Dropout/ Operating Time/ Verification of releases/ Over current operating characteristics/ Limiting value of over current	IS/IEC 60898-1: 2002 Cl. 9.10 IS/IEC 60898-2: 2003 Cl. 9.10 IEC 60898-1: 2003 Cl. 9.10 IS 12640 (Part 1): 2008/ IEC 61008-1: 2006 Cl. 9.9,9.18 IS 12640 (Part 2): 2008/ IEC 61009-1: 2006 Cl. 9.9,9.18 IEC 61008-1: 2013 Cl. 9.9,9.18 IEC 61009-1: 2013 Cl. 9.9,9.18 IS 3231 (Part 2/Sec I to II) : 1987 Cl. 12.1,12.2,12.6,3.1.5,5.0 IS 3231 (Part 3/Sec I to V) : 1987 Cl. 5.0,6.0 IS 9385 (Part 1): 1979 Cl. 6.6 IS 9385 (Part 2): 1980 Cl. 7.6 IEC 60255-1: 2009 Cl. 6.5 IEC 60255-3: 1989 Cl. 4.0,6.0,7.0 IEC 60255-8: 1989 Cl. 4.0,5.0	Test current 1A to 30000 A, 10V

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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
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Location: 1

Switchgear Products

Time Current Characteristics / Operating Limits/ Pick up/ Dropout/ Operating Time/ Verification of releases/ Over current operating characteristics/ Limiting value of over current	IEC 60255-12: 1980 Cl. 4.0,14.0 IEC 60255-13: 1980 Cl. 4.0,15.0 IEC 60255-16: 1982 Cl. 4.0,6.0 IEC 60255-121: 2014 Cl. 6.0	Test current 1A to 30000 A, 10V
Verification of main contact position / Verification of actuating force / Verification of rotation	IS/IEC 60947-1: 2007 Cl. 8.2.5 IS/IEC 60947-2: 2003 Cl. 8.3.3.9 IS/ IEC 60947-3: 1999 Cl. 8.3.3.7 IS/IEC 60947-4-1: 2000 IS/IEC60947-5-1: 2003 Cl. 8.2.5,8.2.6, Annexure K IEC 60947-1: 2014 Cl. 8.2.5 IEC 60947-2: 2013 Cl. 8.3.3.9 IEC 60947-3: 2012 Cl. 8.3.3.7 IEC 60947-5-1: 2009 Cl. 8.2.5,8.2.6, Annexure K	0.1 Nm to 6 Nm & 1 Nm to 68 Nm

Laboratory

**Electrical Research and Development Association, ERDA Road,
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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
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Location: 1**Switchgear Products**

Performance under conditional short circuit current

IS/ IEC 60947-5-1: 2003
Cl. 8.3.4,
Annexure K
IEC 60947-5-1: 2009
Cl. 8.3.4,
Annexure K

1000 A, 750 V ac

Dry heat /
Dry cold / Climatic /
Environmental Test

IS/IEC 60947-1: 2007
Annexure Q
IS/IEC 60947-2: 2003
Cl. 8.5
IS/IEC 60947-4-1: 2000
Cl. 9.1.5,
Annexure B
IS/ IEC 60947-5-1: 2003
Annexure F
IEC 60947-1: 2014
Annexure Q
IEC 60947-2: 2013
Cl. 8.5
IEC 60947-4-1: 2012
Cl. 9.1.5.2,
Annexure B
IEC 60947-5-1: 2009
Annexure F
IS 13703 (Part 1 & 2): 1993
IS/IEC 60898-1: 2002
Cl. 9.7
IS/IEC 60898-2: 2003
Cl. 9.22.1

(-)-40 °C to 180 °C
Chamber size :
900mm (L) x 850 mm
(W) x 850 mm (H)

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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
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Location: 1

**Switchgear
Products**

Dry heat /
Dry cold / Climatic /
Environmental Test

IEC 60898-1: 2003 Cl. 9.7
IS 12640 (Part 1): 2008/
IEC 61008-1: 2006
Cl. 9.22.1 & 9.7
IS 12640 (Part 2): 2008/
IEC 61009-1: 2006
Cl. 9.22.1 & 9.7
IEC 61008-1: 2013
Cl. 9.22.1 & 9.7
IEC 61009-1: 2013
Cl. 9.22.1 & 9.7
IS 3231 (Part 1 to 3): 1987
IEC 60255-1: 2009 Cl. 6.12
IEC 60255-27: 2013 Cl. 10.5.1
IEC 62271-1: 2011 Cl. 6.10.5
IEC 62271-100: 2012 Cl. 6.10.5
IEC 62271-200: 2011
Cl. 6.10.5
IS 13118: 1991 Cl. 6.101.4
IS 4007 (Part 1): 1982 Cl. 8.14
IS 9000 (Part 1): 1988
(General Procedure)
IS 9000 (Part 2/Sec I to IV): 1977
(General Procedure)
IS 9000 (Part 3/Sec I to V): 1977
(General Procedure)

(-)40 °C to 180 °C
Chamber size :
900mm (L) x 850 mm
(W) x 850 mm (H)

Laboratory **Electrical Research and Development Association, ERDA Road,
Makarpura Industrial Esate, Makarpura, Vadodara, Gujarat**
Location 1: ERDA Road, Makarpura Industrial Estate, Makarpura, Vadodara, Gujarat
Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

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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
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Location: 1

**Switchgear
Products**

Dry heat /
Dry cold / Climatic /
Environmental Test

IS 9000 (Part 4): 2008
(General Procedure)
IEC 60068 - 2 - 1: 2007
(General Procedure)
IEC 60068 - 2 - 2: 200
(General Procedure)

(-)40 °C to 180 °C
Chamber size :
900mm (L) x 850 mm
(W) x 850 mm (H)

Humidity/ Reliability
Test/Resistance to corrosion

IS 13703 (Part 1 & 2): 1993
Cl. 7.12, 8.11.2.3.3, 8.2.4.2
IEC 60269- 1 : 2014
Cl. 7.12, 8.11.2.2.3, 8.2.4.2
IS/IEC 60898-1: 2002
Cl. 9.7
IS/IEC 60898-2: 2003
Cl. 9.7
IEC 60898-1: 2003
Cl. 9.7
IS 12640 (Part 1): 2008/
IEC 61008-1: 2006
Cl. 9.7,9.22
IS 12640 (Part 2): 2008/
IEC 61009-1: 2006
Cl. 9.7,9.22
IEC 61008-1: 2013
Cl. 9.7,9.22
IEC 61009-1: 2013
Cl. 9.7,9.22
IEC 60255-1: 2009
Cl. 6.12

25°C to 60°C,
40 % to 98 % RH
Chamber size :
900mm (L) x 850 mm
(W) x 850 mm (H)

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Location: 1

Switchgear Products	Humidity/ Reliability Test/Resistance to corrosion	IEC 60255-27: 2013 Cl. 10.5 IEC 62271-1: 2011 Cl. 6.10.5 IEC 62271-100: 2012 Cl. 6.101.4 IEC 62271-103: 2011 Cl. 6.102.4 IS 13118: 1991 Cl. 6.101.4 IS 4007 (Part 1): 1982 Cl. 8.14 IS 9000 (Part 1): 1988 (General Procedure) IS 9000 (Part 5/ Sec I to II): 1981 (General Procedure) IEC 68 - 2 -30: 2005 (General Procedure) IEC 68 - 2 - 78: 2012 (General Procedure) IEC 61439-1: 2011 Cl. 10.2, 10.2.2 IEC 61439-2: 2011 Cl. 10 IEC 61439-3: 2012 Cl. 10 IEC 61439-6: 2012 Cl. 10	25°C to 60°C, 40 % to 98 % RH Chamber size : 900mm (L) x 850 mm (W) x 850 mm (H)
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Location: 1

Switchgear Products

Insulation Resistance Test

IS 12640 (Part 2): 2008/
 IEC 61009-1: 2006
 Cl. 9.7.2
 IEC 61008-1: 2013
 Cl. 9.7
 IEC 61009-1: 201
 Cl. 9.7
 IS 3231 (Part 1/Sec I to III): 1986
 Cl. 6.0
 IS 3231 (Part 3/Sec I to V): 1987
 Cl. 10.0,11.0,12.0
 IS 2086: 1993
 Cl. 9.7
 IEC 60255-1: 2009
 Cl. 6.12.2.2
 IEC 60255-27: 2013
 Cl. 10.5.3.3
 IEC 61810-1: 2008
 Cl. 10
 IEC 60255-12: 1980
 Cl. 11.0
 IEC 60255-13: 1980
 Cl. 12.0
 IEC 60255-16: 1982
 Cl. 11.0
 IS 4007 (Part 1): 1982
 Cl. 8.7
 IS12083-2:1986
 Cl. 6.0

0.1 MΩ to 10 GΩ,
 500 V to 1000 V DC

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<u>Location: 1</u>				
	Switchgear Products	Operating value and time	IS 3231 (Part 2/Sec I to II): 1987 Cl. 12.1,12.2,12.6,6.0,5.0	1V to300Vac
		Reset value and time	IS 3231 (Part 3/Sec I to V) : 1987 Cl.4.0,4.2,5.0,6.0,14.0,14.2, 15.0,15.2 IEC 60255-1: 2009 Cl. 6.5 IEC 60255-121: 2014 Cl. 6 IEC 60255-3: 1989 Cl. 4.0,6.0,7.0 IEC 60255-3: 1989 Cl. 4.0,6.0,7.0 IEC 60255-8: 1989 Cl. 4.0,5.0 IEC 60255-12: 1980 Cl. 4.0,14.0 IEC 60255-13: 1980 Cl. 4.0,15.0 IEC 60255-16: 1982 Cl. 4.0,6.0	1V to 424V dc 1A to 100A ac & 1A to 20A dc Time : 0.02-999.9 Sec.
		Thermal requirements	IS 3231 (Part 2/Sec I to II) : 1987 (4.0,5.0,12.5) IS 3231 (Part 3/Sec I to V): 1987 Cl. 4.0,5.0,6.0 IEC 60255-1: 2009 Cl. 6.4 IEC 60255-27: 2013 Cl. 10.5.4.1 IEC 60255-12: 1980 Cl. 6.0,15.0 IEC 60255-13: 1980 Cl. 6.0,16.0 IEC 60255-16: 1982 Cl. 5.0,16.0	1V to 300V ac 1V to 424V dc 1A to 100A ac & 1A to 20A dc

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Location: 1

**Switchgear
Products**

Effect of voltage, frequency
and ambient temperature
verification

IS 3231 (Part 2/Sec I to II): 1987
Cl. 6.0
IS 3231 (Part 3/Sec I to V): 1987
Cl. 3.0,4.0,8.0
IEC 60255-1: 2009
Cl. 6.5.3
IEC 60255-12: 1980
Cl. 8.0
IEC 60255-13: 1980
Cl. 8.0

1V to 300V AC
1V to 424V dc
1A to 100A AC &
1A to 20A DC
Frequency : 45 Hz to 55
Hz.

Continuous capacity

IS 3231 (Part 2/Sec I to II): 1987
Cl. 7.0,12.8
IEC 60255-1: 2009
Cl. 6.11
IEC 60255-27: 2013
Cl. 10.5.4.4
IEC 60255-12: 1980
Cl. 9.0
IEC 60255-13: 1980
Cl. 10.0
IEC 60255-16: 1982
Cl. 10.0
IS 12083 (Part 1): 1986
Cl. 5.0

1V to 300V AC
1V to 424V DC
1 A to 60 A AC &
1A to 20A DC

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Location: 1

Switchgear Products	Mechanical Strength of terminal / Torque Test	IS/IEC 60947-1: 2007 Cl. 8.2.4.2 IS/IEC 60947-4-1: 2000 Cl. 8.2.4 IS/ IEC 60947-5-1: 2003 Cl. 8.1.2,8.3.1.2,8.2.4 IEC 60947-1 IEC 60947-1: 2014 Cl. 8.2.4.2 IEC 60947-4-1: 2012 Cl. 8.2.4 IEC 60947-5-1: 2009 Cl. 8.1.2,8.3.1.2,8.2.4 IEC 60947-1) IEC60947-7-1: 2009 Cl. 8.3.3.1, 8.3, Annexure D IEC 60947-7-2: 2009 Cl. 8.3.3.1, 8.3, Annexure D IS 8623 (Part 3): 1993/ IEC 60439-3: 2001 Cl. 8.2.14 IEC 61439-4: 2012 Cl. 8.1.5,10.2.6 IS 13703 (Part 1 & 2): 1993 Cl. 8.11 IEC 60269- 1: 2014 Cl. 7.11,8.11,E8.2 IEC 60269-2: 2013 Cl. 8.11 IS/IEC 60898-1: 2002 Cl. 9.4,9.5 IEC 60898-1: 2003 Cl. 9.4,9.5 IEC 61008-1: 2013 Cl. 9.4, 9.5 IEC 61009-1: 2013 Cl. 9.4, 9.5 IS 4007 (Part 1): 1982 Cl. 8.9	0.1 Nm to 6 Nm & 1 Nm to 68 Nm
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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
Location: 1				
	Switchgear Products	OverLoad Performance	IS/IEC 60947-2: 2003 Cl. 8.3.3.4 IEC 60947-2: 2013 Cl. 8.3.3.4	0.5A to 2 kA AC, \ 110 V to 750 VAC, 50 Hz 0.5 A to 300A DC, 10 to 230V dc and 0.5A to 6.3 kA AC, 110 V to 525 V AC, 50 Hz & 10 A to 1000 A DC, 10 V DC to 230V DC
		Leakage current Test	IS/IEC 60947-2: 2003 Cl.8.3.3.2,8.3.5.3,8.3.6.5,8.3.7.3,8.3.7.7 ,8.3.8.5,8.3.3.5,8.3.4.3,8.4.5 IS/ IEC 60947-3: 1999 Cl.8.3.5.4,8.2.4.2,8.3.3.5,8.3.6.4,8.3.7.3 IEC 60947-2: 2013 Cl.8.3.3.2,8.3.5.3,8.3.6.5,8.3.7.3,8.3.7.7 ,8.3.8.5,8.3.3.5,8.3.4.3,8.4.5 IEC 60947-3:2012 Cl.8.3.5.4,8.2.4.2,8.3.3.5,8.3.6.4,8.3.7.3 IS/IEC 60898-1: 2002 Cl. 9.7 IS/IEC 60898-2: 2003 Cl. 9.7 IEC 60898-1: 2003 Cl. 9.7 IS 12640 (Part 1): 2008/ IEC 61008-1: 2006 Cl. 9.7 IS 12640 (Part 2): 2008/ IEC 61009-1: 2006 Cl. 9.7 IEC 61008-1: 2013 Cl. 9.7 IEC 61009-1: 2013 Cl. 9.7	0.1 mA to 2 mA

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<u>Location: 1</u>				
	Switchgear Products	28 day Test/ Reliability at 40 °C/Verification of thermal Stability	IS/IEC 60898-1: 2002 Cl. 9.9 IS/IEC 60898-2: 2003 Cl. 9.9 IEC 60898-1: 2003 Cl. 9.9 IS 12640 (Part 1): 2008/ IEC 61008-1: 2006 Cl. 9.22.2 IS 12640 (Part 2): 2008/ IEC 61009-1: 2006 Cl. 9.22.2) IEC 61008-1: 2013 Cl. 9.22.2) IEC 61009-1: 2013 Cl. 9.22.2) IEC 61439-1: 2011 Cl. 10.2.3) IEC 61439-2: 2011 Cl. 10 Cl. 10.2.3	0.5A to 125 A, 30V AC & 40°C to 150°C
		Shock & impact Test	IS/IEC 60898-1: 2002 Cl. 9.13 IEC 60898-1: 2003 Cl. 9.13 IS 12640 (Part 1): 2008/ IEC 61008-1: 2006 Cl. 9.12 IS 12640 (Part 2): 2008/ IEC 61009-1: 2006 Cl. 9.13 IEC 61008-1: 2013 Cl. 9.12 IEC 61009-1: 2013 Cl. 9.13)	Qualitative

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Location: 1

Switchgear Products

Mechanical strength of fuse link

IS 13703 (Part 1 & 2): 1993
Cl. 8.11.1
IEC 60269-1: 2014
Cl. 7.1.5
IEC 60269-2: 2013
Cl. 8.11.1.2

Qualitative

Impact Test

IS/IEC 60898-1: 2002
Cl. 9.13
IEC 60898-1: 2003
Cl. 9.13
IS 12640 (Part 1): 2008/
IEC 61008-1: 2006
Cl. 9.12
IS 12640 (Part 2): 2008/
IEC 61009-1: 2006
Cl. 9.13
IEC 61008-1: 2013
Cl. 9.12
IEC 61009-1: 2013
Cl. 9.13
IEC 61330 : 1995
Cl. 6.6
IEC 62262: 2002
Cl. 6
IEC 60068-2-75: 1997
(General Procedure)
IEC 61439-1: 2011
Cl. 10.2.6

Pendulum length
1 mt.,
Hammer weight:
100 N & 500 N
20 J, 5 kg

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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
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Location: 1

Switchgear Products	Resistance to abnormal heat and fire	IS/IEC 60898-1: 2002 Cl. 9.15 IEC 60898-1: 2003 Cl. 9.15 IS 12640 (Part 1): 2008/ IEC 61008-1: 2006 Cl. 9.14 IS 12640 (Part 2): 2008/ IEC 61009-1: 2006 Cl. 9.15 IEC 61008-1: 2013 Cl. 9.14 IEC 61009-1: 2013 Cl. 9.15 IEC 60695-2-10: 2013 (General Procedure) IEC 60695-2-11 : 2014 (General Procedure) IS 8623 (Part 2): 1993/ IEC 60439-2: 2005 Cl. 7.1.1.4 IEC 61810-1: 2008 Cl. 13 IEC 61810-2: 2011 (General Procedure) IS 8623 (Part 3): 1993/ IEC 60439-3: 2001 Cl. 8.2.12 IEC 61439-1: 2011 Cl. 10.2.3.2 IEC 61439-2: 2011 Cl. 10 IEC 61439-3: 2012 Cl. 10 IEC 61439-6: 2012 Cl. 10 IEC 60947-6-1:2013 Cl. 8.1.1	650°C to 960 °C
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Location: 1

Switchgear Products

Power loss dissipation & acceptance

IS/IEC 60898-1: 2002 Cl. 9.8.5
 IEC 60898-1: 2003 Cl. 9.8.5
 IEC 60947-7-1: 2009 Cl. 7.2.4, 8.4.4
 IEC 60947-7-2: 2009 Cl. 7.2.4, 8.4.4
 IS 13703 (Part 1 & 2): 1993 Cl. 8.3
 IEC 60269- 1: 2014 Cl. 5.5, 7.3, 8.3
 IEC 60269-2: 2013 Cl. 5.5, 8.3, 8.3.4.2, 8.3.3
 IS 8623 (Part 1): 1993/
 IEC 60439-1: 2004 Cl. 8.2.1
 IS 8623 (Part 2): 1993/
 IEC 60439-2: 2005 Cl. 8.2.8

1 W to 110 W

Protection against electric Shock

IEC 60269- 1: 2014 Cl. 7.9
 IEC 60269-2: 2013 Cl. 7.9
 IS/IEC 60898-1: 2002 Cl. 9.6
 IS/IEC 60898-2: 2003 Cl. 9.6
 IEC 60898-1: 2003 Cl. 9.6
 IS 12640 (Part 1): 2008/
 IEC 61008-1: 2006 Cl. 9.6
 IS 12640 (Part 2): 2008/
 IEC 61009-1: 2006 Cl. 9.6
 IEC 61008-1: 2013 Cl. 9.6
 IEC 61009-1: 2013 Cl. 9.6

Qualitative (Not applicable Only Visual observation.)

