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|-----|-------------------------------|----------------------------|---|---|
|-----|-------------------------------|----------------------------|---|---|

## **ELECTRONICS TESTING**

| Ι. | IT EQUIPMENT                           |   |   |   |
|----|--|---|---|---|
| 1. | Information<br>Technology<br>Equipment | Components<br>Transformer<br>Interconnecting Cable                | IS 13252 (Part 1) (Clause 1.5)                | Qualitative   |
|    | including<br>Electrical                | Abnormal Operating<br>and fault conditions                        | IS 13252 (Part 1) (Clause 5.3)                | 1 °C to 400°C   |
|    | Business<br>Equipment                  | Clearance, Creepage,<br>Distance & Distance<br>through Insulation | IS 13252 (Part 1)<br>(Clause 2.10.3 & 2.10.4) | 0.02 mm to 200 mm   |
|    |  | Connection to cable<br>distribution system-<br>Voltage surge test | IS 13252 (Part 1)<br>(Clause 7.4.2)           | 0.01kV to 10 kV   |
|    |  | Connections to Main<br>Supply-cord Anchorage<br>and Strain Relief | IS 13252 (Part 1)<br>(Clause 3.2.6)           | 30 N to 100 N<br>0.1 Nm to 0.35 Nm  |
|    |  | Connections to Mains<br>Supply–Cord Guards                        | IS 13252 (Part 1)<br>Clause 3.2.8             | 1 gN to 9999 gN   |
|    |  | Design & Construction handle, manual control                      | IS 13252 (Part 1)<br>Clause 4.3.2             | 0.5 N to 300 N  |
|    |  | Direct Plug–in<br>Equipment                                       | IS 13252 (Part 1)<br>Clause 4.3.6             | 0.01 Nm to 0.60 Nm  |
|    |  | Discharge of capacitors   | IS 13252 (Part 1)<br>Clause 2.1.1.7           | 5 ns to 50 s<br>2 mV/div. to 10 V/div.                                    |
|    |  | Electrical Insulation   | IS 13252 (Part 1)<br>Clause 2.9.2             | (–) 20 °C to 80 °C<br>10 %Rh to 95 %Rh<br>0.01 MΩ to 10GΩ<br>50 V to 1 kV |

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|     |                               | Electrical Strength   | IS 13252 (Part 1)<br>Clause 5.2                                   | 0.1 kV <sub>DC</sub> to 6 kV <sub>DC</sub><br>0.1 kV <sub>AC</sub> to 6 kV <sub>AC</sub>  |
|     |                               | Energy Hazards  | IS 13252 (Part 1)<br>Clause 2.1.1.5                               | 10 mV <sub>AC</sub> to 750 V <sub>AC</sub><br>30 μA <sub>AC</sub> to 10 A <sub>AC</sub><br>1 μA <sub>DC</sub> to 10 A <sub>DC</sub><br>0.1 mV <sub>DC</sub> to 1000 V <sub>DC</sub> |
|     |                               | Limited Current Circuits  | IS 13252 (Part 1)<br>Clause 2.4                                   | 0.1 mA to 30 A<br>1 kW to 10 kW<br>0.1 Vac/dc to 6 kVac/dc  |
|     |                               | Limited Power Sources   | IS 13252 (Part 1)<br>Clause 2.5                                   | 1 kW to 10 kW<br>0.1 mV <sub>DC</sub> to 1000 V <sub>DC</sub><br>10 mV <sub>AC</sub> to 750 V <sub>AC</sub>   |
|     |                               | Marking & Instructions  | IS 13252 (Part 1)<br>Clause 1.7                                   | Qualitative   |
|     |                               | Mechanical Strength–<br>Drop Test                                 | IS 13252 (Part 1)<br>Clause 4.2.6                                 | Qualitative   |
|     |                               | Mechanical Strength–<br>Impact Test                               | IS 13252 (Part 1)<br>Clause 4.2.5                                 | 0 to 500 g, 0 to 1.3 m,<br>0 to 50 mm   |
|     |                               | Mechanical Strength–<br>Steady Force Test                         | IS 13252 (Part 1)<br>Clause. 4.2.2, 4.2.3, 4.2.4                  | 0.5 N to 300 N  |
|     |                               | Mechanical Strength–<br>Stress Relief Test                        | IS 13252 (Part 1)<br>Clause 4.2.7                                 | 0.1 °C to 100 °C  |
|     |                               | Openings in enclosures  | IS 13252 (Part 1)<br>Clause 4.6                                   | 0.02 mm to 150 mm   |
|     |                               | Over Current and Earth<br>Fault Protection in<br>Primary Circuits | IS 13252(Part 1)<br>Clause. 2.7                                   | Qualitative   |
|     |                               | Power Interface- Input<br>Current                                 | IS 13252 (Part 1)<br>Clause 1.6.2                                 | 0.1 V <sub>AC</sub> to 350 V <sub>AC</sub><br>1 kW to 10 kW<br>0.01 A to 30 A   |
|     |                               | Protection against<br>Hazards                                     | IS 13252 (Part 1)<br>Clause 4.4                                   | 0.5 N to 50 N   |

