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|---|---|---|---|
| **Laboratory** | **Delta Laboratory, 80-B, Prem Nagar, Indore, Madhya Pradesh** | | |
| **Accreditation Standard** | **ISO/IEC 17025: 2005** | | |
| **Discipline** | **Electrical Testing** | **Issue Date** | **17.12.2013** |
| **Certificate Number** | **T-1959** | **Valid Until** | **16.12.2015** |
| **Last Amended on** | **-** | **Page** | **1 of 6** |

| S.No. | Product / Material of Test | Specific Test Performed | Test Method Specification against which tests are performed | Range of Testing / Limits of Detection |
|---|---|---|---|---|
| **I.** | **CABLES & WIRES** | | | |
| **1.** | **<u>CONDUCTORS</u>:**<br>**A. Aluminium Conductors for overhead Transmission Purposes–**<br>**1.** Aluminium Stranded Conductors {IS:398(Pt.1)-1996} | Freedom from defects, Direction of lay, Stranding, Application of paper, Overlapping, Arrangement of layers of paper | IS:398 (Pt.1)-1996, RA 2002<br>IS:398 (Pt.2)-1996, RA 2002<br>IS:398 (Pt.4)-1994, RA 2004<br>IS:6162 (Pt.1)-1971, RA 1998<br>IS:6162 (Pt.2)-1971, RA 1998<br>IS:7404 (Pt.1)-1991, RA 1995 | Visual Examination |
| | **2.** Aluminium Conductors, Galvanized Steel Reinforced {IS:398(Pt.2)-1996} | Dimensional Measurement | IS:398 (Pt.1)-1996, RA 2002<br>IS:398 (Pt.2)-1996, RA 2002<br>IS:398 (Pt.4)-1994, RA 2004<br>IS:6162 (Pt.1)-1971, RA 1998<br>IS:6162 (Pt.2)-1971, RA 1998<br>IS:7404 (Pt.1)-1991, RA 1995 | 0.01-150 mm |
| | **3.** Aluminium Alloy Stranded Conductors {IS:398(Pt.4)-1994} | Tensile Strength/ Breaking Load Test | IS:398 (Pt.1)-1996, RA 2002<br>IS:398 (Pt.2)-1996, RA 2002<br>IS:398 (Pt.4)-1994, RA 2004<br>IS:6162 (Pt.1)-1971, RA 1998<br>IS:6162 (Pt.2)-1971, RA 1998<br>IS:7404 (Pt.1)-1991, RA 1995 | 1 N -25 kN |
| | **B. Paper Covered Conductors–**<br>**1.** Round Aluminium Conductors {IS:6162(Pt.1)-1971} | Resistance Test | IS:398 (Pt.1)-1996, RA 2002<br>IS:398 (Pt.2)-1996, RA 2002<br>IS:398 (Pt.4)-1994, RA 2004<br>IS:6162 (Pt.1)-1971, RA 1998<br>IS:6162 (Pt.2)-1971, RA 1998<br>IS:7404 (Pt.1)-1991, RA 1995 | 0.05 mΩ-19.99 Ω |
| | **2.** Rectangular Aluminium Conductors {IS:6162(Pt.2)-1971} | Lay Ratio | IS:398 (Pt.1)-1996, RA 2002<br>IS:398 (Pt.2)-1996, RA2 002<br>IS:398 (Pt.4)-1994, RA 2004 | 1-50 |
| | **3.** Round Copper Conductors {IS:7404(Pt.1)-1991} | | | |