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<u>Location: 1</u>				
	Switchgear Products	Non interchangeability	IS/IEC 60898-1: 2002 Cl. 8.1.6 IEC 60898-1: 2003 Cl. 8.1.6 IS 12640 (Part 2): 2008/ IEC 61009-1: 2006 Cl. 8.1.6 IEC 61009-1: 2013 Cl. 8.1.6	Qualitative
		Reliability of screws, current carrying parts and connection	IS/IEC 60898-1: 2002 Cl. 9.4 IS/IEC 60898-2: 2003 Cl. 9.4 IEC 60898-1: 2003 Cl. 9.4 IS 12640 (Part 1): 2000/ IEC 61008-1: 2006 Cl. 9.4 IS 12640 (Part 2): 2001/ IEC 61009-1: 2006 Cl. 9.4 IEC 61008-1: 2013 Cl. 9.4 IEC 61009-1: 2013 Cl. 9.4 IS 8187: 1976 Cl. 5.11, 7.17	0.5 Nm to 6 Nm

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<u>Location: 1</u>				
	Switchgear Products	Reliability of terminal for external connection	IS/IEC 60898-1: 2002 Cl. 9.5 IS/IEC 60898-2: 2003 Cl. 9.5 IEC 60898-1: 2003 Cl. 9.5 IS 12640 (Part 1): 2008/ IEC 61008-1: 2006 Cl. 9.5 IS 12640 (Part 2): 2008/ IEC 61009-1: 2006 Cl. 9.5 IEC 61008-1: 2013 Cl. 9.5 IEC 61009-1: 2013 Cl. 9.5 IS 8187: 1976 Cl. 7.4	0.1 N to 100 N
		Residual operating characteristics	IS 12640 (Part 1): 2008/ IEC 61008-1: 2006 Cl. 9.9 IS 12640 (Part 2): 2008/ IEC 61009-1: 2006 Cl. 9.9 IEC 61008-1: 2013 Cl. 9.9 IEC 61009-1: 2013 Cl. 9.9	I = 10 mA to 500 A V = 230V AC

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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
<u>Location: 1</u>				
	Switchgear Products	Determination of Test device ampere turns	IS 12640 (Part 1): 2008/ IEC 61008-1: 2006 Cl. 9.16 IS 12640 (Part 2): 2008/ IEC 61009-1: 2006 Cl. 9.16 IEC 61008-1: 2013 Cl. 9.16 IEC 61009-1: 2013 Cl. 9.16	Qualitative
		Behaviour in case of failure of line voltage	IS 12640 (Part 1): 2008/ IEC 61008-1: 2006 Cl. 9.17 IS 12640 (Part 2): 2008/ IEC 61009-1: 2006 Cl. 9.17 IEC 61008-1: 2013 Cl. 9.17 IEC 61009-1: 2013 Cl. 9.17	1V to 500 V AC
		Behaviour in case of surge currents	IS 12640 (Part 1): 2008/ IEC 61008-1: 2006 Cl. 9.19 IS 12640 (Part 2): 2008/ IEC 61009-1: 2006 Cl. 9.19 IEC 61008-1: 2013 Cl. 9.19 IEC 61009-1: 2013 Cl. 9.19	200 A & 3000 A, 8/20 µs

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<u>Location: 1</u>				
	Switchgear Products	DC Components	IS 12640 (Part 1): 2008/ IEC 61008-1: 2006 Cl. 9.21 IS 12640 (Part 2): 2008/ IEC 61009-1: 2006 Cl. 9.21 IEC 61008-1: 2013 Cl. 9.21 IEC 61009-1: 2013 Cl. 9.21	0° to 180° 230 V to 500 V AC
		Test device	IS 12640 (Part 1): 2008/ IEC 61008-1: 2006 Cl. 9.16 IS 12640 (Part 2): 2008/ IEC 61009-1: 2006 Cl. 9.16 IEC 61008-1: 2013 Cl. 9.16 IEC 61009-1: 2013 Cl. 9.16	1V to 500 V AC
		Conventional fusing & non- fusing current	IS 13703 (Part 1 & 2): 1993 Cl. 8.4.3.1 IEC 60269-1: 2014 Cl. 8.4.3.1 IEC 60269-2: 2013 Cl. 8.4.3.1	Test current 1A to 20 kA, 10 V

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<u>Location: 1</u>				
	Switchgear Products	Rated current Test	IS 13703 (Part 1 & 2): 1993 Cl. 8.4.3.2 IEC 60269- 1: 2014 Cl. 8.4.3.2 IEC 60269-2: 2013 Cl. 8.4.3.2	Test current 1A to 20 kA, 10 V
		Over Load Test	IS 13703 (Part 1 & 2): 1993 Cl. 8.4.3.4 IEC 60269- 1: 2014 Cl. 8.4.3.4, 7.4 IEC 60269-2: 2013 Cl. 8.4.3.4	Test current 1A to 20 kA, 10 V
		Conventional cable overLoad protection	IS 13703 (Part 1 & 2): 1993 Cl. 8.4.3.5 IEC 60269- 1: 2014 Cl. 8.4.3.5 IEC 60269-2: 2013 Cl. 8.4.3.5	Test current 1A to 20 kA, 10 V
		Non Deterioration of contacts or insulating parts of fuse link or base	IS 13703 (Part 1 & 2): 1993 Cl. 8.10 IEC 60269- 1: 2014 Cl. 8.10 IEC 60269-2: 2013 Cl. 8.10	Test current 1A to 20 kA, 10 V

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<u>Location: 1</u>				
	Switchgear Products	Resistance to heat	IS 13703 (Part 1 & 2): 1993 Cl. 8.9 IEC 60269- 1: 2014 Cl. 8.9 IEC 60269-2: 2013 Cl. 8.9 IS/IEC 60898-1: 2002 Cl. 9.14 IS/IEC 60898-2: 2003 Cl. 9.14 IEC 60898-1: 2003 Cl. 9.14 IS 12640 (Part 1): 2008/ IEC 61008-1: 2006 Cl. 9.13 IS 12640 (Part 2): 2008/ IEC 61009-1: 2006 Cl. 9.14 IEC 61008-1: 2013 Cl. 9.13 IEC 61009-1: 2013 Cl. 9.13 IEC 61810-2: 2011 (General Procedure)	40°C to 150 °C, Test current 1A to 20 kA, 1 N to 400 N, 0.01 mm to 150 mm
		Mechanical Strength Test	IS 13703 (Part 1 & 2): 1993 Cl. 8.11.1 IEC 60269- 1: 2014 Cl. 8.11.1 IEC 60269-2: 2013 Cl. 8.11 IS 2086: 1993 Cl. 9.4 IS 8187: 1976 Cl. 7.15	1 N to 400 N, 0.01 mm to 150 mm, 0.5 Nm to 6 Nm & 12 Nm to 68 Nm 50 g to 250 gm

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<u>Location: 1</u>				
	Switchgear Products	Freedom from season cracking	IS 13703 (Part 1 & 2): 1993 Cl. 8.11.2.1) IEC 60269- 1: 2014 Cl. 8.11.2.1 IEC 60269-2: 2013 Cl. 8.11.2.1	Qualitative (Visual observation.)
		Withdrawal pull Test	IS 2086: 1993 Cl. 9.5	1 N to 400 N
		Water Absorption Test	IS 2086: 1993 Cl. 9.10	1 to 200 g
		Test on ceramic material	IS 2086: 1993 Cl. 11	1°C to 70 °C
		Rated burden	IS 3231 (Part 2/Sec I to II): 1987 Cl. 8.0,12.9 IS 3231 (Part 3/Sec I to V): 1987 Cl. 6.0,7.0,11.0 IEC 60255-1: 2009 Cl. 6.10 IEC 60255-12: 1980 Cl. 10.0 IEC 60255-13: 1980 Cl. 11.0 IEC 60255-16: 1982 Cl. 8.0	10mV to 300 V ac, 1V to 424 V dc, 1A to 100A ac, 1A to 20A dc

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Location: 1

Switchgear Products

Ageing Test of screw less type terminals	IEC 60947-7-1: 2009 Cl. 8.4.7, Annexure D IEC 60947-7-2: 2009 Cl.8.4.7, Annexure D	1A to 20000 A, 40 °C
Attachment of the terminal block on its support	IEC 60947-7-1: 2009 Cl. 8.3.2 IEC 60947-7-2: 2009 Cl. 8.3.2	0.5 to 6 Nm & 12 to 68 Nm
Verification of thermal characteristic	IEC 60947-7-1: 2009 Cl. 8.5, Annexure D IEC 60947-7-2: 2009 Cl. 8.5, Annexure D	Qualitative
Verification of the electrical characteristics of the busbar trunking system	IS 8623 (Part 2): 1993/ IEC 60439-2 : 2005 Cl. 8.2.8 IEC 61439-6: 2012 Annexure.BB, CC, DD, EE	1A to 20000 A, 10 V
Verification of structural strength	IS 8623 (Part 2): 1993/ IEC 60439-2 : 2005 Cl. 8.2.9, 8.2.10 IEC 61439-6: 2012 Cl. 10.2.101	1 to 225 kg

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Location: 1

	Switchgear product	Verification of crushing Resistance	IS 8623 (Part 2): 1993/ IEC 60439-2: 2005 Cl. 8.2.12 IEC 61439-6: 2012 Cl. 10.2.101.3	1 to 225 kg
42.	Piercing connector	Electrical ageing Test	NFC 33-004: 1998 Cl. 5.0 NFC 33-020: 1998 Cl. 2.8	1A to 1000 A ac
		Temperature rise and over current Test	NFC 33-004: 1998 Cl. 2.9 NFC 33-020: 1998 Cl. 5.3.3.2, 5.3.3.3	1A to 1000 A rated current & over current test 1 to 50 kA
43.	Switchgear product Rotating machine Lamps & Luminaires	Ingress Protection	IS/IEC 60947-1: 2007 Cl. 7.1.12 IS/IEC 60947-2: 2003 Cl. 7.1.12 IS/IEC 60947-3: 1999 Cl. 7.1.11 IS/IEC 60947-4-1: 2000 Cl. 9.3.1 IS/IEC 60947-5-1: 2003 Cl. 8.3.1 IEC 60947-1: 2011 Cl. 8.2.3 Annexure C IEC 60947-2: 2013 Cl. 3.8	IX to 6X & X1 to X8

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Location: 1

Switchgear product Rotating machine Lamps & Luminaires	Ingress Protection	IEC 60947-3: 2012 Cl. 7.1.12 Annexure C IEC 60947-4-1: 2012 Cl. 8.1.12 IEC 60947-5-1: 2009 Cl. 8.3.1 IEC 60214-1: 2014 Cl. 8.2.3 IS 15884: 2010 Cl. 5.2.5 IS 8623 (Part 1): 1993/ IEC 60439-1: 2004 Cl. 8.2.7 IS 8623 (Part 2): 1993/ IEC 60439-2 : 2005 Cl. 8.2.7 IS 8623 (Part 3): 1993/ IEC 60439-3: 2001 Cl. 8.2.7 IEC 61439-1: 2011 Cl. 10.3 IEC 61439-2: 2011 Cl. 10, 10.3 IEC 61439-3: 2012 Cl. 10, 10.3 IEC 61439-6: 2012 Cl. 10, 10.3	IX to 6X & X1 to X8
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Location: 1

Switchgear product	Ingress Protection	IEC 61439-4: 2012 Cl. 10, 10.3	IX to 6X & X1 to X8
Rotating machine		IS 13703 (Part 1 & 2): 1993 Cl. 8.8	
Lamps &		IEC 60269-1: 2014 Cl. 8.8	
Luminaires		IEC 60269-2: 2013 Cl. 8.8	
		IS/IEC 60898-1: 2002 Cl. 9.6	
		IS/IEC 60898-2: 2003 Cl. 9.6	
		IEC 60898-1: 2003 Cl. 9.6	
		IS 12640 (Part 1): 2008/ IEC 61008-1: 2006 Cl. 9.6	
		IS 12640 (Part 2): 2008/ IEC 61009-1: 2006 Cl. 9.6	
		IEC 61008-1: 2013 Cl. 9.6	
		IEC 61009-1: 2013 Cl. 9.6	
		IS 9921 (Part 4): 1985 Cl. 6	
		IS 9920 (Part 1): 2002 Cl. 6.7	
		IS 9920 (Part 2): 2001 Cl. 6.7	
		IS 3231 (Part 1 to 3): 1987	
		IS 10027: 2000 Cl. 7 Annexure C	

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<u>Location: 1</u>				
	Switchgear product Rotating machine Lamps & Luminaires	Ingress Protection	IEC 60255-1: 2009 Cl. 6.3 IEC 60255-27: 2013 Cl. 10.5.2.3 IEC 62271-1: 2011 Cl. 6.7,5.13 IEC 62271-100: 2012 Cl. 6.7 IEC 62271-102: 2013 Cl. 6.7 IEC 62271-103: 2011 Cl. 6.7 IEC 62271-200: 2011 Cl. 6.7,5.13 IS 8468:1977 Cl. 11 IS 5039: 1983 Cl. 8.6 IS 13118: 1991 Cl. 11 IS 3427: 1997 Cl. 6.103 IS 4007 (Part 1): 1982 Cl. 8 IS 2675: 1983 Cl. 8.6,6.2 IEC 60265-2: 1988 Cl. 6.7 IS 13032:1991 Cl. 9	IX to 6X & X1 to X8

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Location: 1

Switchgear product Rotating machine Lamps & Luminaires	Ingress Protection	IEC 60529: 2013 Cl. 11 to 15 IS/IEC 60529: 2001 Cl. 11 to 15 IEC 60034-5: 2006 Cl. 8,4,9 IS/IEC 60034-5: 2000 Cl. 8,4,9 IS 10322 (Part 4): 1984 Cl. 2 IS 13779: 1999 Cl. 12.5 IS 14697: 1999 Cl. 12.5 IS 13032: 1991 Cl. 9 IEC 61330: 1995 Cl. 6.5 IEC 62052-11: 2003 Cl. 5.9 IEC 62053-21: 2003 Cl. 5.9 IEC 62053-22: 2003 Cl. 5.9 IEC 62053-23: 2003 Cl. 5.9 IS 14772: 2000 Cl. 12.3.5, 12.4 IEC 61439-6: 2012 Cl. 10.3	IX to 6X & X1 to X8
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Location: 1

Switchgear product Rotating machine Lamps & Luminaires	Ingress Protection	IS 10322-5-1: 2012 Cl. 14	IX to 6X & X1 to X8		
		IS 10322-5-2: 2012 Cl. 12			
		IS 10322-5-3: 2012 Cl. 13.5			
		IS 10322-5-4: 1987 Cl. 6			
		IS 10322-5-5: 1987 Cl. 6			
		IEC 60598-1: 2014 (General Procedure)			
		IEC 60598-2-1-1979 Cl. 1.13			
		IEC 60598-2-2: 2011 Cl. 2.14			
		IEC 60598-2-3: 2011 Cl. 3.13			
		IEC 60598-2-4: 1997 Cl. 4.13			
		Lifting		IEC 61439-1: 2011 Cl. 10.2.5	1 kg to 5000 kg
				IEC 61439-2: 2011 Cl. 10	
				IEC 61439-3: 2012 Cl. 10	
				IEC 61439-6: 2012 Cl. 10	
				IEC 61439-4: 2012 Cl. 10	

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Location: 1

44.	Switchgear product Rotating machine	Verification of ageing of electronic components	IS 12640 (Part 1): 2008/ IEC 61008-1: 2006 Cl. 9.23 IS 12640 (Part 2): 2008/ IEC 61009-1: 2006 Cl. 9.23 IEC 61008-1: 2013 Cl. 9.23 IEC 61009-1: 2013 Cl. 9.23	40°C to 150 °C
		Over run Test	IEC 60214-1: 2014 Cl. 6.2.2, 8.2.2	Qualitative
		Mechanical Tests	IEC 60214-1: 2014 Cl. 5.3.2, 5.2.6	Qualitative