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|-----|-------------------------------|---|---|--|
|     |                               | Protection from<br>Hazards in equipment                 | IS 13252 (Part 1)<br>Clause 6.1                                   | 0.01 kV <sub>DC</sub> to 5 kV <sub>DC</sub><br>0.01 kV <sub>AC</sub> to 5 kV <sub>AC</sub><br>0.01 MΩ to 10 GΩ |
|     |                               | Protection from<br>Hazards-Access to<br>Energized Parts | IS 13252 (Part 1)<br>Clause 2.1.1.1                               | 0.5 N to 300 N   |
|     |                               | Protection from Over<br>Heating                         | IS 13252 (Part 1)<br>Clause 6.3                                   | 1 °C to 400 °C   |
|     |                               | Protection from Over<br>Voltage                         | IS 13252 (Part 1)<br>Clause 6.2.2.2                               | 0.001 kV to 12 kV  |
|     |                               | Protections against<br>Mechanical damages               | IS 13252 (Part 1)<br>Clause 3.2.7                                 | Qualitative  |
|     |                               | Protections from<br>Hazards in equipment                | IS 13252 (Part 1)<br>Clause 6.1                                   | 0.01 kV <sub>AC</sub> to 5 kV <sub>AC</sub>  |
|     |                               | Provision for Earthing<br>and Bonding                   | IS 13252 (Part 1)<br>Clause 2.6.3.4                               | 0.001 Ω to 1 Ω   |
|     |                               | Resistance to abnormal<br>Heat                          | IS 13252 (Part 1)<br>Clause 4.5.5                                 | 1 N to 20 N<br>0.1 mm to 10 mm<br>25 °C to 150 °C  |
|     |                               | Resistance to fire                                      | IS 13252 (Part 1) Clause 4.7                                      | 0 °C to 960 °C   |
|     |                               | Safety Interlocks                                       | IS 13252 (Part 1)<br>Clause 2.8                                   | Qualitative  |
|     |                               | SELV Circuits   | IS 13252 (Part 1)<br>Clause 2.2                                   | 0.1 mV <sub>DC</sub> to 1000 V <sub>DC</sub><br>10 mV <sub>AC</sub> to 750 V <sub>AC</sub>                     |
|     |                               | Stability   | IS 13252 (Part 1)<br>Clause 4.1                                   | 1º to 20 º<br>0.5 N to 300 N   |
|     |                               | Thermal Requirements                                    | IS 13252 (Part 1) Clause 4.5                                      | 1 °C to 400 °C   |
|     |                               | TNV Circuits  | IS 13252 (Part 1)<br>Clause 2.3                                   | 10 mV <sub>AC</sub> to 750 V <sub>AC</sub><br>0.1 mV <sub>DC</sub> to 1000 V <sub>DC</sub>                     |
|     |                               | Touch Current and<br>Protective Conductor<br>Current    | IS 13252 (Part 1)<br>Clause 5.1                                   | 0.1 µA to 20 mA  |