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| | | Wrapping Test | IS:398 (Pt.1)-1996, RA 2002<br>IS:398 (Pt.2)-1996, RA 2002<br>IS:6162 (Pt.1)-1971, RA 1998 | Upto 5 mm dia. |
| | | Elongation Test | IS:398 (Pt.2)-1996, RA 2002<br>IS:398 (Pt.4)-1994, RA 2004<br>IS:6162 (Pt.1)-1971, RA 1998<br>IS:6162 (Pt.2)-1971, RA1998 | 1-100/% |
| | | Torsion Test | IS:398 (Pt.2)-1996, RA 2002 | Upto 5 mm dia. |
| | | Mass of Zinc Coating (by Stripping Method) | IS:6745-1972, RA 2001 | 10- 2000 gm /$m^2$ |
| | | Uniformity of Zinc Coating | IS:2633-1986, RA 2006 | Visual Examination |
| **2.** | **<u>Cables</u> :** | Application & Construction of Conductors/Tape Insulation/Inner & Outer Sheath/ Braid/ Screen / Separator/ Armouring wires/ Cores, Covering, Colour, Marking, Core Identification, Freedom from defect | IS:694-2010<br>IS:1554 (Pt.1)-1988, RA 1999<br>IS:3975-1999, RA 2004<br>IS:7098 (Pt.1)-1988, RA 2005<br>IS:8130-1984, RA 2001<br>IS:14255-1995, RA 2005 | Visual Examination |
| | **1.** PVC Insulated Cables for working voltages upto & incl. 450/750 Volt (IS:694-2010) | | | |
| | **2.** PVC Insulated Heavy duty Electric Cables for working voltage upto & incl. 1100 Volt {IS:1554(Pt.1)-1988} | Dimensional Measurement | IS:694-2010<br>IS:1554(Pt.1)-1988, RA 1999<br>IS:7098(Pt.1)-1988, RA 2005<br>IS:8130-1984, RA 2001<br>IS:10810(Pt.6)-1984, RA 2005<br>IS:14255-1995, RA 2005 | 0.01-150 mm |

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|---|---|---|---|---|
| | **3.**Crosslinked Polyethylene Insulated PVC Sheathed Cables for working voltage upto & incl. 1100 Volt {IS:7098(Pt.1)-1988} | Annealing Test | IS:10810 (Pt.1)-1984, RA 2001 | 1- 100% |
| | | Persulphate Test | IS:10810 (Pt.4)-1984, RA 2006 | 0.1 -20 gm /$m^2$ |
| | | Tensile Strength/ Breaking Load of Aluminium Conductor & Armouring Wire | IS:1608-2005<br>IS:10810 (Pt.2)-1984, RA 2001<br>IS:10810 (Pt.37)-1984, RA 2006 | 1 N -25 kN |
| | **4.** Aerial Bunched Cables for working voltage upto & incl. 1100 Volt (IS:14255-1995) | Wrapping Test of Aluminium Conductor & Armouring wire | IS:1755-1983, RA 2006<br>IS:10810 (Pt.3)-1984, RA 2006<br>IS:10810 (Pt.39)-1984, RA 2006 | Upto 5 mm dia. |
| | | Resistance Test | IS:10810 (Pt.5)-1984, RA 2001<br>IS:10810 (Pt.42)-1984, RA 2006 | 0.05 mΩ-19.99 Ω |
| | | Tensile Strength of Insulation & Sheath | IS:10810 (Pt.7)-1984, RA 2001 | 1-2500 N |
| | | Elongation at Break | IS:10810 (Pt.7)-1984, RA 2001 | 5-1000% |
| | | Ageing in Air Oven | IS:10810 (Pt.11)-1984, RA 2001 | 1-2500N |
| | | Loss of Mass Test | IS:10810 (Pt.10)-1984, RA 2001 | 10 mg -220gm |
| | | Shrinkage Test | IS:10810(Pt.12)-1984, RA 2006 | 0.5- 50% |
| | | Heat Shock Test | IS:10810 (Pt.14)-1984, RA 2001 | Visual Examination |
| | | Hot Deformation Test | IS:10810 (Pt.15)-1984, RA 2001 | 5-100% |