X. LAMPS, LUMINARIES AND ACCESSORIES

1.	GLS Lamps (Tungsten filament lamps)	General requirements and marking.	IS 418: 2004 Cl.5 & 6 IS 15518-1: 2004 Cl. 4.1 & 4.2 IEC 60064: 2005 Cl.3.1 & 3.2 IEC 60432-1: 2012 Cl. 2.1 & 2.2	Qualitative
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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
<u>Location: 1</u>				
	Tubular Fluorescent Lamps. (Double capped fluorescent lamps)	Visual Examination & Checking for marking / General and Marking	IS 2418 (Part 1): 1977 Cl. 5 IEC 61195: 2012, Cl. 2.1 & 2.2 Cl. 1.5.8 IEC 60081: 2002	Qualitative
	High Pressure Mercury Vapour Lamps	Marking & Glass bulb	IS 9900 (Part 1): 1981 Cl.6	Qualitative
	High Pressure Sodium Vapour Lamps/(Discharge lamps Excluding fluorescent lamps)	Marking & Glass bulb	IS 9974 (Part 1): 1981 Cl. 5 & 4.2 IEC 60662: 2011 Cl. 5 IEC 62035: 2012 Cl. 4.2	Qualitative
	Starter for fluorescent lamps	Visual Examination, Connections , Marking and Quality of marking	IS 2215: 2006 Cl.7.9, 6, 7.11 IEC 60155: 1993 Cl. 7.9, 6, 7.11	Qualitative
	Ballast for fluorescent lamps	Qualitative (Visual Examination) & Marking	IS 1534: 1977 Cl. 8 IEC 60921: 2006 Cl. 5 IEC 61347-2-8: 2006 Cl. 7	Qualitative
	Ballast for HPMV lamps / Ballast for discharge lamps Excluding fluorescent lamps	Qualitative(Visual Examination) & Marking	IEC 60923: 2006 Cl. 5 IEC 61347-2-9: 2012 Cl. 7	Qualitative
	Electronic Ballast for tubular fluorescent lamps	Marking	IS 13021 (Part 1): 1991 Cl. 7 IS 13021 (Part 2): 1991 Cl. 5 IEC 61347-2-3: 2011 Cl. 7 IEC 60929: 2011 Cl. 5	Qualitative

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Location: 1

Particular requirements for d.c. or a.c. supplied electronic Controlgear for LED modules Luminaries	Marking	IEC 61347-2-13: 2014 Cl. 7	Qualitative
	Qualitative(Visual Examination) & Marking	IS 10322 (Part 5/ Sec IV & V): 1987, Cl. 6 IEC 60598-2-1: 1979, Cl. 1.5 IEC 60598-2-2: 2011 Cl. 2.6 IEC 60598-2-3: 2011 Cl. 3.5 IEC 60598-2-4 : 1997 Cl. 4.5 MNRE specifications	Qualitative
Self ballasted lamp for general lighting service.	Marking.	IS 15111 (Part 1): 2002 Cl. 6 IEC 60968: 2012 Cl. 5	Qualitative
Single capped fluorescent lamps	General requirements and marking.	IS 15687 (Part 1): 2006 Cl. 4.2 IEC 61199: 2012, Cl. 4.2 IEC 60901: 2001 Cl.1.5.10	Qualitative

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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
<u>Location: 1</u>				
2.	GLS Lamps (Tungsten filament lamps)	Lamp dimension, Interchange ability	IS 418 : 2004 Cl. 7 IS 15518 (Part 1): 2004, Cl. 4.10 IEC 60432-1: 2012, Cl. 2.10 IEC 60064: 2005 Cl. 3.3	0.1 mm to 620 mm
	Tubular Fluorescent Lamps (Double capped fluorescent lamps)	Dimensions & Caps./ Dimensional requirements for caps, / Lamp minimum overall length	IS 2418 (Part 1): 1977 Cl. 4 IEC 60081: 2002 Cl. 1.5 IEC 61195: 2012 Cl. 2.10	0.1 mm to 620 mm
	High Pressure Mercury Vapour Lamps	Lamp Dimensions	IS 9900 (Part 1): 1981 Cl. 4 IEC 60188: 2001 Cl. 1.4.2	0.1 mm to 620 mm
	High Pressure Sodium Vapour Lamps	Lamp Dimensions	IS 9974 (Part 1): 1981 Cl. 4.3 IEC 60662: 2011 Cl. 6	0.1 mm to 620 mm
	Self ballasted lamp for general lighting service.	Interchange ability & Dimensions.	IS 15111 (Part 1): 2002 Cl. 7 IS 15111 (Part 2): 2002 Cl. 6 IEC 60968: 2012, Cl. 6 IEC 60969: 2001 Cl. 3	0.1 mm to 620 mm
	Starter for fluorescent lamps	Dimensions	IS 2215: 2006 Cl. 7.6 IEC 60155: 1993 Cl. 7.6	0.1 mm to 620 mm
	Single capped fluorescent lamps	Dimensions & Caps.	IEC 60901: 2001, Cl. 1.5.3 IS 15687 (Part 1):2006 Cl. 4.3	0.1 mm to 620 mm

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<u>Location: 1</u>				
3.	GLS Lamps (Tungsten filament lamps)	Insulation Resistance Test	IS 15518 (Part 1): 2004 Cl. 4.6 IEC 60432-1: 2012 Cl. 2.6	0.1 MΩ to 2000 MΩ 500V DC
	Tubular Fluorescent Lamps. (Double capped fluorescent lamps)	Insulation Resistance Test	IS 2418 (Part 1): 1977 Cl. 6.5 IEC 61195: 2012 Cl. 2.4	0.1 MΩ to 2000 MΩ 500V DC
	High Pressure Mercury Vapour Lamps	Caps (Insulation Resistance Test and Cap dimension Test)	IS 9900 (Part 1): 1981 Cl. 4 IEC 60188: 2001 Cl. 1.4.3	0.1 MΩ to 2000 MΩ 500V DC
	High Pressure Sodium Vapour Lamps	Caps (Insulation Resistance Test and Cap dimension Test)	IS 9974 (Part 1): 1981 Cl. 4.3 IEC 60662: 2011 Cl. 7	0.1 MΩ to 2000 MΩ 500V DC
	Single capped fluorescent lamps	Insulation Resistance Test	IS 15687 (Part 1): 2006 Cl. 4.4 IEC 61199: 2012 Cl. 2.4	0.1 MΩ to 2000 MΩ 500V DC
4.	GLS Lamps (Tungsten filament lamps)	Resistance to torque	IS 15518 (Part 1): 2004 Cl. 4.5 IEC 60432-1: 2012 Cl. 2.5	0.1 Nm to 5 Nm, 25°C to 250°C 0.1 hrs to 2000 hrs.
	Tubular Fluorescent Lamps. (Double capped fluorescent lamps)	Torsion Test/ Mechanical requirements for caps	IS 2418 (Part 1): 1977 Cl. 6.4 IEC 61195: 2012 Cl. 2.3	0.1 Nm to 5 Nm, 25°C to 250°C 0.1 hrs to 2000 hrs.
	High Pressure Mercury Vapour Lamps	Torsion Test	IS 9900 (Part 1): 1981 Cl. 4	0.1 Nm to 5 Nm, 25°C to 250°C 0.1 hrs to 2000 hrs.

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<u>Location: 1</u>				
	High Pressure Sodium Vapour Lamps./ (Discharge lamps Excluding fluorescent lamps) Starter for fluorescent lamps	Torsion Test / Mechanical requirements	IS 9974 (Part 1): 1981 Cl. 4.3.3 IEC 62035: 2012 Cl. 4.3	0.1 Nm to 5 Nm, 25°C to 250°C 0.1 hrs to 2000 hrs.
	Self ballasted lamp for general lighting service Single capped fluorescent lamps	Torsion Test Mechanical strength Mechanical requirements for caps	IS 2215: 2006 Cl. 7.7 IEC 60155: 1993 Cl. 7.7 IS 15111 (Part 1): 2002 Cl. 10 IEC 60968: 2012 Cl. 9 IS 15687 (Part 1): 2006 Cl. 4.3 IEC 61199: 2012 Cl. 4.3	0.1 Nm to 5 Nm, 25°C to 250°C 0.1 hrs to 2000 hrs. 0.1 Nm to 5 Nm, 25°C to 250°C 0.1 hrs to 2000 hrs.
5.	GLS Lamps (Tungsten filament lamps) Tubular Fluorescent Lamps. (Double capped fluorescent lamps)	Characteristics and tolerances of initial readings Test for electrical and luminous characteristics / Electrical and cathode characteristics, Photometric characteristics	IS 418: 2004 Cl. 8 for IEC 60064: 2005 Cl. 3.4 IS 2418 (Part 1): 1977 Cl. 6.8 IEC 60081: 2002 Cl. 1.5.5	0.1 W to 200 W 50 lm to 10000 lm 0.1 W to 54 W, 50 lm to 10000 lm
	High Pressure Mercury Vapour Lamps	Test for electrical and luminous characteristics/ Electrical characteristics and Photometric characteristics	IS 9900 (Part 1): 1981 Cl. 7 IEC 60188: 2001 Cl. 1.4.5 & 1.4.6	0.1 W to 400 W 50 lm to 80000 lm

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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
<u>Location: 1</u>				
	High Pressure Sodium Vapour Lamps	Lamp electrical characteristics	IS 9974 (Part 1) : 1981 Cl. 7 IEC 60662: 2011 Cl. 1.4.5	0.1 W to 400 W
	Electronic Ballast for tubular fluorescent lamp	Operating conditions	IS 13021 (Part 2): 1991 Cl. 8 IEC 60929: 2011 Cl. 8	50 lm to 80000 lm 2x14W to 2x40 W
	Self ballasted lamp for general lighting service.	Lamp wattage , Luminous flux & Power factor	IS 15111 (Part 2): 2002 Cl. 9,10,16 IEC 60969: 2001, Cl. 9 MNRE specifications	0.1 W to 60 W 50 lm to 10000 lm
	Single capped fluorescent lamps	Electrical characteristics, Photometric characteristics	IEC 60901: 2001 Cl. 1.5.5	0.1 W to 60 W 2000K to 8000K
6.	GLS Lamps (Tungsten filament lamps)	Lamp cap temperature rise Test	IS 15518 (Part 1): 2004 Cl. 4.4 IEC 60432-1: 2012 Cl. 2.4	15 °C to 200 °C
	Self ballasted lamp for general lighting service.	Cap temperature rise.	IS 15111 (Part 1): 2002 Cl. 11 IEC 60968: 2012 Cl. 10	15 °C to 200 °C
	Single capped fluorescent lamps	Lamp cap temperature rise Test	IS 15687 (Part 1): 2006 Cl. 4.9 IEC 61199: 2012 Cl. 4.9	15 °C to 200 °C
	Tubular Fluorescent Lamps. (Double capped fluorescent lamps)	Lamp cap temperature rise Test.	IEC 61195: 2012 Cl. 2.9	15 °C to 200 °C

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<u>Location: 1</u>				
7.	GLS Lamps (Tungsten filament lamps)	Lumen maintenance and Life. Safety at the end of life	IS 418: 2004 Cl. 9 IEC 60064: 2005 Cl. 3.5 IS 15518 (Part 1): 2004 Cl. 4.9 IEC 60432-1: 2005 Cl. 2.9	0.1 hr to 25000 hr
	Tubular Fluorescent Lamps. (Double capped fluorescent lamps)	Life Test / Lumen maintenance	IS 2418 (Part 1): 1977 Cl. 6.9, 7.4 IEC 60081: 2002 Cl. 1.5.7	0.1 hr to 25000 hr
	High Pressure Mercury Vapour Lamps	Test for life performance	IS 9900 (Part 1): 1981 Cl. 8	0.1 hr to 25000 hr
	High Pressure Sodium Vapour Lamps./ (Discharge lamps Excluding fluorescent lamps)	Test for life performance	IS 9974 (Part 1): 1981 Cl. 410	0.1 hr to 25000 hr
	Self ballasted lamp for general lighting service.	Lumen maintenance and Life Test requirements.	IS 15111 (Part 2): 2002 Cl. 13 IEC 60969: 2001 Cl. 9	0.1 hr to 25000 hr
	Single capped fluorescent lamps	Lumen maintenance	IEC 60901: 2001 Cl. 1.5.8	0.1 hr to 25000 hr
8.	Tubular Fluorescent Lamps. (Double capped fluorescent lamps)	Testing of starting Characteristics and Burning Test. / Starting characteristics	IS 2418 (Part 1): 1977 Cl. 6.7, 6.6 IEC 60081: 2002 Cl. 1.4.4	1 s to 60 min
	Self ballasted lamp for general lighting service.	Starting & Run-up	IS 15111(Part 2): 2002 Cl. 8 IEC 60969: 2001 Cl. 5	1 s to 60 min

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<u>Location: 1</u>				
	High Pressure Mercury Vapour Lamps	Starting and warm up characteristics.	IS 9900 (Part 1): 1981 Cl. 4.2 IEC 60188: 2001 Cl. 1.4.4	1 s to 60 min
	High Pressure Sodium Vapour Lamps	Lamp starting and warm up Test	IS 9974 (Part 1): 1981 Cl. 7.3 IEC 60662: 2011 Cl. 8.2 & 8.3	1 s to 60 min
	Single capped fluorescent lamps	Starting characteristics.	IEC 60901: 2001 Cl. 1.5.4	1 s to 60 min
9.	Tubular Fluorescent Lamps. (Double capped fluorescent lamps) Self ballasted lamp for general lighting service.	Test for colour characteristics / Photometric characteristics Colour	IS 2418 (Part 1): 1977 Cl. 6.8 IEC 60081: 2002 Cl. 1.4.6 IS 15111 (Part 2): 2002 Cl. 11 IEC 60969: 2001, Cl. 8 MNRE specifications	2000 K to 8000 K 2000 K to 8000 K
10.	High Pressure Mercury Vapour Lamps	Lamp Stability with rapidly reduced supply voltage.	IS 9900 (Part 1): 1981 Cl. 7.6 IEC 60188: 2001 Cl. 1.4.8	1 s to 10 s
11.	High Pressure Sodium Vapour Lamps./ (Discharge lamps Excluding fluorescent lamps)	General Lamp Extinguishing Voltage Test	IS 9974 (Part 1): 1981 Cl. 3 IEC 60662: 2011 Cl. 4 IS 9974 (Part 1): 1981 Cl. 7.2.1 IEC 60662: 2011 Cl. 8.6	- 40°C 1 s to 10 s

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<u>Location: 1</u>				
12.	Starter for fluorescent lamps	Insulation Resistance under humidity conditions , Dielectric strength	IS 2215: 2006 Cl. 7.4,7.5 IEC 60155: 1993 Cl. 7.5	0.1 MΩ to 2000 MΩ 500V DC 0.1 kV to 5 kV
	Self ballasted lamp for general lighting service	Insulation Resistance and electric strength after humidity treatment	IS 15111 (Part 1): 2002 Cl. 9 IEC 60968: 2012 Cl. 8	0.1 MΩ to 2000 MΩ 500V DC 0.1 kV to 5 kV
	Single capped fluorescent lamps	Electric Strength Test	IS 15687 (Part 1): 2006 Cl. 4.5 IEC 61199: 2014 Cl. 4.5	0.1 MΩ to 2000 MΩ 500V DC 0.1 kV to 5 kV
	Tubular Fluorescent Lamps (Double capped fluorescent lamps)	Electric Strength Test	IEC 61195: 2014 Cl. 4.5	0.1 MΩ to 2000 MΩ 500V DC 0.1 kV to 5 kV
	High Pressure Sodium Vapour Lamps./ (Discharge lamps Excluding fluorescent lamps)	Electrical requirement	IEC 62035: 2014 Cl. 4.4	0.1 MΩ to 2000 MΩ 500V DC 0.1 kV to 5 kV
13.	Starter for fluorescent lamps	Resistance to heat and Fire	IS 2215: 2006 Cl. 7.10 IEC 60155: 1993 Cl. 7.10	25°C to 650 °C, 0.1 hr to 10000 hr 0.1 mm to 200 mm
	Ballast for fluorescent lamps	Resistance to heat / Resistance to heat, fire and tracking.	IS 1534 (Part 1): 1977 Cl. 9.11 IEC 61347-2-8: 2006 Cl. 20	

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<u>Location: 1</u>				
	Ballast for discharge lamps Excluding fluorescent lamps GLS Lamps (Tungsten filament lamps) Electronic Ballast for tubular fluorescent lamps	Resistance to heat, fire and tracking	IEC 61347-2-9: 2012 Cl. 20	25°C to 650°C, 0.1 hr to 10000 hr 0.1 mm to 200 mm
	Particular requirements for d.c. or a.c. supplied electronic Controlgear for LED modules Luminaries	Resistance to heat.	IS 15518: 2004 Cl. 4.5.3	25°C to 650°C, 0.1 hr to 10000 hr 0.1 mm to 200 mm
		Resistance to Heat & fire./Resistance to Heat, fire and tracking.	IS 13021 (Part 1): 1991 Cl. 18, 19 IEC 61347-2-3: 2011 Cl. 21	25°C to 650°C, 0.1 hr to 10000 hr 0.1 mm to 200 mm
		Resistance to Heat, fire and tracking.	IEC 61347-2-13: 2014 Cl. 19	25°C to 650°C, 0.1 hr to 10000 hr 0.1 mm to 200 mm
		Resistance to Heat, fire and tracking	IS 10322 (Part 5/ Sec VI & V): Cl. 13.7 1987, IEC 60598-2-1: 1979 Cl. 1.15 IEC 60598-2-2: 2011 Cl. 2.16 IEC 60598-2-3: 2011 Cl. 3.15 IEC 60598-2-4: 1997 Cl. 4.15	25°C to 650°C, 0.1 hr to 10000 hr 0.1 mm to 200 mm
	Self ballasted lamp for general lighting service.	Resistance to heat, flame & Ignition	IS 15111 (Part 1): 2002 Cl. 12,13 IEC 60968: 2012 Cl. 12	25°C to 650°C, 0.1 hr to 10000 hr 0.1 mm to 200 mm

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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
<u>Location: 1</u>				
	Single capped fluorescent lamps	Resistance to heat and Fire	IS 15687 (Part 1): 2006 Cl. 4.7 IEC 61199: 2014 Cl. 4.7	25°C to 650°C, 0.1 hr to 10000 hr 0.1 mm to 200 mm
	Tubular Fluorescent Lamps. (Double capped fluorescent lamps) High Pressure Sodium Vapour Lamps./ (Discharge lamps Excluding fluorescent lamps)	Resistance to heat and Fire	IEC 61195: 2014 Cl. 2.7	25°C to 650°C, 0.1 hr to 10000 hr 0.1 mm to 200 mm
		Thermal requirement	IEC 62035: 2014 Cl. 4.5	25°C to 650°C, 0.1 hr to 10000 hr 0.1 mm to 200 mm
14.	Starter for fluorescent lamps	Starting Test	IS 2215: 2006 Cl. 8 IEC 60155: 1993 Cl. 8	1V to 2000 V
		Endurance Test	IS 2215: 2006 Cl. 9 IEC 60155: 1993 Cl. 9	1 to 10000 operation
		Deactivated Lamp Test	IS 2215: 2006 Cl. 10 IEC 60155: 1993 Cl. 10	0.1 hrs to 100 hrs
		Test for RFI suppression capacitor	IS 2215: 2006 Cl. 7.12 IEC 60155: 1993 Cl. 7.12	1 nF to 999 nF
15.	Single capped fluorescent lamps	Test for RFI suppression capacitor	IS 15687 (Part 1): 2006 Cl. 4.10 IEC 61199: 2014 Cl. 4.10	1 nF to 999 nF
		Radio interference suppression (RIS)	IEC 60901: 2001 Cl. 1.5.9	1 nF to 999 nF