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|------|--|--|--|---|
|      |  | Transient Levels   | IS 13252 (Part 1)<br>Clause 2.10.3.4                                 | 1 V to 12 kV  |
|      |  | Wiring, Connections and Supply                           | IS 13252 (Part 1)<br>Clause. 3.1                                     | Qualitative   |
| II.  |  | <br>_  |  | ••••••••••••••••••••••••••••••••••••••  |
| 1.   | Audio, Video and<br>Similar Electronic<br>Apparatus–Safety | Strain Relief<br>Clearances and<br>Creepage distances    | IS 616 (Clause 16.5)<br>IS 616 (Clause 13.0)                         | 0 to 150 mm<br>0.02 mm to 200 mm  |
|      | Requirements   | Components<br>Devices forming a [art<br>of main plug     | IS 616 (Clause 14.0)<br>IS 616 (Clause 15.4)                         | Qualitative<br>0.01 Nm to 60 Nm   |
|      |  | Dielectric Strength<br>Drawers<br>Fault Condition tests– | IS 616 (Clause 10.3)<br>IS 616 (Clause 12.4)<br>IS 616 (Clause 11.1) | 0.01 kV <sub>AC</sub> to 5 kV <sub>AC</sub><br>0.5 N to 180 N<br>10 mV <sub>AC</sub> to 750 V <sub>AC</sub> |
| <br> |  | Heating<br>Humidity Treatment                            | IS 616 (Clause 11.2 )<br>IS 616 (Clause 10.2)                        | 1 °C to 400 °C<br>(−) 20 °C to 80 °C<br>10 %Rh to 95 %Rh  |
|      |  | Insulation Resistance                                    | IS 616 (Clause 10.3)   | 0.01 MΩ to 1 GΩ<br>5 V to 1 kV  |
|      |  | Mechanical Strength<br>Drop Test                         | IS 616 (Clause 12.1.4)   | Qualitative   |
|      |  | Mechanical Strength–<br>Stress Relief                    | IS 616 (Clause 12.1.5 )  | 25 N to 100 N   |
|      |  | Mechanical Strength–<br>Vibration Test                   | IS 616 (Clause 12.1.2, 8.18 (b))                                     | 5 Hz to 2000 Hz<br>1 g to 50 g<br>0.2 mm to 25 mm   |
|      |  | Protection against<br>Electric shock–<br>Accessibility   | IS 616 (Clause 9.1.1.2, 9.2)   | 0.5 N to 300 N  |

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|         |                               | Protection against<br>Electric shock–Opening<br>in Enclosures                              | IS 616 (Clause 9.1.3)   | 4V to 100 V  |
|         |                               | Remote Control<br>Devices held in hand   | IS 616 (Clause 12.3)  | Qualitative  |
|         |                               | Resistance to external<br>forces   | IS 616 (Clause 9.1.7)   | 0.5 N to 300 N   |
|         |                               | Resistance to fire   | IS 616 (Clause 20.0)  | 0 to 35 mm<br>100 °C to 700 °C<br>500 °C to 960 °C   |
|         |                               | Stability & mechanical<br>hazard   | IS 616 (Clause 19.0)  | 1° to 360°, 1° to 15°<br>0.5 N to 300 N  |
|         |                               | Strain Relief  | IS 616 (Clause 16.5)  | 30 N to 100 N<br>0 to 100 count<br>0.1 Nm to 0.35 Nm   |
|         |                               | Terminals–Provision for<br>protective Earthing   | IS 616 (Clause 15, 15.2)  | 0.001 Ω to 1 Ω   |
|         |                               | Torque on screw terminals  | IS 616 (Clause 17.1)  | 0.1 Nm to 5 Nm<br>0.02 mm to 6 mm  |
| <u></u> |                               | Torque test on covers  | IS 616 (Clause 17.7)  | 0.1 N to 10 N  |
|         |                               | Transient voltages   | IS 616 (Clause 13.3.4)  | 1 V to 12 kV   |
|         |                               | Wall / ceiling mounting  | IS 616 (Clause 19.6)  | 0.5 N to 300 N   |
|         |                               | Constructional<br>Requirements with<br>regard to protection<br>against Electrical<br>Shock | IS 616 (Clause 8.0)   | 1 mA to 250 mA<br>0.1 kV to 10 kV<br>0.1 N to 300 N  |
|         |                               | Hazardous Live Parts &<br>Accessible Parts   | IS 616 (Clause 9.1.1.1)   | 0.1 μA to 20 mA<br>30 μA <sub>AC</sub> to 10 A <sub>AC</sub><br>10 mV <sub>AC</sub> to 750 V <sub>AC</sub><br>1 μA <sub>DC</sub> to 10 A <sub>DC</sub><br>0.1 mV to 1000 V |