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| | | Cold Bend Test | IS:10810 (Pt.20)-1984, RA 2006 | Visual Examination |
| | | Cold Impact Test | IS:10810 (Pt.21)-1984, RA 2006 | Visual Examination |
| | | Hot Set Test | IS:10810 (Pt.30)-1984, RA 2006 | 0.5- 250% |
| | | Water Absorption Test (Gravimetric) | IS:10810 (Pt.33)-1984, RA 2001 | 10 mg -220gm |
| | | Insulation Resistance/ Volume Resistivity Test | IS:10810 (Pt.43)-1984, RA 2001 | 10 MΩ- $10^9$MΩ |
| | | High Voltage Test (at Room Temperature) | IS:694-2010<br>IS:1554 (Pt.1)-1988, RA 1999<br>IS:7098 (Pt.1)-1988, RA 2005<br>IS:10810 (Pt.45)-1984, RA 2001<br>IS:14255-1995, RA 2005 | 1 kV- 6 kV AC |
| | | Additional Ageing Test | IS:694-2010 | 1 kV- 6 kVAC |
| | | High Voltage Test (Water Immersion) | IS:694-2010<br>IS:1554 (Pt.1)-1988, RA 1999<br>IS:10810 (Pt.45)-1984, RA 2001 | 1 kV -6 kV AC,<br>0.5 kV- 3 kVDC |
| | | Flammability Test | IS:10810 (Pt.53)-1984, RA 2001 | 1-475 mm<br>1-900 sec. |
| | | Thermal Stability Test | IS:5831-1984, RA 2006<br>IS:10810 (Pt.60)-1988, RA 2006 | 1-300 minute<br>200º C |
| | | Torsion Test | IS:1717-1985, RA 2006<br>IS:10810 (Pt.38)-1984, RA 2006 | Upto 5 mm dia. |

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| | | Mass of Zinc Coating (by Stripping Method) | IS:6745-1972, RA 2001<br>IS:10810 (Pt.41)-1984, RA 2006 | 10 -2000 gm /$m^2$ |
| | | Uniformity of Zinc Coating | IS:2633-1986, RA 2006<br>IS:10810(Pt.40)-1984, RA 2001 | Visual Examination |
| | | Adhesion Test | IS:4826-1979, RA 2006 | Visual Examination |
| | | Elongation Test | IS:14255-1995, RA 2005 | 1-100% |
| | | Bending Test | IS:10810 (Pt.50)-1984, RA 2006<br>IS:14255-1995, RA 2005 | Visual Examination |
| **II.** | **ELECTRICAL INDICATING & RECORDING INSTRUMENTS** | | | |
| **1.** | **ENERGY METERS:**<br>**1.**A.C. Static Watt-hour Meters<br>Class - 1 & 2<br>(IS:13779-1999) | Test of Starting Condition | IS:13779-1999, RA 2009<br>IS:14697-1999, RA 2009 | 30 to 300 V,<br>1 mA to 120 A |
| | | Test for No-load Condition | IS:13779-1999, RA 2009<br>IS:14697-1999, RA 2009 | 30 to 300 V |
| | | A.C. High Voltage Test | IS:13779-1999, RA 2009<br>IS:14697-1999, RA 2009 | 1 kV- 6 kV AC |
| | **2.**A.C. Static Transformer operated Watt-hour & VAR-hour Meters<br>Class -0.2S, 0.5S&1.0S<br>(IS:14697-1999) | Insulation Resistance Test | IS:13779-1999, RA 2009<br>IS:14697-1999, RA 2009 | At 500 ± 50 V DC,<br>10 MΩ - $10^9$MΩ |
| | | Test of Meter Constant | IS:13779-1999, RA 2009<br>IS:14697-1999, RA 2009 | 30 to 300 V,<br>1 mA to 120 A |
| | | Test on Limits of Error | IS:13779-1999, RA 2009<br>IS:14697-1999, RA 2009 | 30 to 300 V,<br>1 mA to 120 A |

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| **Discipline** | **Electrical Testing** | **Issue Date** | **17.12.2013** |
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|---|---|---|---|---|
| | | Test of Repeatability of Error | IS:13779-1999, RA 2009<br>IS:14697-1999, RA 2009 | 30 to 300 V,<br>1 mA to 120 A |
| | | Test of Power Consumption | IS:13779-1999, RA 2009<br>IS:14697-1999, RA 2009 | 1mVA - 20 VA<br>1mW -10W |

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