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<u>Location: 1</u>				
16.	Ballast for fluorescent lamps	Test for Terminals for External wiring	IS 1534 (Part 1): 1977 Cl. 4 IEC 61347-2-8: 2006 Cl. 9	0.1 Nm to 6 Nm
	Ballast for HPMV lamps/ Ballast for discharge lamps Excluding fluorescent lamps Electronic Ballast for tubular fluorescent lamps	Terminals for External wiring	IEC 61347-2-9: 2012 Cl. 9	0.1 Nm to 6 Nm
	Particular requirements for d.c. or a.c. supplied electronic Controlgear for LED modules Luminaries	Terminals	IS 13021 (Part 1): 1991 Cl. 8 IEC 61347-2-3: 2011 Cl. 9 IEC 61347-2-13: 2014 Cl. 9	0.1 Nm to 6 Nm
		Terminals, External & Internal wiring.	IS 10322 (Part 5/ Sec 4 & 5): 1987, Cl. 9, 10 IEC 60598-2-1: 1979, Cl. 1.9 IEC 60598-2-2: 2011 Cl. 2.10 & Cl. 2.11 IEC 60598-2-3: 2011 Cl. 3.9 IEC 60598-2-4: 1997 Cl. 4.9	0.1 Nm to 6 Nm

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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
<u>Location: 1</u>				
17.	Ballast for fluorescent lamps	Test for screw, Current carrying parts and connections	IS 1534 (Part 1): 1977 Cl. 5 IEC 61347-2-8: 2006 Cl. 19	0.1 Nm to 6 Nm
	Ballast for HPMV lamps/ Ballast for discharge lamps Excluding fluorescent lamps	Test for screw, Current carrying parts and connections	IEC 61347-2-9: 2012 Cl. 19	0.1 Nm to 6 Nm
	Electronic Ballast for tubular fluorescent lamps	Screws, current carrying Parts and Connection	IS 13021(Part 1): 1991 Cl. 17 IEC 61347-2-3: 2011 Cl. 20	0.1 Nm to 6 Nm
	Particular requirements for d.c. or a.c. supplied electronic Controlgear for LED modules	Screws, current carrying Parts and Connection	IEC 61347-2-13: 2014 Cl. 18	0.1 Nm to 6 Nm
18.	Ballast for fluorescent lamps	Test for Provision for Earthing	IS 1534 (Part 1): 1977 Cl. 6 IEC 61347-2-8: 2006 Cl. 10	0.1 Nm to 6 Nm
	Ballast for HPMV lamps/ Ballast for discharge lamps Excluding fluorescent lamps	Provision for Earthing.	IEC 61347-2-9: 2012 Cl. 10	0.1 Nm to 6 Nm

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<u>Location: 1</u>				
	Electronic Ballast for tubular fluorescent lamps	Test for Provision for Earthing.	IS 13021(Part 1): 1991 Cl. 9 IEC 61347-2-3: 2011 Cl. 10	0.1 Nm to 6 Nm
	Particular requirements for d.c. or a.c. supplied electronic Controlgear for LED modules	Test for Provision for Earthing.	IEC 61347-2-13: 2014 Cl. 10	0.1 Nm to 6 Nm
	Luminaries	Provision for Earthing.	IS 10322 (Part 5/ Sec IV & V): 1987 Cl. 8 IEC 60598-2-1: 1979, Cl. 1.9 IEC 60598-2-2: 2011 Cl. 2.10 & Cl. 2.11 IEC 60598-2-3: 2011 Cl. 3.9 IEC 60598-2-4 : 1997 Cl. 4.9	0.1 Nm to 6 Nm
19.	Ballast for fluorescent lamps	Test for Creep age Distance and Clearance	IS 1534 (Part 1): 1977 Cl. 7 IEC 61347-2-8: 2006 Cl. 18	0.1 mm to 100 mm

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Location: 1

Ballast for HPMV lamps/ Ballast for discharge lamps Excluding fluorescent lamps	Test for Creep age Distance Clearance	IEC 61347-2-9: 2012 Cl. 18	0.1 mm to 100 mm
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Electronic Ballast for tubular fluorescent lamps	Creepage distances and clearances	IS 13021(Part 1): 1991 Cl. 10 IEC 61347-2-3: 2011 Cl. 19	0.1 mm to 100 mm
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Particular requirements for d.c. or a.c. supplied electronic Controlgear for LED modules	Creepage distances and clearances	IEC 61347-2-13: 2014 Cl. 17	0.1 mm to 100 mm
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Luminaries	Creepage distances and clearances	IS 10322 (Part 5/ Sec IV & V): 1987 Cl. 7 IEC 60598-2-1: 1979, Cl. 1.9 IEC 60598-2-2: 2011 Cl. 2.10 & Cl. 2.11 IEC 60598-2-3: 2011 Cl. 3.9 IEC 60598-2-4: 1997 Cl. 4.9	0.1 mm to 100 mm
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	GLS Lamps (Tungsten filament lamps)	Creepage distance for B-15 & B-22 d capped lamps	IS 15518 (Part 1): 2004 Cl. 4.8 IEC 60432-1: 2012 Cl. 2.8	0.1 mm to 100mm
	Single capped fluorescent lamps	Creepage distance for caps	IS 15687 (Part 1): 2006 Cl. 4.8 IEC 61199: 2014 Cl. 4.8	0.1 mm to 100mm
	Tubular Fluorescent Lamps. (Double capped fluorescent lamps)	Creepage distance for caps	IEC 61195: 2014 Cl. 2.8	0.1 mm to 100mm
	Particular requirements for d.c. or a.c. supplied electronic Controlgear for LED modules	Test for Provision for Earthing.	IEC 61347-2-13: 2014 Cl. 10	0.1 mm to 100mm
20.	Ballast for fluorescent lamps	Protection against accidental contact and Electric Shock/ Protection of associated components	IS 1534 (Part 1): 1977 Cl. 9.5 IEC 61347-2-8: 2006 Cl. 8	30 N

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	<u>Location: 1</u>			
	Ballast for HPMV lamps/ Ballast for discharge lamps Excluding fluorescent lamps	Protection against electric Shock & accidental contact. Protection against of associated components	IEC 61347-2-9: 2012 Cl. 8	30 N
	Electronic Ballast for tubular fluorescent lamps	Protection against accidental contact with live parts and Protection against electric Shock. / Protection against accidental contact with live parts and Protection against of associated components	IS 13021(Part 1): 1991 Cl. 11, 12 IEC 61347-2-3: 2011 Cl. 8	30 N
	Particular requirements for d.c. or a.c. supplied electronic Controlgear for LED modules	Protection against accidental contact with live parts and Protection against of associated components	IEC 61347-2-13: 2014 Cl. 8	30 N
	Self ballasted lamp for general lighting service Starter for TFL	Protection against electric Shock	IS 15111 (Part 1): 2002 Cl. 8 IEC 60968: 2012 Cl. 7	30 N
		Protection against accidental electric Shocks	IS 2215: 2006 Cl. 7.3 IEC 60155: 1993 Cl. 7.3	30 N

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<u>Location: 1</u>				
	Luminaries	Protection against electric Shock	IS 10322 (Part 5/ Sec IV & V): 1987 Cl. 11 IEC 60598-2-1: 1979, Cl. 1.11 IEC 60598-2-2: 2011 Cl. 2.12 IEC 60598-2-3: 2011 Cl. 3.11 IEC 60598-2-4 : 1997 Cl. 4.11	30 N
	GLS Lamps (Tungsten filament lamps)	Protection against accidental contact in screw lamp holders and Accidentally live part .	IS 15518 (Part 1) : 2004 Cl. 4.7 IEC 60432-1: 2012 Cl. 2.3	30 N
	Single capped fluorescent lamps	Parts which can become accidentally live	IS 15687 (Part 1): 2006 Cl. 4.7 IEC 61199: 2014 Cl. 4.6	30 N
	Tubular Fluorescent Lamps. (Double capped fluorescent lamps)	Parts which can become accidentally live	IEC 61195: 2014 Cl. 2.6	30 N
21.	Ballast for fluorescent lamps	Voltage Across Capacitors	IEC 61195: 2014 Cl. 2.6	0.1 V to 50 V
22.	Ballast for fluorescent lamps	Test for Moisture Resistance & Insulation/ Electric strength	IS 1534 (Part 1): 1977 Cl. 9.7 IEC 61347-2-8: 2006 Cl. 11	20 % RH to 97 % RH 20°C to 60°C 0.1 MΩ to 2000 MΩ 0.1 kV to 5 kV

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	Ballast for HPMV lamps/ Ballast for discharge lamps Excluding fluorescent lamps	Moisture Resistance & Insulation/Electric strength	IEC 61347-2-9: 2012 Cl. 11	20 % RH to 97 % RH
	Electronic Ballast for tubular fluorescent lamps	Moisture Resistance & insulation., Electric strength.	IS 13021 (Part 1): 1991 Cl. 13,14 IEC 61347-2-3: 2011 Cl. 11	20 °C to 60 °C
	Particular requirements for d.c. or a.c. supplied electronic Controlgear for LED modules	Moisture Resistance & insulation., Electric strength.	IEC 61347-2-13: 2014 Cl. 11	0.1 MΩ to 2000 MΩ
23.	Ballast for fluorescent lamps	Test for thermal Endurance of Winding	IS 1534 (Part 1): 1977 Cl. 9.8 IEC 61347-2-8: 2006 Cl. 13	25 °C to 300 °C
	Ballast for HPMV lamps/ Ballast for discharge lamps Excluding fluorescent lamps	Endurance Test	IEC 61347-2-9: 2012 Cl. 13	25 °C to 300 °C

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Location 2: K-V2/A, GIDC, Savli, Manjusar, Vadodara, Gujarat

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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
<u>Location: 1</u>				
24.	Ballast for fluorescent lamps	Test for Limitation of Ballast Heating	IS 1534 (Part 1): 1977 Cl. 9.9 IEC 61347-2-8: 2006 Cl. 14	25 °C to 200° C
	Ballast for HPMV lamps/ Ballast for discharge lamps Excluding fluorescent lamps	Limitation of Ballast Heating	IEC 61347-2-9: 2012 Cl. 13	25 °C to 200° C
	Particular requirements for d.c. or a.c. supplied electronic Controlgear for LED modules	Transformer Heating	IEC 61347-2-13: 2014 Cl. 15	25 °C to 200° C
25.	Ballast for fluorescent lamps	Test for mechanical strength of independent ballast	IS 1534 (Part 1): 1977 Cl. 9.10	0.35 Nm, 50N Specified Tumbling Barrel (500 mm)
	Starter for TFL	Mechanical Strength	IS 2215: 2006 7.8 IEC 60155: 1993 Cl. 7.8	Cl. 0.35 Nm, 50N Specified Tumbling Barrel (500 mm)

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Location: 1

27.	Ballast for fluorescent lamps	Testing of Performance - Voltage (Open circuit voltage Peak and RMS) at termination of lamp or starter - Preheat condition - Lamp power and current output - Circuit Power factor - Supply current - Current waveform - RMS Voltage across terminals of voltage operated starter. - Magnetic screening	IS 1534 (Part 1): 1977 Cl. 9.13 IEC 60921: 2006 Cl. 6, 7, 8, 9, 10, 6.4, 13 IEC 61000-3-2 Cl. 3.16.2	10 °C to 50° C 0 to 3kV (Peak) 0.05 A to 10 A P.F : 0.01 to 1.00 Harmonic: (1 to 50 th order)
	Single capped fluorescent lamps	General statement	IEC 60901: 2001 Cl. 1.2	
	Electronic Ballast for tubular fluorescent lamps	General statement	IS 13021 (Part 2): 1991 Cl. 6 IEC 60929: 2011 Cl. 6	
28.	Ballast for fluorescent lamps	Test for ballast losses	IS 1534 (Part 1): 1977 Cl. 9.14	0.1 W to 80 W

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Location: 1

29.	Ballast for HPMV lamps/ Ballast for discharge lamps Excluding fluorescent lamps	Test for Short Circuit Current	IEC 60923: 2006 Cl. 12.2	0.1 W to 2000 W 0.1 A to 10 A
		Test for Open Circuit Voltage	IEC 60923: 2006 Cl. 13.3	1 V to 1000V
		Test for Current Wave Shape	IEC 60923: 2006 Cl. 9 IEC 61000-3-2 Cl.6.2	2 nd to 50 th harmonic
		Test for Protection against magnetic Influence	IEC 60923: 2006 Cl. 10	0.1 A to 10 A
30.	Electronic Ballast for tubular fluorescent lamps	Magnetic screening	IS 13021 (Part 2): 1991 Cl. 13	0.1 A to 10 A
		Circuit P.F & Supply current	IS 13021 (Part 2): 1991 Cl. 9 IEC 60929: 2011 Cl. 9 & 10	0.1 A to 10 A
	Ballast for HPMV lamps/ Ballast for discharge lamps Excluding fluorescent lamps	Circuit P.F & Supply current	IEC 60923: 2006 Cl. 7 & 8	0.1 A to 10 A

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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
<u>Location: 1</u>				
31.	Electronic Ballast for tubular fluorescent lamps	Maximum current in any lead to a cathode	IS 13021 (Part 2): 1991 Cl. 11 IEC 60929: 2011 Cl. 11	0.1 A to 10 A
	Ballast for TFL	Maximum current in any lead to a cathode	IEC 60921: 2006 Cl. 11	0.1 A to 10 A
32.	Electronic Ballast for tubular fluorescent lamps	Abnormal Condition. Operational Tests for Abnormal Condition	IS 13021 (Part 1): 1991 Cl.15 IEC 61347-2-3: 2011 Cl. 16 IS 13021 (Part 2): 1991 Cl. 8 IEC 60929: 2011 Cl. 14	1 V to 300 V
	Particular requirements for d.c. or a.c. supplied electronic Controlgear for LED modules	Abnormal Condition	IEC 61347-2-13: 2014 Cl. 15.3	1 V to 300 V
33.	Electronic Ballast for TFL	Fault conditions	IS 13021(Part 1): 1991 Cl. 16 IEC 61347-2-3: 2011 Cl. 16	1 V to 300 V
	Particular requirements for d.c. or a.c. supplied electronic Controlgear for LED modules	Fault conditions	IEC 61347-2-13: 2014 Cl. 14	1 V to 300 V
	Self ballasted lamp for general lighting	Fault conditions	IS 15111 (Part 1): 2002 Cl. 14 IEC 60968: 2012 Cl. 13	1 V to 300 V

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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
<u>Location: 1</u>				
34.	Electronic Ballast for tubular fluorescent lamps	Current Waveform	IS 13021 (Part 2): 1991 Cl. 12 IEC 60929: 2011 Cl. 9 IEC 61000-3-2 Cl.6.2	2 nd to 50 th harmonic 1 mA to 500 mA
	Self ballasted lamp for general lighting	Harmonics	IS 15111 (Part 2): 2002 Cl. 14 IEC 60969: 2001, Cl. 11 IEC 61000-3-2	2 nd to 50 th harmonic 1 mA to 500 mA
35.	Electronic Ballast for tubular fluorescent lamps	Endurance Test	IS 13021 (Part 2): 1991, Cl. 17 IEC 60929: 2011 Cl. 15	25 °C to 200°C 0.1 hrs. to 200 hrs.
36.	Luminaries	Endurance Test	IS 10322 (Part 5/ Sec IV & V): 1987, Cl. 13.4 IEC 60598-2-1: 1979, Cl.1.12 IEC 60598-2-2: 2011 Cl. 2.13 IEC 60598-2-3: 2011 Cl. 3.12 IEC 60598-2-4 : 1997 Cl. 4.12	25 °C to 200°C 0.1 hrs. to 240 hrs.
		Thermal Test ---Normal Operation ---Abnormal Operation	IS 10322 (Part 5/ Sec IV & V): 1987 Cl. 13.4 IEC 60598-2-1: 1979, Cl. 1.12 IEC 60598-2-2: 2011 Cl. 2.13 IEC 60598-2-3: 2011 Cl. 3.12 IEC 60598-2-4 : 1997Cl. 4.12	25 °C to 200°C

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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
<u>Location: 1</u>				
	Luminaries	Resistance to Dust & moisture, Ingress Protection Test Humidity Test	IS 10322 (Part 5/ Sec IV & V): 1987 Cl. 13.5 IEC 60598-2-1: 1979, Cl. 1.13 IEC 60598-2-2: 2011 Cl. 2.14 IEC 60598-2-3: 2011 Cl. 3.13 IEC 60598-2-4 : 1997 Cl. 4.13	IP1X/2X/3X/4X/5X/6X, IPX1/X2/X3/X4/X5/X6/X 7/X8 20 % RH to 97% RH, 0 to 60° C
		Insulation Resistance & Electric Strength	IS 10322 (Part 5/ Sec IV & V): 1987 Cl. 13.6 IEC 60598-2-1: 1979, Cl. 1.14 IEC 60598-2-2: 2011 Cl. 2.15 IEC 60598-2-3: 2011 Cl. 3.14 IEC 60598-2-4 : 1997 Cl. 4.14	0.1 MΩ to 2000 MΩ 500V DC 0.1 kV to 5 kV
		Resistance to tracking	IS 10322 (Part 5/ Sec IV & V): 1987 Cl. 13.7 IEC 60598-2-1: 1979, Cl. 1.15 IEC 60598-2-2: 2011 Cl. 2.16 IEC 60598-2-3: 2011 Cl. 3.15 IEC 60598-2-4 : 1997 Cl. 4.15	1V to 270 V
		Photometric Test	IS 10322 (Part 5/ Sec IV & V): 1987 Cl. 13.8	50 lm to 80000 lm
37.	Photovoltaic (PV) module	Visual inspection	IS 14286: 2010 Cl.10.1 IEC 61215: 2005 Cl.10.1 IEC 61646: 2008 Cl.10.1 MNRE specifications	Visual inspection