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|------|-------------------------------------|--|---|--|
|      |                                     | Disconnection from the mains                   | IS 616 (Clause 8.19, 9.1.6)                                       | 5 ns to 50 s   |
|      |                                     | Heating under Normal<br>Operating Conditions   | IS 616 (Clause 7.1)   | 1 °C to 400 °C   |
| <br> |                                     | Ionization radiation                           | IS 616 (Clause 6.1)   | 1 uR/h to 10000 uR/h   |
|      |                                     | Marking & Instructions                         | IS 616 (Clause 5.0)   | Qualitative  |
|      |                                     | Normal Operating<br>Conditions                 | IS 616 (Clause 4.2)   | 1 W to 10 kW<br>0.1 V <sub>AC</sub> to 350 V <sub>AC</sub><br>0.01 A to 30 A |
| 111. | POWER SUPPLIES                      | & STABILIZERS                                  |   |  |
| 1.   | Uninterruptible                     | Electrical Insulation                          | IS 16242 (Part 1) (Clause 2.9.2)                                  | 0.01 MΩ to 10 GΩ   |
|      | Power Systems<br>(UPS/ Inverters of | Abnormal Operating<br>and Fault Conditions     | IS 16242 (Part 1) (Clause 8.3)                                    | 20 °C to 400 °C  |
|      | rating 5 kVA)                       | Connection to<br>Telecommunication<br>Networks | IS 16242 (Part 1) (Clause 9)                                      | 1 V to 600 V   |
|      |                                     | Electric Strength                              | IS 16242 (Part 1) IEC 62040–1<br>(Clause 8.2)                     | Qualitative<br>5 mA to 250 mA<br>0.01 kV to 5kV<br>2 mm to 100 mm            |
|      |                                     | External Signalling<br>Circuit                 | IS 16242 (Part 1) (Clause 5.2.4)                                  | Qualitative  |
|      |                                     | Leakage current test                           | IS 16242 (Part 1) (Clause 8.1)                                    | 1 μA to 3.5 mA   |
|      |                                     | Limited Current Circuits                       | IS 16242 (Part 1) (Clause 5.2.3)                                  | 0.5 mA to 100 mA   |
|      |                                     | Limited Power Sources                          | IS 16242 (Part 1) (Clause 5.2.5)                                  | 1 W to 500 W<br>10 V to 800 V<br>30 m 4 to 20 4                              |
|      |                                     | Marking  | IS 16242 (Part 1) (Clause 4 7)                                    | Qualitative  |
|      |                                     | Over current and Earth<br>Fault Protection     | IS 16242 (Part 1) (Clause 5.5)                                    | Qualitative  |

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|------|--|--|---|---|
|      |  | Physical Requirement                             | IS 16242 (Part 1)<br>(Clause 7.1, 7.2, 7.4)   | 10 ° to 20 °  |
|      |  | Power Interface                                  | IS 16242 (Part 1) (Clause 4.6)  | 1 W to 500 W<br>10 V to 800 V<br>30 mA to 20 A  |
|      |  | Protection against<br>Electric shock & hazard    | IS 16242 (Part 1) (Clause 5.1)  | 0 to 75 N<br>1 μA to 3.5 mA   |
|      |  | Provision for protective<br>earthing and bonding | IS 16242 (Part 1) (Clause 5.3)  | 1 μA to 50 A<br>0 V to 12 V   |
| <br> |  | Resistance to fire                               | IS 16242 (Part 1) (Clause 7.5)  | 550 °C to 960 °C  |
|      |  | Safety Interlocks                                | IS 16242 (Part 1) (Clause 5.6)  | Qualitative   |
|      |  | SELV Circuits                                    | IS 16242 (Part 1) (Clause 5.2.1)  | 5 V <sub>AC</sub> to 400 V <sub>AC</sub><br>0.01 V <sub>DC</sub> to 180 V <sub>DC</sub> |
|      |  | Temperature                                      | IS 16242 (Part 1) (Clause 7.7)  | 1 °C to 250 °C  |
|      |  | TNV Circuits                                     | IS 16242 (Part 1) (Clause 5.2.2)  | Qualitative   |
|      |  | Wiring Connections<br>and Supply                 | IS 16242 (Part 1)<br>(Clause 6.1, 6.2, 6.3)   | Qualitative   |
| 2.   | Secondary Cells<br>and Batteries                           | Charging Procedure for<br>Test Purposes          | IS 16046 (Part 1, Part 2)<br>(Clause 8.1)   | 0 to 25 A<br>0 to 18 V  |
|      | containing<br>Alkaline or other<br>non–acid<br>Electrolyte | External Short Circuit                           | IS 16046 (Part 1, Part 2)<br>(Clause 8.3.2, 8.3.3, 7.3.3,<br>8.2.2, 5.1, 7.2.2, 7.3.2)<br>(Clause 8.3.6, 7.1) | Qualitative<br>0 to 25 A / 0 to 18 V  |
|      |  | Moulded Case Stress<br>at High Temperature       | IS 16046 (Part 1)<br>(Clause 7.2.3)   | Qualitative   |
|      |  | Overcharge                                       | IS 16046 (Part 1)<br>(Clause 7.3.8)   | Qualitative   |
|      |  | Temperature Cycling                              | IS 16046 (Part 1)<br>(Clause 7.2.4)   | Qualitative   |