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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
<u>Location: 1</u>				
	Photovoltaic (PV) module	Maximum power determination	IS 14286: 2010 Cl. 10.2 IEC 61215: 2005 Cl. 10.2 IEC 61646: 2008 Cl. 10.2	3 Wp to 300 Wp 2m x 1m 1200 W/m ² to 1100W/m ²
		Insulation Test	IS 14286: 2010 Cl. 10.3 IEC 61215: 2005 Cl. 10.3 IEC 61646: 2008 Cl.10.3	0.1 MΩ to 2000 MΩ 1000V DC
		Measurement of temperature co-efficient	IS 14286: 2010 Cl. 10.4 IEC 61215: 2005 Cl. 10.4 IEC 61646: 2008 Cl. 10.4	3 Wp to 300 Wp 2m x 1m (-)40°C to (+)85°C 200 W/m ² to 1100W/m ²
		Performance at STC	IS 14286: 2010 Cl. 10.6 IEC 61215: 2005 Cl. 10.6 IEC 61646: 2008 Cl. 10.6 MNRE specifications	3 Wp to 300 Wp 2m x 1m 200 W/m ² to 1100W/m ²
		Performance at low irradiance	IS 14286: 2010 Cl. 10.7 IEC 61215: 2005 Cl. 10.7 IEC 61646: 2008 Cl. 10.7	3 Wp to 300 Wp 2m x 1m 200 W/m ² to 1100W/m ²
		Thermal cycling Test	IS 14286: 2010 Cl. 10.11 IEC 61215: 2005 Cl. 10.11 IEC 61646: 2008 Cl. 10.11	(-)40°C to (+)85°C 30 % to 97 % 1 m x 1 m x 1 m 2
		Humidity freeze Test	IS 14286: 2010 Cl. 10.12 IEC 61215: 2005 Cl. 10.12 IEC 61646: 2008 Cl.10.12	(-)40°C to (+)85°C 30 % to 97 % 2 m x 1 m x 1 m

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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
<u>Location: 1</u>				
	Photovoltaic (PV) module	Damp heat Test	IS 14286: 2010 Cl. 10.13 IEC 61215: 2005 Cl.10.13 IEC 61646: 2008 Cl. 10.13	20°C to 85°C 30 % to 97 % 2 m x 1 m x 1 m
38.	Solar Lantern Solar Street lighting system Solar Home lighting system	Checking of efficiency of electronics	IEC 61683: 1999 Cl. 4 IEC 61683: 1999 Cl. 4 MNRE specifications	1VA to 30kVA
		Checking of protection	IEC 62093: 2005 Cl. 11 MNRE specifications	Qualitative (Visual inspection)
XI.	FLAMEPROOF			
1.	Flameproof Enclosure of Electrical Apparatus/ Increased safety motor	Marking/ Rating plate	IS/IEC 60079-0: 2007 Cl. 29 IS/IEC 60079-1: 2007 Cl. 20 IS/IEC 60079-7: 2006 Cl. 9 IEC 60079-0: 2011 Cl. 29 IEC 60079-1: 2014 Cl. 20 IEC 60079-7: 2006 Cl. 9	Qualitative
2.	Flameproof Enclosure of Electrical Apparatus	Documentation	IS/IEC 60079-0: 2007 Cl. 24 IEC 60079-0: 2011 Cl. 24	Qualitative
		Verification & Tests	IS/IEC 60079-1: 2007 Cl. 14 IEC 60079-1: 2014 Cl. 14 IS/IEC 60079-7: 2006 Cl. 6 IEC 60079-7: 2006 Cl. 6	1 °C to 1000 °C

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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
<u>Location: 1</u>				
	Flameproof Enclosure of Electrical Apparatus	Determination of maximum surface temperature/ Temperature measurement	IS/IEC 60079-0: 2007 Cl. 5.3 & 26.5 IS/IEC/60079-7: 2006 Cl.4.7 & 6.2 IEC 60079-0: 2011 Cl. 5.3 & 26.5 IEC 60079-7: 2006 Cl. 4.7 & 6.2	1 °C to 1000 °C
2.	Flameproof Enclosure of Electrical Apparatus	Flame proof joints	IS/IEC 60079-1: 2007 Cl. 5 IEC 60079-1: 2014 Cl. 5	Qualitative
		Cemented joints	IS/IEC 60079-1: 2007 Cl. 6 IEC 60079-1: 2014 Cl. 6	Qualitative
		Operating roads	IS/IEC 60079-1: 2007 Cl. 7 IEC 60079-1: 2014 Cl. 7	Qualitative
		Supplementary requirement for shaft & bearing	IS/IEC 60079-1: 2007 Cl. 8 IEC 60079-1: 2014 Cl. 8	Qualitative
		Breathing & Draining devices	IS/IEC 60079-1: 2007 Cl. 10 IEC 60079-1: 2014 Cl. 10	Qualitative
		Fasteners, associated holes and closing device	IS/IEC 60079-1: 2007 Cl. 11 IEC 60079-1: 2014 Cl. 11	Qualitative
		Entries into enclosure	IS/IEC 60079-1: 2007 Cl.13 IEC 60079-1: 2014 Cl. 13	Qualitative

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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
<u>Location: 1</u>				
	Flameproof Enclosure of Electrical Apparatus	Overpressure Test (Static)	IS/IEC 60079-1: 2007 Cl.15.1.3.1 IEC 60079-1: 2014 Cl. 15.2.3.2	Upto 80 kg/cm ²
3.	Flameproof Enclosure of Electrical Apparatus/ Increased safety	maximum surface temperature/ Temperature measurement	Cl.No. 5.3 & 26.5 of IS/IEC 60079-0-2007 Cl.No.4.7 & 6.2 of IS/IEC/60079-7-2006 Cl.No. 5.3 & 26.5 of IEC 60079-0-2011 Cl.No. 4.7 & 6.2 of IEC 60079-7-2006	1 °C to 1000 °C
4.	Increased safety	Constructional Requirement	IS/IEC/60079-7: 2006 Cl. 4 IEC 60079-7: 2006 Cl. 4	Qualitative
		Torque Test for bushing	IS/IEC 60079-0: 2007 Cl. 26.6 IS/IEC 60079-7: 2006 Cl. 8.2 IEC 60079-0: 2011 Cl. 26.6 IEC 60079-7: 2006 Cl. 8.2	Qualitative
5.	Increased safety Flameproof Enclosure of Electrical Apparatus	Compliance of prototype with documents	IS/IEC 60079-0: 2007 Cl. 25 IEC 60079-0: 2011 Cl. 25	Qualitative
		Dielectric Strength	IS/IEC 60079-7: 2006 Cl. 6.1 IEC 60079-7: 2006 Cl. 6.1	0.025 kV to 28 kV
		Supplementary requirements for Rotating electrical machines	IS/IEC 60079-7: 2006 Cl. 5.2 IEC 60079-7: 2006 Cl. 5.2	1 mm to 1000 mm 0.37 kW to 110 kW

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Location: 1

**Increased safety
Flameproof
Enclosure of
Electrical
Apparatus**

Terminal insulating material

IS/IEC 60079-7: 2006
Cl. 6.9
IEC 60079-7: 2006
Cl. 6.9

(-)40°C to (+)180 °C

Mechanical Test/ Impact
Test / Drop Test

IS/IEC 60079-7: 2006
Cl. 6
IEC 60079-7: 2006
Cl. 6
IS/IEC 60079-0: 2007
Cl. 26.4.2 & 26.4.3
Cl. 26.4.2 & 26.4.3
IS/IEC 60079-0: 2011
IEC 60079-1: 2014
Cl. 5.2, 10.8 & C3.4.2
IS/IEC 60079-1: 2007
Cl. 5.2, 10.8 & C3.4.2

Qualitative

Laboratory

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AT SITE

Location: 1

I. ELECTRICAL AND ELECTRONIC (STATIC) ENERGY METERS

1. Electrical and Electronic (Static) Energy Meters / Prepayment Meters and Tariff and Load Control equipment Electrical / Electronic Equipment. Electrical Measuring Transducers/ Electrical & Electronic Multifunction Measuring Meters	Dielectric strength or AC high voltage Test	IS 15707: 2006 IS 13779: 1999 (RA 2004) Cl. 12.7.6.3 IS 14697: 1999 (RA 2004) Cl.12.7.6.3 CBIP Publication No. 304 Cl. 5.4.6.3 IEC 62052-11: 2003 Cl. 7.3.3 IEC 62053-21: 2003 Cl. 7.4. IEC 62053-22: 2003 Cl. 7.4 IEC 62053-23: 2003 Cl. 7.4 IS 15884: 2010 Cl. 5.4.6.3	Upto 5 kV
	Insulation Resistance / insulation Test	IS 15707: 2006 IS 13779: 1999 (RA 2004) Cl. 12.7.6.4 IS 14697: 1999 (RA 2004) Cl. 12.7.6.4 CBIP Publication No. 304 Cl. 5.4.6.4 IS 15884: 2010 Cl. 5.4.6.4	Upto 200 MΩ 500 VDC

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Location: 1

	Electrical and Electronic (Static) Energy Meters / Prepayment Meters and Tariff and Load Control equipment Electrical / Electronic Equipment. Electrical Measuring Transducers/ Electrical & Electronic Multifunction Measuring Meters	Limits of errors / Test of accuracy requirement	IS 15707: 2006 IS 13779: 1999 (RA 2004) Cl. 11.1 IS 14697: 1999 (RA 2004) Cl. 11.1 CBIP Publication No. 304 Cl. 5.6.8 IEC 62052-11: 2003 IEC 62053-21: 2003 Cl. 8.1 IEC 62053-22: 2003 Cl. 8.1 IEC 62053-23: 2003 Cl. 8.1 IS 15884: 2010 Cl. 5.6.1	Upto 480 V 10 mA to 120 A 1 ph, 2 W 3 ph, 3 W 3 ph, 4 W
		Effect of self-heating	IS 13779: 1999 (RA 2004) Cl. 12.7.4 IS 14697: 1999 (RA 2004) Cl. 12.7.4 CBIP Publication No. 304 Cl. 5.4.4 IEC 62052-11: 2003 IEC 62053-21: 2003 Cl. 7.3 IEC 62053-22: 2003 Cl. 7.3 IEC 62053-23: 2003 Cl. 7.3 IS 15884: 2010 Cl. 5.4.4	Upto 480 V 10 mA to 120 A 1 ph, 2 W 3 ph, 3 W 3 ph, 4 W
2.	Electrical and Electronic (Static) Energy Meters / Prepayment Meters and Tariff and Load Control equipment Electrical / Electronic Equipment	Test of meter constant	IS 15707: 2006 IS 13779: 1999 (RA 2004) Cl. 12.15 IS 14697: 1999 (RA 2004) Cl. 12.14 CBIP Publication No. 304 Cl. 5.6.6 IEC 62052-11: 2003 IEC 62053-21: 2003 Cl. 8.4 IEC 62053-22: 2003 Cl. 8.4 IEC 62053-23: 2003 Cl. 8.4 IS 15884: 2010 Cl. 5.6.5	Upto 480 V 10 mA to 120 A 1 ph, 2 W 3 ph, 3 W 3 ph, 4 W

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Location: 1**Electrical and Electronic (Static) Energy Meters / Prepayment Meters and Tariff and Load Control equipment Electrical / Electronic Equipment**

Starting	IS 15707: 2006 IS 13779: 1999 (RA 2004) Cl. 12.15 IS 14697: 1999 (RA 2004) Cl. 12.14 CBIP Publication No. 304 Cl. 5.6.6 IEC 62052-11: 2003 IEC 62053-21: 2003 Cl. 8.4 IEC 62053-22: 2003 Cl. 8.4 IEC 62053-23: 2003 Cl. 8.4 IS 15884: 2010 Cl. 5.6.5	Upto 200 mA Upto 480 V 10 mA to 120 A 1 ph, 2 W 3 ph, 3 W 3 ph, 4 W
Running with no Load / Test of no-Load condition	IS 15707: 2006 IS 13779: 1999 (RA 2004) Cl. 12.15 IS 14697: 1999 (RA 2004) Cl. 12.14 CBIP Publication No. 304 Cl. 5.6.6 IEC 62052-11: 2003 IEC 62053-21: 2003 Cl. 8.4 IEC 62053-22: 2003 Cl. 8.4 IEC 62053-23: 2003 Cl. 8.4 IS 15884: 2010 Cl. 5.6.5	Upto 480 V
Test of Influence Quantities: -Frequency Variation -Reverse Ph Sequence -Voltage variation -Waveform 10% of 3 rd harmonic in current -Voltage unbalance -Harmonic components in the voltage and current circuits	IS 13779: 1999 (RA 2004) Cl. 12.11 IS 14697: 1999 (RA 2004) Cl. 12.10 CBIP Publication No. 304 Cl. 5.6.2 IEC 62052-11: 2003 IEC 62053-21: 2003 Cl. 8.2 IEC 62053-22: 2003 Cl. 8.2 IEC 62053-23: 2003 Cl. 8.2 IS 15884: 2010 Cl. 4.6.2	45 to 55 Hz Upto 480 V 10 mA to 120 A 1 ph, 2 W 3 ph, 3 W 3 ph, 4 W

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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
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Location: 1

Electrical and Electronic (Static) Energy Meters / Prepayment Meters and Tariff and Load Control equipment Electrical / Electronic Equipment	Power loss / power consumption	IS 15707: 2006 IS 13779: 1999 (RA 2004) Cl. 12.15 IS 14697: 1999 (RA 2004) Cl. 12.14 CBIP Publication No. 304 Cl. 5.6.6 IEC 62052-11: 2003 IEC 62053-21: 2003 Cl. 8.4 IEC 62053-22: 2003 Cl. 8.4 IEC 62053-23: 2003 Cl. 8.4 IS 15884: 2010 Cl. 5.6.5	Upto 20 W Upto 30 VA
	Heating / Test of influence of heating	IS 13779: 1999 (RA 2004) Cl. 12.11 IS 14697: 1999 (RA 2004) Cl. 12.10 CBIP Publication No. 304 Cl. 5.6.2 IEC 62052-11: 2003 IEC 62053-21: 2003 Cl. 8.2 IEC 62053-22: 2003 Cl. 8.2 IEC 62053-23: 2003 Cl. 8.2 IS 15884: 2010 Cl. 4.6.2	Upto 480 V 10 mA to 120 A 1 ph, 2 W 3 ph, 3 W 3 ph, 4 W
	Mechanical Test of meter case / Spring hammer Test	IS 13779: 1999 (RA 2004) Cl. 12.3.3 IS 14697: 1999 (RA 2004) Cl. 12.3.3 CBIP Publication No. 304 Cl. 5.2.1 IEC 62052-11: 2003 Cl. 5.2.2.1 IEC 62053-21: 2003 Cl. 5.2.2.1 IEC 62053-22: 2003 Cl. 5.2.2.1 IEC 62053-23: 2003 Cl. 5.2.2.1 IS 15884: 2010 Cl. 5.2.1	0.22 Nm 0.2 J ± 0.02 J

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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
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Location: 1

Electrical and Electronic (Static) Energy Meters / Prepayment Meters and Tariff and Load Control equipment Electrical / Electronic Equipment	Repeatability of error Test	IS 15707: 2006, IS 13779: 1999 (RA 2004) Cl. 12.17 IS 14697: 1999 (RA 2004) Cl. 12.16 of CBIP Publication No. 304 Cl. 5.6.9 IS 15884: 2010 Cl. 5.6.7	Upto 480 V 10 mA to 120 A 1 ph, 2 W 3 ph, 3 W 3 ph, 4 W
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II. TRANSFORMERS AND REACTORS

1 Current Transformers	Verification of terminal marking and polarity	IS 2705 (Part 1): 1992 Cl. 9.2 IEC 61869-1: 2007-10 Cl. 7.3.6	Qualitative
	Measurement of winding Resistance	IS 2705 (Part 4): 1992 Cl. 6.2 IEC 61869-2: 2012-09 Cl. 7.3.201	100 $\mu\Omega$ to 20 k Ω
	Temperature rise Test	IS 2705 (Part 1): 1992 Cl. 9.7 IEC 61869-1: 2007-10 Cl. 7.2.2 IEC 61869-2: 2012-09 Cl. 7.2.2	1 A to 5000 A
	High voltage power frequency Test	IS 2705 (Part 1): 1992 Cl. 9.3 & 9.4 IEC 61869-1: 2007-10 Cl. 7.3.1, 7.3.3 & 7.3.4 IEC 61869-2: 2012-09 Cl. 7.3.1, 7.3.3 & 7.3.4	1 kV to 5 kV AC
	Over – voltage inter-turn Test	IS 2705 (Part 1): 1992 Cl. 9.5 IEC 61869-2: 2012-09 Cl. 7.3.204	0.1 A to 10 A

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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
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Location: 1

Current Transformers

Instrument Security factor	IS 2705 (Part 2): 1992 Cl. 7.1.2 IEC 61869-2: 2012-09 Cl. 7.2.6.202 & 7.5.2	Qualitative
Determination of errors according to the requirements of appropriate accuracy class.	IS 2705 (Part 2 & 3): 1992 Cl. 7.1.1 & 7.2.1 IEC 61869-1: 2007-10 Cl. 7.2.6 & 7.3.5 IEC 61869-2: 2012-09 Cl. 7.2.6 & 7.3.5	1 A to 5000 A
Composite error Measurement	IS 2705 (Part 3): 1992 Cl. 7.1.2 & 7.2.2 IEC 61869-2: 2012-09 Cl. 7.2.6.203 & 7.3.5.203	0.1 % to 10 %
Turns ratio Test	IS 2705 (Part 4): 1992 Cl. 6.3 IEC 61869-2: 2012-09 Cl. 7.3.5.206	1 to 4000
Measurement of knee point voltage & exciting Current	IS 2705 (Part 4): 1992 Cl. 6.1 IEC 61869-2: 2012-09 Cl. 7.3.203	0.1V to 8 kV
Measurement of Capacitance & Tan δ	IS 2705 (Part 1): 1992 Cl. 9.1.3(b) IEC 61869-1 (Edition 1.0): 2007-10 Cl. 7.4.3 IEC 61869-2 (Edition 1.0): 2012-09 Cl. 7.4.3	0.1 kV to 12 kV Capacitance: 0 to 100 μ F Tan δ : 0 to (\pm)9.9999

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Location: 1

2.	Voltage Transformers	Verification of terminal marking and polarity	IS 3156 (Part 1): 1992 Cl. 9.2 IEC 61869-1: 2007-10 Cl. 7.3.6	Qualitative
		Measurement of winding Resistance	IS 3156 (Part 1): 1992 Cl. 9.5 IEC 61869-1: 2007-10 Cl. 7.2.2 IEC 61869-3: 2011-07 Cl. 7.2.2	100 $\mu\Omega$ to 20 k Ω
		Determination of errors according to the requirements of appropriate accuracy class.	IS 3156 (Part 2): 1992 Cl. 8.1.1 & 8.2.1 IS 3156 (Part 3): 1992 Cl. 10.1.1.2, 10.1.2.1 IEC 61869-1: 2007-10 Cl. 7.2.6 & 7.3.5 IEC 61869-3: 2011-07 Cl. 7.2.6 & 7.3.5	110 V to 33 kV/110 V 110 V/rt(3) to 33 kV/ rt(3) /110 V/rt(3)
		High voltage power frequency Test	IS 3156 (Part 1): 1992 Cl. 9.3 & 9.4 IEC 61869-1: 2007-10 Cl. 7.3.1, 7.3.3, 7.3.4 IEC 61869-3: 2011-07 Cl. 7.3.3, 7.3.4	0 to 5 kV AC
		Separate source voltage withstand Test	IS 3156 (Part 1): 1992 Cl. 9.3.1.1 & 9.3.2.1 IEC 61869-3: 2011-07 Cl. 7.3.1.302	0 to 5 kV AC

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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
<u>Location: 1</u>				
3.	Distribution/ Power transformers Dry type transformers	Measurement of winding Resistance	IS 2026 (Part 1): 2011 Cl. 10.1.1.a IS 1180 (Part 1): 1989 Cl. 22.4.a IS 1180 (Part 2): 1989 Cl. 21.4.a IS 11171: 1985 Cl. 13.2.a IEC 60076 (Part 1): 2011 Cl. 11.1.2.1.a IEC 60076 (Part 11): 2004-05 Cl. 15 IS 1180 (Part 1): 2014 Cl. 21.2.a	100 $\mu\Omega$ to 20 k Ω
		Measurement of voltage ratio and check of voltage vector relationship/phase displacement	IS 2026 (Part 1): 2011 Cl. 10.1.1.b IS 1180 (Part 1): 1989 Cl. 22.4.b IS 1180 (Part 2): 1989 Cl. 21.4.b IS 11171: 1985 Cl. 13.2.b IEC 60076 (Part 1): 2011 Cl. 11.1.2.1.b IEC 60076 (Part 11): 2004-05 Cl. 16 IS 1180 (Part 1): 2014 Cl. 21.2.b	1 to 4000
		Measurement of impedance voltage/short circuit impedance and Load loss.	IS 2026 (Part 1): 2011 Cl. 10.1.1.c IS 1180 (Part 1): 1989 Cl. 22.4.c IS 1180 (Part 2): 1989 Cl. 21.4.c IS 11171: 1985 Cl. 13.2.c IEC 60076 (Part 1): 2011 Cl. 11.1.2.1.c IEC 60076 (Part 11): 2004-05 Cl. 17 IS 1180 (Part 1): 2014 Cl. 21.2.c	1 kVA to 100 mVA, HV: 3.3 kV to 220 kV & LV: 250 V to 33 kV

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Location: 1

**Distribution/
Power
transformers
Dry type
transformers**

Measurement of no Load loss and current

IS 2026 (Part 1): 2011 Cl. 10.1.1.d
IS 1180 (Part 1): 1989 Cl. 22.4.d
IS 1180 (Part 2): 1989 Cl. 21.4.d
IS 11171: 1985 Cl. 13.2.d
IEC 60076 (Part 1): 2011 Cl. 11.1.2.1.d
IEC 60076 (Part 11): 2004-05 Cl. 18
IS 1180 (Part 1): 2014 Cl. 21.2.d

1 kVa to 100 mVa,
HV: 3.3 kV to 220 kV &
LV: 250 V to 33 kV

Measurement of insulation Resistance

IS 2026 (Part 1): 2011 Cl. 10.1.3.j
IS 1180 (Part 1): 1989 Cl. 22.4.e
IS 1180 (Part 2): 1989 Cl. 21.4.e
IEC 60076 (Part 1): 2011 Cl. 11.1.2.2.b
IS 1180 (Part 1): 2014 Cl. 21.2.e

250 V to 10 kV DC
1kΩ to 1 TΩ

Temperature rise Test

IS 2026 (Part 1): 2011 Cl. 10.1.2.a
IS 1180 (Part 1): 1989 Cl. 22.3.j
IS 1180 (Part 2): 1989 Cl. 21.3.j
IS 11171: 1985 Cl. 13.1.h
IEC 60076 (Part 1): 2011 Cl. 11.1.3.a
IEC 60076 (Part 11): 2004-05 Cl. 23
IS 1180 (Part 1): 2014 Cl. 21.3.b

1 kVa to 100 mVa,
HV: 3.3 kV to 220 kV &
LV: 250 V to 33 kV

Measurement of zero sequence impedance for 3Ø transformer

IS 2026 (Part 1): 2011 Cl. 10.7
IEC 60076 (Part 1): 2011 Cl. 11.1.4.f

1 kVa to 100 mVa,
HV: 3.3 kV to 220 kV &
LV - 250V to 33 kV

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Location: 1				
	Distribution/ Power transformers Dry type transformers	Air pressure Test	IS 1180 (Part 1): 1989 Cl. 22.3.m IS 1180 (Part 2): 1989 Cl. 21.4.h/3.m CBIP pub no: 295 Mar: 2006 IS 1180 (Part 1): 2014 Cl. 21.2.h & 21.3.d	1 kVa to 100 mVa, HV: 3.3 kV to 220 kV & LV: 250V to 33 kV
		Unbalanced current Test	CBIP publication no: 275 Oct: 1999	1 kVa to 100 mVa, HV: 3.3 kV to 220 kV & LV: 250V to 33 kV
		Magnetic balance	CBIP pub no: 295 Mar: 2006 CBIP pub no: 317 April: 2013	1 kVa to 100 mVa, HV: 3.3 kV to 220 kV & LV: 250 V to 33 kV
		Vacuum Test	CBIP pub no: 295 March: 2006 CBIP pub no: 317 April: 2013 IS 1180 (Part 1): 2014 Cl. 21.3.d	1 kVa to 100 mVa, HV: 3.3 kV to 220 kV & LV: 250 V to 33 kV
		Oil leakage Test	IS 1180 (Part 1): 2014 Cl. 21.2.j CBIP pub no: 317 April: 2013	1 kVa to 100 mVa, HV: 3.3 kV to 220 kV & LV: 250 V to 33 kV
		Measurement of Capacitance & Tan δ	IS 2026 (Part 1): 2011 Cl. 10.1.3(b) & (j) IEC 60076 – 1 (Edition 3.0): 2011-04 Cl. 11.1.4(c)& (d)	0.1 kV to 12 kV Capacitance: 0 to 100 μF Tan δ: 0 to (±)9.9999

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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
<u>Location: 1</u>				
4.	Potential Transformers	Measurement of Capacitance & Tan δ	IEC 61869-1 (Edition 1.0): 2007-10 Cl. 7.4.3 IEC 61869-3 (Edition 1.0): 2011-07 Cl. 7.4.3	0.1 kV to 12 kV Capacitance: 0 to 100 μ F Tan δ : 0 to (\pm)9.9999
5.	Pre & Post Test of Current Transformer	Verification Of Terminal Marking & Polarity	IS 2705 (Part 1): 1992 Cl.9.2 IEC 61869-2: 2012 Cl.6.13.201	Qualitative
		Accuracy Test (Ratio Error & Phase Angle Error)	IS 2705 (Part 1, 2 & 3): 1992 Cl.7.1.1 IEC 61869-2: 2012 Cl.7.3.5 and Cl. 3.4.4	Accuracy Class 0.1 to 5, 1A to 3200A
		Turns Ratio	IS 2705 (Part 4): 1992 Cl.6.3 IEC 61869-2: 2012 Cl.7.3.5	1A to 3200A
		Secondary Winding Resistance	IS 2705 (Part 4): 1992 Cl.6.2 IEC 61869-2: 2012 Cl.7.3.201	100 μ Ω to 1200 Ω , 0.01A to 50A
		Knee Point Voltage & Exciting Current	IS 2705 (Part 4): 1992 Cl.6.1 IEC 61869-2: 2012 Cl.7.3.203	20V to 750V, 220V to 2200V, 20mA to 10A
		Instrument Security Current Test	IS 2705 (Part 2): 1992 Cl.7.1.2 IEC 61869-2: 2012 Cl.7.2.6.202	20V to 750V, 220V to 2200V, 20mA to 10A 100 μ Ω to 1200 Ω , 0.01A to 50A

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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
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AT LABORATORY

Location: 2

I. TRANSFORMER AND REACTORS

1. Current Transformer	Lightning Impulse Voltage Test	IS 2705: 1992 Cl. 9.8 IEC 61869-1: 2007 IEC 61869-2: 2012 IEC 61869-4: 2013 Cl. 7.2.3.2 IEEE Std.C.57.13: 2008 Cl. 4.7	5 kVp to 1600 kVp, 80 kJ
	Chopped Impulse Voltage Withstand Test	IS 2705: 1992 Cl. 9.10 IEC 61869-1: 2007 IEC 61869-2: 2012 IEC 61869-4: 2013 Cl. 7.4.1 IEEE Std.C.57.13: 2008 Cl. 4.7	5 kVp to 1600 kVp, 80 kJ
	Multiple Chopped Impulse Test	IEC 61869-1: 2007 IEC 61869-2: 2012 Cl. 7.4.2	5 kVp to 1600 kVp, 80 kJ.
	Switching Impulse Voltage Test (Dry/Wet)	IS 2705: 1992 Cl. 9.11 IEC 61869-1: 2007 IEC 61869-2: 2012 IEC 61869-4: 2013 Cl. 7.2.3.3 IEEE Std.C.57.13: 2008 Cl. 4.7	5 kVp to 1200 kVp, 80 kJ.
	Radio Interference Voltage Test	IEC 61869-1: 2007 IEC 61869-2: 2012 Cl. 7.2.5.1	1 kV to 700 kV AC
	Transmitted Over Voltage Test (Upto 400 kV)	IEC 61869-1: 2007 IEC 61869-2: 2012 Cl. 7.4.4	10 Vp to 100 kVp, 80 kJ

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Location: 2

	Current Transformer	Dry Power Frequency Voltage Withstand Test	IS 2705: 1992 Cl. 9.3 IEC 61869-1: 2007 IEC 61869-2: 2012 IEC 61869-4: 2013 Cl. 7.3.1 IEEE Std.C.57.13: 2008 Cl. 4.7	1 kV to 700 kV AC
		Wet Power Frequency Voltage Withstand Test	IS 2705: 1992 Cl. 9.9 IEC 61869-1: 2007 IEC 61869-2: 2012 IEC 61869-4: 2013 Cl. 7.2.4 IEEE Std.C.57.13: 2008 Cl. 4.7	1 kV to 700 kV AC
		Visible Corona Test	As per customer's requirement	1 kV to 700 kV AC
		Short-time Current Test	IS 2705-1: 1992 IEC 61869-2: 2012	0.1 kA to 120 kA for 0.2 s or 70 kA for 3s
2.	Potential Transformer	Lightning Impulse Voltage Test	IS 3156: 1992 Cl. 9.6 IEC 61869-1: 2007 IEC 61869-3: 2011 IEC 61869-4: 2013 IEC 61869-5: 2011 IEC 60044-5: 2011 Cl. 7.2.3.2 IEEE Std.C.57.13: 2008 Cl. 4.7	5 kVp to 1600 kVp, 80 kJ.
		Chopped Impulse Voltage Withstand Test	IS 3156: 1992Cl. 9.8 IEC 61869-1: 2007 IEC 61869-3: 2011 IEC 61869-5: 2011Cl. 7.4.1 IEEE Std.C.57.13: 2008 Cl. 4.7	5 kVp to 1600 kVp, 80 kJ.

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<u>Location: 2</u>				
	Potential Transformer	Multiple Chopped Impulse Test	IEC 61869-1: 2007 IEC 61869-3: 2011 Cl. 7.4.2	5 kVp to 1600 kVp, 80 kJ.
		Switching Impulse Voltage Test (Dry/Wet)	IS 3156: 1992 Cl. 9.10 IEC 61869-1: 2007 IEC 61869-3: 2011 IEC 61869-5: 2011 Cl. 7.2.3.3 IEEE Std.C.57.13: 2008 Cl. 4.7	5 kVp to 1200 kVp, 80 kJ.
		Radio Interference Voltage Test	IEC 61869-1: 2007 IEC 61869-3: 2011 IEC 61869-5: 2011 Cl. 7.2.5.1	1 kV to 700 kV AC
		Transmitted Over Voltage Test (Upto 400 kV)	IEC 61869-1: 2007 IEC 61869-3: 2011 IEC 61869-5: 2011 Cl. 7.4.4	10 Vp to 100 kVp, 80 kJ.
		Dry Power Frequency Voltage Withstand Test	IS 3156: 1992 Cl. 9.3 IEC 61869-1: 2007 IEC 61869-3: 2011 IEC 61869-4: 2013 Cl. 7.3.1 IEEE Std.C.57.13: 2008 Cl. 4.7	1 kV to 700 kV AC
		Wet Power Frequency Voltage Withstand Test	IS 3156: 1992 Cl. 9.7 IEC 61869-1: 2007 IEC 61869-3: 2011 IEC 61869-4: 2013 Cl. 7.2.4 IEEE Std.C.57.13: 2008 Cl. 4.7	1 kV to 700 kV AC
		Visible Corona Test	As per customer's requirement	1 kV to 700 kV AC

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<u>Location: 2</u>				
3.	Distribution/ Power/ Dry Type Transformer	Lightning Impulse Voltage Test	IS 2026-3: 2009 IS 1180-1: 2014 IS 11171: 1985 Cl. 13, 14, 21.3(a) & 16 IEC 60076-3: 2013 IEC 60076-11: 2004 Cl. 13 & 21 IEEE 57.12.90: 2010 Cl. 10.5 IEEE 57.12.60: 2009 Cl. 10.5	5 kVp to 1600 kVp, 80 kJ.
		Switching Impulse Voltage Test	IS 2026-3– 2009, Cl. 15 IEC 60076-3: 2013 IEC 60076-11: 2004 Cl. 14 IEEE 57.12.90: 2010 Cl. 10.6 IEEE 57.12.60: 2009 Cl. 3.8	5 kVp to 1200 kVp, 80 kJ.
4.	Reactor	Lightning Impulse Voltage Test	IS 5553-3: 1990 IS 5553-4: 1989 Cl. 9.10 & 8.9 IEC 60076-4: 2002 IEC 60289-4: 1988 Cl. 13 & 17.10	5 kVp to 1600 kVp, 80 kJ.
5.	Lightning Arrester	Lightning Impulse Residual Voltage Test at 500 A.	IS 3070–3: 1993 Cl. 6.4.2 IEC 60099-4: 2014 Cl. 8.3.2	5 kVp to 1600 kVp, 80 kJ.
		Measurement of Power Frequency Voltage at Reference Current	IS 3070–3: 1993 Cl. 5.3 IEC 60099-4: 2014 Cl. 9.2.1	1 kV to 700 kV AC

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<u>Location: 2</u>				
6.	Pre & Post Test of Transformer	Induced AC Voltage Test	IS1180 (Part 1): 1989 Cl. 22.4 IS 1180 (Part 2): 1989 Cl. 21.4 IS 2026 (Part 1): 2011 Cl. 10.1.1 IS 11171: 1985 Cl. 13.2 IEC 60076-1: 2011 Cl. 11.1.2.1 IS 3151: 1982 Cl. 6.1.2 IS 1180 (Part 1): 2014 Cl. 21.2	50Hz to 1000Hz. 0 to 750V
		Separate Source AC Withstand Voltage Test	IS 1180 (Part 1): 2014 Cl. 21.2 IS 2026 (Part 1): 2011 Cl. 10.1.1 IS 11171: 1985 Cl. 13.2 IEC 60076-1: 2011 Cl. 11.1.2.1 IS 3151: 1982 Cl. 6.1.2 IS 1180 (Part 1): 1989 Cl. 22.4 IS 1180 (Part 2): 1989 Cl. 21.4	0.5 kV to 100 kV, 2 mA to 100mA
		Measurement of Winding Resistance	IS 2026 (Part 1): 2011 Cl.10.1.1 IS 11171: 1985 Cl.13.2 IEC 60076-1: 2011 Cl. 11.1.2.1 IS 3151: 1982 Cl.6.1.2 IS1180 (Part 1): 2014 Cl.21.2 IS 1180 (Part 1): 1989 Cl.22.4 IS 1180 (Part 2): 1989 Cl.21.4	100 $\mu\Omega$ to 1200 Ω , 0.01A to 50 A
		Measurement of Short-Circuit Impedance and Load Loss	IS 2026 (Part 1): 2011 Cl.10.1.1 IS 11171: 1985 Cl.13.2 IEC 60076-1: 2011 Cl.11.1.2.1 IS 3151: 1982 Cl.6.1.2 IS1180 (Part 1): 2014 Cl.21.2 IS 1180 (Part 1): 1989 Cl.22.4 IS 1180 (Part 2): 1989 Cl.21.4	1.5V- 1000 V, 0.05A-30A, 45 Hz.-55 Hz., Cos ϕ = 0.05 lag-0.8lead

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Location: 2

Pre & Post Test of Transformer	Measurement of No-Load Loss and Current	IS 2026 (Part 1): 2011 Cl.10.1.1 IS 11171: 1985 Cl.13.2 IEC 60076-1: 2011 Cl.11.1.2.1 IS 3151: 1982 Cl.6.2.1 IS 1180 (Part 1): 2014 Cl.21.2 IS1180 (Part 1): 1989 Cl.22.4 IS1180 (Part 2): 1989 Cl.21.4	1.5V- 1000 V, 0.05A-30A, 45 Hz.-55 Hz., Cosφ= 0.05 lag-0.8lead
	Measurement of Voltage Ratio and Check of Phase Displacement	IS 2026 (Part 1): 2011 Cl.10.1.1 IS 11171: 1985 Cl.13.2 IEC 60076-1: 2011 Cl.11.1.2.1 IS 3151: 1982 Cl.6.1.2 IS 1180 (Part 1): 2014 Cl.22.4 IS 1180 (Part 1): 1989 Cl.22.4 IS 1180 (Part 2): 1989 Cl.21.4	2 to 13000
	Insulation Resistance Measurement	IS 2026 (Part 1): 2011 Cl.10.1.1 IS 11171: 1985 Cl.13.2 IEC 60076-1: 2011 Cl.11.1.2.1 IS 3151: 1982 Cl.6.1.2. IS 1180 (Part 1): 2014 Cl.21.2 IS 1180 (Part 1): 1989 Cl.22.4 IS 1180 (Part 2): 1989 Cl.21.4	250 V to 5.0 kV, 10 MΩ to 1000 GΩ
	Induce Overvoltage	IS 1180-1: 2014 Cl. 12.1	50V to 22kV,100Hz
	Withstand Test	IS 1180-2: 1989 Cl. 12.1 IS 2026-3: 2009Cl. 12.1 IS 11171: 1985 Cl. 12.1 IEC 60076-3: 2013 Cl. 11.2	50V to 22kV,100Hz

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<u>Location: 2</u>				
	Pre & Post Test of Transformer	High Voltage Test	IS 1180-1: 2014 Cl. 11 IS 1180-2: 1989 Cl. 11 IS 2026-3: 2009 Cl. 11 IS 11171: 1985 Cl. 11 IEC 60076-3: 2013 Cl. 10	1kV to 100kV, 300mA
		Measurement of Winding Resistance	IS 1180-1: 2014 Cl. 10.2 IS 1180-2: 1989 Cl. 10.2 IS 2026-1: 2011 Cl. 10.2 IS 11171: 1985 Cl. 10.2 IEC 60076-1: 2011 Cl. 11.2	0.1Ω to 20kΩ
		Load Loss Test	IS 1180-1: 2014 Cl. 10.4 IS 1180-2: 1989 Cl. 10.4 IS 2026-1: 2011 Cl. 10.4 IS 11171: 1985 Cl. 10.4 IEC 60076-1: 2011 Cl. 11.4	50V to 3000V 100A
		No-Loss Test	IS 1180-1: 2014 Cl. 10.5 IS 1180-2: 1989 Cl. 10.5 IS 2026-1: 2011 Cl. 10.5 IS 11171: 1985 Cl. 10.5 IEC 60076-1: 2011 Cl. 11.5	50 V to 11 kV, 100A
		Voltage Ratio & Vector Group	IS 1180-1: 2014 Cl. 10.3 IS 1180-2: 1989 Cl. 10.3 IS 2026-1: 2011 Cl. 10.3 IS 11171: 1985 Cl. 10.3 IEC 60076-1: 2011 Cl. 11.3	Ratio: 1 to 9999.9

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<u>Location: 2</u>				
	Pre & Post Test of Transformer	Terminal Marking & Polarity	IS 2705-1: 1992 IEC 61869-2: 2012	5A to 3200A Primary Current
		Accuracy Test (Ratio Error & Phase Angle Error)	IS 2705-1: 1992 Cl. 3.3 IS 2705-2: 1992 Cl. 3.3 IS 2705-3: 1992 Cl. 3.3 IEC 61869-2: 2012 Cl. 7.3.5.201	Accuracy class 0.2S to 5S, 5A to 3200A Primary Current
		Measurement Of Turn Ratio Error	IS 2705-4: 1992 Cl. 6.3 IEC 61869-2: 2012 Cl. 7.3.5.206	1A to 3200A
		Measurement of Winding Resistance	IS 2705-4: 1992 Cl. 6.2 IEC 61869-2: 2012 Cl. 7.3.201	100 $\mu\Omega$ to 1200 Ω , 0.01A to 50A
		Knee Point Voltage & Excitation Current Transformer	IS 2705-4: 1992 Cl. 6.1 IEC 61869-2: 2012 Cl. 7.3.203	20V to 750V, 220V to 2200V, 20mA to 10A
		Measurement ISF	IS 2705-2: 1992 Cl. 7.1.2 IEC 61869-2: 2012 Cl. 7.2.6.202	20V to 750V, 220V to 2200V, 20mA to 10A 100 $\mu\Omega$ to 1200 Ω , 0.01A to 50A
		Measurement of Composite Error	IS 2705-3: 1992 Cl. 7.1.2 IEC 61869-2: 2012 Cl. 7.3.5.203	20V to 750V, 220V to 2200V, 20mA to 10A 100 $\mu\Omega$ to 1200 Ω , 0.01A to 50A

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Pre & Post Test of Transformer	High Voltage Test	IS2705-1: 1992 Cl. 9.3,9.4 IEC 61869-2: 2012 Cl. 7.3.1,7.3.4	0.5 kV to 100kV, 0 to 100mA
	Induce Overvoltage Interturn Test	IS 2705-1: 1992 Cl. 9.5 IEC 61869-2: 2012 Cl. 7.3.204	20V to 750V, 220V to 2200V, 20mA to 10A

II. POWER CAPACITORS

1. L.T. / H.T. Power Capacitor	Lightning Impulse Voltage Test	IS 13340-1: 2012, IS 13585-1: 2012, IS 11530: 1985 Cl. 15,15.7.8 IEC 60831-1: 2014, IEC 60871-1: 2014 Cl. 15 & 15.1 CSA C22.2 NO.190-M1985 Cl. 6.2.4	5 kVp to 500 kVp, 80 kJ.
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III. CABLES AND ACCESSORIES

1. H.T.XLPE Cable Single/ Three Core	Lightning Impulse Voltage Test	IS 7098-2: 2011 Cl. 19.6 IEC 60502 -1: 2009 IEC 60502 -2: 2014 IEC 60502 -4: 2010 IEC 60840: 2011 Cl. 17.4 18.2.4 8 & 12.4.7	5 kVp to 1050 kVp, 80 kJ.
2. H.T.PVC Cable Single/ Three Core	Lightning Impulse Voltage Test	IS 1554-2: 1988 Cl. 19.6	5 kVp to 1050 kVp, 80 kJ.
3. H.T. Elastomer Cable Single/ Three Core	Lightning Impulse Voltage Test	IS 9968-2: 2002 Cl. 23.6	5 kVp to 1050 kVp, 80 kJ.

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	Insulators	Lightning Impulse Voltage Test	IS 731: 1971 IS 2544: 1973, IS 9431: 1979 Cl. 10.3 9.3 & 9.2 IEC 60168: 2001, IEC 61109 : 2008 IEC 60383-1: 1993 IEC 60383-2: 1993 IEC 60660: 1999 Cl. 4.5,11.1,13,9, & 3.3	5 kVp to 1600 kVp, 80 kJ.
		Lightning Impulse Voltage Flashover Test	IS 731: 1971 IS 2544: 1973, IS 9431: 1979 Cl. 10.3.5,9.3.6,9.2.3 IEC 60168: 2001, IEC 60383-1: 1993 IEC 60383-2: 1993 Cl. 4.5.2,13, & 9	5 kVp to 1600 kVp, 80 kJ.
		Switching Impulse Voltage Test (Dry/Wet)	IEC 60168: 2001, IEC 61109 : 2008 IEC 60383-1: 1993 IEC 60383-2: 1993 Cl. 4.6, 11.1, & 11	5 kVp to 1200 kVp, 80 kJ.
		Dry Power Frequency Voltage Withstand Test	IS 2544: 1973, IS 9431: 1979 IS 5300: 1969 Cl. 9.4,9.3, & 7.2 IEC 60168: 2001, IEC 62217: 2012 IEC 60660: 1999 Cl. 4.7,9.2.7.4 & 3.4	1 kV to 700 kV AC

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Location: 2**Insulators**

Wet Power Frequency
Voltage Withstand Test

IS 731: 1971
IS 2544: 1973,
IS5300: 1969 Cl. 10.4,9.5,7.3
IEC 60168: 2001,
IEC 61109 : 2008
IEC 60383-1: 1993
IEC 60383-2: 1993
Cl. 4.8,11.1,14, & 10

1 kV to 700 kV AC

Dry Power Frequency
Voltage Flashover Test

IS 2544: 1973,
IS 9431: 1979 Cl. 9.4.4 & 9.3
IEC 60168: 2001,
IEC 62217: 2012 Cl. 4.7. & 9.2.4

1 kV to 700 kV AC

Wet Power Frequency
Voltage Flashover Test

IS 731: 1971
IS 2544: 1973, Cl. 10.4. & 9.5.5
IEC 60168: 2001,
IEC 60383-1: 1993
IEC 60383-2: 1993 Cl. 4.8,14 & 10

1 kV to 700 kV AC

Power Frequency Puncture
Voltage Test

IS 731: 1971
IS 2544: 1973 Cl. 10.10 & 9.9
IEC 60168: 2001, Cl. 4.9

1 kV to 300 kV AC

Radio Interference Voltage
Test

IS 8263: 1976 Cl. 5
IEC 60437: 1997 Cl. 13

1 kV to 700 kV AC

Visible Corona Test

As per customer's requirement

1 kV to 700 kV AC

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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
<u>Location: 2</u>				
5.	Bushing	Lightning Impulse Voltage Test	IS 2099: 1986 Cl. 11.4 IEC 60137: 2008 Cl. 8.3	5 kVp to 1600 kVp, 80 kJ.
		Switching Impulse Voltage Test (Dry/Wet)	IS 2099: 1986 Cl. 11.5 IEC 60137: 2008 Cl. 8.4	5 kVp to 1200 kVp, 80 kJ.
		Dry Power Frequency Voltage Withstand Test	IS 2099: 1986 IS 7421: 1988 Cl. 11.13 & 11.4 IEC 60137: 2008 Cl. 8.1	1 kV to 700 kV AC
		Wet Power Frequency Voltage Withstand Test	IS 2099: 1986 IS 7421: 1988 Cl. 11.3 & 11.5 IEC 60137: 2008 Cl. 8.1	1 kV to 700 kV AC
		Electrical Routine Test	IS 5621: 1980 Cl. 3.3 IEC 62155: 2003 Cl. 10.4	1 kV to 700 kV AC
		Radio Interference Voltage	IEC 60437: 1997 Cl. 13	1 kV to 700 kV AC
		Visible Corona Test	As per customer's requirement	1 kV to 700 kV AC
6.	Air Break Switch	Lightning Impulse Voltage Test	IS 9920-1: 2002 IS 9920-4: 1985 Cl. 6.2 & 3.1.6 IEC 60265- 1: 1998 IEC 62271-103: 2011 Cl. 6	5 kVp to 1600 kVp, 80 kJ.
		Dry Power Frequency Voltage Withstand Test	IS 9920-1: 2002 IS 9920-4: 1985 Cl. 6.2 & 3.1.8	1 kV to 700 kV AC
		Wet Power Frequency Voltage Withstand Test	IS 9920-1: 2002 IS 9920-4: 1985 Cl. 6.2 ,3.1.8	1 kV to 700 kV AC

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Location: 2

7.	Horn Gap Fuse, Drop Out Fuse	Lightning Voltage Test	IS 9385-2: 1980 Cl. 7.3.5	5 kVp to 1600 kVp, 80 kJ
		Dry Power Frequency Voltage Withstand Test	IS 9385-2: 1980 Cl. 7.3.6	1 kV to 700 kV AC
		Wet Power Frequency Voltage Withstand Test	IS 9385-2: 1980 Cl. 7.3.7	1 kV to 700 kV AC
8.	Disconnecter (Isolator) and Earth Switch	Lightning Impulse Voltage Test	IS 9921-4: 1985 Cl. 3.1.6 IEC 62271-203: 2011 IEC 62271-102: 2013 IEC 62271-1: 2011 Cl. 6.2	5 kVp to 1600 kVp, 80 kJ.
		Switching Impulse Voltage Test (Dry/Wet)	IS 9921-4: 1985 Cl. 3.1.7 IEC 62271-203: 2011 IEC 62271-102: 2013 IEC 62271-1: 2011 Cl. 6.2	5 kVp to 1200 kVp, 80 kJ.
		Dry Power Frequency Voltage Withstand Test	IS 9921-4: 1985 Cl. 3.1.8 IEC 62271-203: 2011 IEC 62271-102: 2013 IEC 62271-1: 2011 Cl. 6.2	1 kV to 700 kV AC
		Wet Power Frequency Voltage Withstand Test	IS 9921-4: 1985 Cl. 3.1.8 IEC 62271-203: 2011 IEC 62271-102: 2013 IEC 62271-1: 2011 Cl. 6.2	1 kV to 700 kV AC
		Radio Interference Voltage Test	IEC 62271-203: 2011 IEC 62271-102: 2013 IEC 62271-1: 2011 Cl. 6.3	1 kV to 700 kV AC
		Visible Corona Test	As per customer's requirement	1 kV to 700 kV AC

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Location: 2

VI. HIGH VOLTAGE TEST FACILITY

1. High Voltage Insulating Material (Cable Boot, Ladder, Earthing Rod, Silicone Rubber Tube)	Lightning Impulse Voltage Test	IS 2071-1: 1993 IS 2071-2: 1974, Cl. 20 & 4.3 IEC 60060-1: 2010 IEC 60060-2: 2010 Cl. 7	5 kVp to 1600 kVp, 80 kJ.
	Lightning Impulse Voltage Flashover Test	IS 2071-1: 1993 IS 2071-2: 1974, Cl. 20 & 4.3 IEC 60060-1: 2010 IEC 60060-2: 2010 Cl. 7	5 kVp to 1600 kVp, 80 kJ.
	Switching Impulse Voltage Withstand Test (Dry/Wet)	IS 2071-1: 1993 IS 2071-2: 1974, Cl. 23 & 5 IEC 60060-1: 2010 IEC 60060-2: 2010 Cl. 8	5 kVp to 1600 kVp, 80 kJ.
	Switching Impulse Voltage Flashover Test (Dry/Wet)	IS 2071-1: 1993 IS 2071-2: 1974, Cl. 23 & 5 IEC 60060-1: 2010 IEC 60060-2: 2010 Cl. 8	5 kVp to 1600 kVp, 80 kJ.
	Dry Power Frequency Voltage Withstand Test	IS 2071-1: 1993 IS 2071-2: 1974, Cl. 8 & 3.2 IEC 60060-1: 2010 IEC 60060-2: 2010 Cl. 6	1 kV to 700 kV AC
	Wet Power Frequency Voltage Withstand Test	IS 2071-1: 1993 IS 2071-2: 1974, Cl. 9 & 3.2 IEC 60060-1: 2010 IEC 60060-2: 2010 Cl. 4 & 6	1 kV to 700 kV AC

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Location: 2

High Voltage Insulating Material (Cable Boot, Ladder, Earthing Rod, Silicone Rubber Tube)	Dry Power Frequency Voltage Flashover Test	IS 2071-1: 1993 IS 2071-2: 1974, Cl. 17.2 & 3 IEC 60060-1: 2010 IEC 60060-2: 2010 Cl. 6.3	1 kV to 700 kV AC
	Wet Power Frequency Voltage Flashover Test	IS 2071-1: 1993 IS 2071-2: 1974, Cl. 17.2&3 IEC 60060-1: 2010 IEC 60060-2: 2010 Cl. 4 & 6	1 kV to 700 kV AC
Short Circuit Test	Thermal And Dynamic Ability to Withstand Short Circuit	IS 1180-1: 2014 Cl. 4 IS 1180-2: 1989 Cl. 4 IS 2026-5: 2011 Cl. 4 IS 11171: 1985 Cl. 20 IEC 60076-1: 2011 Cl. 4 IEC 60076-5: 2006 Cl. 4	5 kVA to 2.5 MVa for 11,22/0.433 kV & 5 kVA to 4 MVa, 33kV

VII. SWITCHGEAR EQUIPMENTS

1. Circuit Breaker	Lightning Impulse Voltage Test	IEC 62271-100: 2012 IEC 62271-1: 2011 IEC 62271-203: 2011 IEC 62271-106: 2011 Cl. 6.2.6.2,6.2.5.1	5 kVp to 1600 kVp, 80 kJ.
	Switching Impulse Voltage Test (Dry/Wet)	IEC 62271-100: 2012 IEC 62271-1: 2011 IEC 62271-203: 2011 Cl. 6.2.7.2	5 kVp to 1200 kVp, 80 kJ.

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<u>Location: 2</u>				
	Circuit Breaker	Dry Power Frequency Voltage Withstand Test	IEC 62271-100: 2012 IEC 62271-1: 2011 IEC 62271-203: 2011 IEC 62271-106: 2011 Cl. 6.2.6.1,6.2	1 kV to 700 kV AC
		Wet Power Frequency Voltage Withstand Test	IEC 62271-100: 2012 IEC 62271-1: 2011 IEC 62271-203: 2011 IEC 62271-106: 2011 Cl. 6.2.6.1,6.2.2	1 kV to 700 kV AC
		Radio Interference Voltage Test	IEC 62271-100: 2012 IEC 62271-1: 2011 IEC 62271-203: 2011 Cl. 6.3	1 kV to 700 kV AC
		Visible Corona Test	As per customer's requirement	1 kV to 700 kV AC
2.	H.T. Panel	Lightning Impulse Voltage Test	IEC 62271-200: 2011 IEC 62271-1: 2011 Cl. 6.2.6.2	5 kVp to 500 kVp, 80 kJ.
		Dry Power Frequency Voltage Withstand Test	IEC 62271-200: 2011 IEC 62271-1: 2011 Cl. 6.2.6.1	1 kV to 200 kV AC
		Wet Power Frequency Voltage Withstand Test	IEC 62271-200: 2011 IEC 62271-1: 2011 Cl. 6.2.6.1	1 kV to 200 kV AC
3.	ACBs & MCCBs	Service Short-Circuit Breaking Capacity Test	IS/IEC 60947-1: 2007 Cl. 8.3.4 IS/IEC 60947-2: 2003 Cl. 8.3.4 IEC 60947-1: 2014 Cl. 8.3.4 IEC 60947-2: 2013 Cl. 8.3.4	0.2 kA to 120 kA, 570 V

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<u>Location: 2</u>				
	ACBs & MCCBs	Ultimate Short-Circuit Breaking Capacity Test	IS/IEC 60947-1: 2007 Cl. 8.3.5 IS/IEC 60947-2: 2003 Cl. 8.3.5 IEC 60947-1: 2014 Cl. 8.3.5 IEC 60947-2: 2013 Cl. 8.3.5	0.2 kA to 120 kA, 570 V
		Short Circuit Breaking Capacity at Maximum Short-time Withstand Current Test	IS/IEC 60947-1: 2007 Cl. 8.3.6.4 IS/IEC 60947-2: 2003 Cl. 8.3.6.4 IEC 60947-1: 2014 Cl. 8.3.6.4 IEC 60947-2: 2013 Cl. 8.3.6.4	0.2 kA to 120 kA, 570 V
		Verification of Operational Capability	IS/IEC 60947-1: 2007 Cl. 8.3.8.4 IS/IEC 60947-2: 2003 Cl. 8.3.8.4 IEC 60947-1: 2014 Cl. 8.3.8.4 IEC 60947-2: 2013 Cl. 8.3.8.4	0.2 kA to 120 kA, 570 V
4.	ACBs, Switch-Disconnectors	Short-time Withstand Current Test	IS/IEC 60947-1: 2007 Cl. 8.3.6 IS/IEC 60947-2: 2003 Cl. 8.3.6 IS/IEC 60947-3: 1999 Cl. 8.3.5.1 IEC 60947-1: 2014 Cl. 8.3.6 IEC 60947-2: 2013 Cl. 8.3.6 IEC 60947-3: 2012 Cl. 8.3.5.1	0.2 kA to 120 kA for 1s or 70 kA for 3s
5.	ACBs	Over Load Performance	IS/IEC 60947-1: 2007 Cl. 8.3.3.4 IS/IEC 60947-2: 2003 Cl. 8.3.3.4 IEC 60947-1: 2014 Cl. 8.3.3.4 IEC 60947-2: 2013 Cl. 8.3.3.4	0.2 kA to 120 kA, 570 V
6.	Switch Disconnectors	Short Circuit Making Capacity Test	IS/IEC 60947-1: 2007 Cl. 8.3.5.2 IS/IEC 60947-3: 1999 Cl. 8.3.5.2 IEC 60947-1: 2014 Cl. 8.3.5.2 IEC 60947-3: 2012 Cl. 8.3.5.2	0.2 kA to 120 kA, 570 V

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Location: 2

7.	SFUs, FSUs, Switch-disconnectors, Switch disconnecter Fuse	Fuse Protected Short-Circuit Withstand	IS/IEC 60947-1: 2007 Cl. 8.3.6.2.1a IS/IEC 60947-3: 1999 Cl. 8.3.6.2.1a IEC 60947-1: 2014 Cl. 8.3.6.2.1a IEC 60947-3: 2012 Cl. 8.3.6.2.1a	0.2 kA to 120 kA,570 V
		Fuse Protected Short-Circuit Making	IS/IEC 60947-1: 2007 Cl. 8.3.6.2.1b IS/IEC 60947-3: 1999 Cl. 8.3.6.2.1b IEC 60947-1: 2014 Cl. 8.3.6.2.1b IEC 60947-3: 2012 Cl. 8.3.6.2.1b	0.2 kA to 120 kA,570 V
8.	Starters, Contactors & Combination Starters	Performance Under Short Circuit Conditions	IS/IEC 60947-1: 2007 Cl. 9.3.4 IS/IEC 60947-4-1: 2000 Cl. 9.3.4 IEC 60947-1: 2014 Cl. 9.3.4 IEC 60947-4-1: 2012 Cl. 9.3.4	0.2 kA to 120 kA,570 V
9.	SFUs & FSUs	Verification of Rated Fused Short-Circuit Current	IS/IEC 60947-1: 2007 Cl. 8.3.5.2 IS/IEC 60947-3: 1999 Cl. 8.3.5.2 IEC 60947-1: 2014 Cl. 8.3.5.2 IEC 60947-3: 2012 Cl. 8.3.5.2	0.2 kA to 120 kA,570 V
10.	Enclosed Distribution Fuse Boards and Cutouts	Verification of Short-circuit Strength	IS 2675: 1983 Cl. 8.4	0.2 kA to 120 kA for 1s or 70 kA for 3s
11.	Panel	Testing Under Condition of Arcing Due to Internal Fault	IEC/TR 61641: 2014 Cl. 8	0.2 kA to 120 kA,570 V
12.	HRC Fuse	Verification of the Breaking Capacity	IS 13703-1: 1993 Cl. 8.5 IEC 60269-1: 2014Cl. 8.5	0.2 kA to 120 kA,570 V

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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
<u>Location: 2</u>				
	HRC Fuse	Verification of the Cut-Off Current Characteristic	IS 13703-1: 1993 Cl. 8.6 IEC 60269-1: 2014 Cl. 8.6	0.2 kA to 120 kA,570 V
		Verification of I ² t Characteristic and Over current Discrimination	IS 13703-1: 1993 Cl. 8.7 IEC 60269-1: 2009 Cl. 8.7	0.2 kA to 120 kA,570 V
		Verification of the peak withstand current of a fuse-base	IS 13703-1: 1993 Cl. 8.5 IS 13703-2-1: 1993 Cl. 8.5 IEC 60269-1: 2009 Cl. 8.5 IEC 60269-2: 2013 Cl. 8.5	0.2 kA to 120 kA,570 V
13.	LT Panel, LTDB & LT Busduct	Verification of the Short-Circuit Withstand Strength	IS 8623-1: 1993 Cl. 8.2.3 IS 8623-2: 1993 Cl. 8.1.1c IS 8623-3: 1993 Cl. 8.1.1c IEC 61439-1: 2011 Cl. 10.11 IEC 61439-2: 2011 Cl. 10 IEC 61439-3: 2012 Cl. 10 IEC 61439-6: 2012 Cl. 10.11.5.3.3	0.2 kA to 120 kA for 1s or 70 kA for 3s
14.	LT Panel, LTDB & LT Busduct	Verification Of The Effectiveness Of The Protective Circuit	IS 8623-1: 1993 Cl. 8.2.4.2 IS 8623-2: 1993 Cl. 8.1.1d IS 8623-3: 1993 Cl. 8.1.1d IEC 61439-1: 2011 Cl. 10.11.5.6 IEC 61439-2: 2011 Cl. 10.11.5.6 IEC 61439-3: 2012 Cl. 10.11.5.6 IEC 61439-6: 2012 Cl. 10.11.5.6	0.2 kA to 120 kA for 1s or 70 kA for 3s
15.	HT Panel, HT Breakers, Metering Cubicles & HT Panel with Breaker	Short-time and Peak Withstand Current Test	IS 3427: 1997 Cl. 6.5 IEC 62271-1: 2011 Cl. 6.6 IEC 62271-100: 2012 Cl. 6.6 IEC 62271-200: 2011 Cl. 6.6	0.2 kA to 120 kA for 1s or 70 kA for 3s

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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
<u>Location: 2</u>				
16.	Isolators & Earth Switch	Short-time and Peak Withstand Current Test	IS 9921-1: 1981 Cl. 3.3 IS 9921-2: 1982 Cl. 3.3 IS 9921-4: 1985 Cl. 3.3 IEC 62271-1: 2011 Cl. 6.6 IEC 62271-102: 2013 Cl. 6.6	0.2 kA to 65kA,3s
17.	HT Connectors & HT Busduct	Short time Current Test	IS 5561: 1970 Cl. 13 IS 8084: 1976 Cl. 7.1.3	0.2 kA to 120 kA for 1s or 70 kA for 3s
18.	AB Switch	Rated Peak Withstand Current and Rated Short- time Current Test	IS 9920-1: 2002 Cl. 3.4 IS 9920-4: 1985 Cl. 3.4 IEC 62271-1: 2011 Cl. 6.6 IEC 60265-1: 1998 Cl. 6.6	0.2 kA to 120 kA for 1s or 70 kA for 3s
19.	Rewirable Fuses	Test for Breaking Capacity	IS 2086: 1993 Cl. 9.9	0.2 kA to 4 kA, 570 V
20.	Portable Equipment for Earthing & Short Circuiting	Short-Circuit Current Test	IEC 61230: 2008 Cl. 5.7	0.2 kA to 120 kA
21.	Distribution Pillar	Verification of the Short- Circuit Strength	IS 5039: 1983 Cl. 8.4	0.2 kA to 120 kA for 1s or 70kA for 3s
22.	Automatic Transfer Switching Equipment	Verification of Rated Fused Short-Circuit Current	IEC 60947-1: 2014 Cl. 9.3.4.3 IEC 60947-6-1: 2013 Cl. 9.3.4.3	0.2 kA to 120 kA 570 V

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<u>Location: 2</u>				
23.	Earthing Truck	Short-time Withstand Current and Peak Withstand Current Test	IS 9921-1: 1981 Cl. 3.3 IS 9921-2: 1982 Cl. 3.3 IS 9921-4: 1985 Cl. 3.3 IEC 62271-1: 2011 Cl. 6.6 IEC 62271-102: 2013 Cl. 6.6 IEC 62271-200: 2011 Cl. 6.6	0.2 kA to 120 kA for 1s or 70 kA for 3s
24.	HT Bushing	Short-time Withstand Current and Peak Withstand Current Test	IEC 60137: 2008 Cl. 8.8	0.2 kA to 120 kA for 1s or 70 kA for 3s
25.	On-Load Tap Changer(OLTC)	Short-time Current Test	IS 8468: 1977 Cl. 8.7 IEC 60214-1: 2014 Cl. 7.2.3	0.2 kA to 120 kA for 1s or 70kA for 3 s
26.	ACBs, MCCBs & Combination Starter	Verification of Over Load Releases	IS/IEC 60947-1: 2007 Cl. 8.3.5.1,8.3.8.1,8.3.8.7 IS/IEC 60947-2: 2003 Cl. 8.3.5.1,8.3.8.1,8.3.8.7 IS/IEC 60947-4-1: 2000 Cl. 8.3.5.1,8.3.8.1,8.3.8.7 IEC 60947-1: 2014 Cl. 8.3.5.1,8.3.8.1,8.3.8.7 IEC 60947-2: 2013 Cl. 8.3.5.1,8.3.8.1,8.3.8.7 IEC 60947-4-1: 2012 Cl. 8.3.5.1,8.3.8.1,8.3.8.7	2000 A to 10000 A,10V 3-Phase

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<u>Location: 2</u>				
27.	ACBs, MCCBs, SFU, FSU & Switch- Disconnecter Fuse	Verification of Temperature Rise	IS/IEC 60947-1: 2007 Cl. 8.3.3.6 IS/IEC 60947-2: 2003 Cl. 8.3.3.6 IS/IEC 60947-3: 1999 Cl. 7.2.2 IEC 60947-1: 2014Cl. 8.3.3.6 IEC 60947-2: 2013 Cl. 8.3.3.6 IEC 60947-3: 2012Cl. 7.2.2	10A to 800A, 3-Phase
28.	Starters, Contactors, Combination Starter	Temperature Rise Test	IS/IEC 60947-4-1: 2000 Cl. 9.3.3.3 IEC 60947-4-1: 2012Cl. 9.3.3.3	10A to 800A,3-Phase
29.	Rewirable Fuses, HRC Fuses, LT Panel, LTDB, LT Switchgear & LT Busduct	Insulation Resistance Measurement	IS 2086: 1993 Cl. 9.7 IS 8187: 1976 Cl. 7.10.2 IS 8623-1: 1993 Cl. 8.3.4 IS 8623-2: 1993 Cl. 8.3.4 IS 8623-3: 1993 Cl. 8.3.4 IS 13703-1: 1993 Cl. 8.5.8 IEC 60269-1: 2014 Cl. 8.2.2 IEC 61439-1: 2011 Cl. 9.1 IEC 61439-2: 2011 Cl 9.1 IEC 61439-3: 2012Cl. 9.1 IEC 61439-6: 2012 Cl. 9.1	250 V to 5 kV, 10 kΩ to1TΩ

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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
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Location: 2

30.	HRC Fuse,LT Panel, HT Panel, HT Breakers, Air Break Switch, Isolators, Rewirable fuses, HRC fuses, MCCBs, SFUs, FSUs, Switch Disconnecter, Switch Disconnecter fuse, Distribution Pillars, Enclosed Distribution fuse boards & Cut outs	Temperature Rise Test	IS 2086: 1993 Cl. 9.6 IS 2675: 1983 Cl. 8.2 IS 3427: 1997 Cl. 6.3 IS 5039: 1983 Cl. 8.2 IS 8187: 1976 Cl. 7.11 IS 8623-1: 1993 Cl. 8.2.1 IS 8623-2: 1993 Cl. 8.1.1a IS 8623-3: 1993 Cl. 8.1.1a IS 9920-2: 2001 Cl. 3.2 IS 9920-4: 1985 Cl. 3.2 IS 9921-4: 1985 Cl. 3.2 IS 10027: 2000 Cl. 7.2 IS 13703-1: 1993 Cl. 8.3 IS/IEC 60947-1: 2007 Cl. 8.3.2.5 IS/IEC 60947-2: 2003 Cl. 8.3.2.5 IS/IEC 60947-3: 1999 Cl. 8.3.3.1 IEC 60269-1: 2014 Cl. 8.3 IEC 60947-1: 2014 Cl. 8.3.2.5 IEC 60947-2: 2013 Cl. 8.3.2.5 IEC 60947-3: 2012 Cl. 8.3.3.1 IEC 61439-1: 2011 Cl. 9.2 IEC 61439-2: 2011 Cl. 9.2 IEC 61439-3: 2012 Cl. 9.2 IEC 61439-6: 2012 Cl. 9.2 IEC 62271-1: 2011 Cl. 6.5 IEC 62271-100: 2012 Cl. 6.5 IEC 62271-102: 2013 Cl. 6.5 IEC 62271-200: 2011 Cl. 6.5	2000 A to 10000 A, 10V 3-Phase
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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
<u>Location: 2</u>				
31.	ACBs, MCCBs, SFU,FSU, Switch disconnecter, Switch disconnecter fuse, Starters, Combination Starters,	Verification of Dielectric Withstand	IS/IEC 60947-1: 2007 Cl. 8.3.3.2 IS/IEC 60947-2: 2003 Cl. 8.3.3.2 IS/IEC 60947-3: 1999 Cl. 8.3.3.2 IS/IEC 60947-4: 2000Cl. 9.3.3.4 IEC 60947-1: 2014 Cl. 8.3.3.2 IEC 60947-2: 2013 Cl. 8.3.3.2 IEC 60947-3: 2012 Cl. 8.3.3.2 IEC 60947-4-1: 2012 Cl. 9.3.3.4	200V to 5KV-100mA/ 1kV to 100kV,300mA
32.	LT Panel, LTDB, Busduct, HT Switchgear upto 33kV, Fuses, Enclosed Distribution boards & cut-outs, Distribution pillars	Verification of Dielectric Withstand	IS 2086: 1993 Cl. 9.8 IS 2675: 1983 Cl. 8.3 IS 3427: 1997 Cl. 6.1 IS 5039: 1983 Cl. 8.3 IS 8623-1: 1993 Cl. 8.2.2 IS 8623-2: 1993 Cl. 8.1.1b IS 8623-3: 1993 Cl. 8.1.1b IS 9920-2: 2001 Cl. 3.1 IS 9920-4: 1985 Cl. 3.1 IS 8084: 1976 Cl. 7.1.4 IEC 61439-1: 2011 Cl. 9.1 IEC 61439-2: 2011 Cl. 9.1 IEC 61439-3: 2012 Cl. 9.1 IEC 61439-6: 2012 Cl. 9.1 IEC 62271-1: 2011Cl. 6.2 IEC 62271-100: 2012 Cl. 6.2 IEC 62271-102: 2013 Cl. 6.2 IEC 62271-200: 2011 Cl. 6.2	200 V to 5 kV-100mA/ 1kV to 100kV,300mA

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<u>Location: 2</u>				
33.	HT Switchgear, HT Breakers, AB Switches & Isolators	Measurement of the Resistance of the Main Circuit	IS 9920-2: 2001 Cl. 4.2 IS 9920-4: 1985 Cl. 4.2 IS 9921-2: 1982 Cl. 3.2.5 IS 9921-4: 1985 Cl. 3.2.5 IEC 62271-1: 2011 Cl. 6.4 IEC 62271-100: 2012 Cl. 6.4 IEC 62271-102: 2013 Cl. 6.4 IEC 62271-200: 2011 Cl. 6.4	10 A to 200A DC, 0.01 μ to 5 Ω
34.	ACB, MCCB, SFU, FSU, Switch Disconnecter, Switch Disconnecter Fuse, Starters, Contactors, Combination Starters	Leakage Current Measurement	IS/IEC 60947-1: 2007 Cl. 8.3.4 IS/IEC 60947-2: 2003 Cl. 8.3.4 IS/IEC 60947-3: 1999 Cl. 8.3.3.5 IS/IEC 60947-4-1: 2000 Cl. 9.3.4.2.3I IEC 60947-1: 2014 Cl. 8.3.4 IEC 60947-2: 2013 Cl. 8.3.4 IEC 60947-3: 2012 Cl. 8.3.3.5 IEC 60947-4: 2012 Cl. 9.3.4.2.3I	0 V to 750 V, 2 mA to 20 mA
35.	High-voltage switchgears SF6-Circuit-Breakers, Vacuum circuit Breakers, Gas-insulated metal-enclosed switchgears	Short-time withstand current	IEC 62271-1: 2011 Cl. 6.6 IEC 62271-100: 2012 Cl. 6.6 IEC 62271-200: 2011 Cl. 6.6 IEC 62271-203—2011 Cl. 6.6	0.2 kA to 120 kA

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	Transformer Oil	Dissolved Gas Analysis	IS 9434: 1992	0.1 µl/l to 10 ⁶ µl/l
		H ₂	IS 10593: 2006	Detection limit :
		O ₂	IS 1866: 2000	0.1 µl/l
		N ₂	IEC 60567: 2011	
		CH ₄	IEC 60599: 2007	
		C ₂ H ₄		
		C ₂ H ₆		
		C ₂ H ₂		
		C ₃ H ₆ +C ₃ H ₈		
		CO ₂		
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