# 60950-1, 2nd Edition Changes

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# 60950-1, 2nd Edition

- EN 60950-1 -
  - Mandatory after 12/1/10 for existing and new products
- UL 60950-1, CSA 60950-1-07 -
  - Mandatory after 12/1/10
  - Existing products can maintain Certification

# 60950-1, 2nd Edition Changes (Annex BB)

- Audio amplifiers, requirements added for consistency with IEC 60065 (2.1.1.9, 4.5.1).
- Ball pressure test, test procedure corrected, different at high ambient (4.5.5).
- Batteries, requirements enhanced (4.3.8).
  - **Many changes. 1-1/4 pages to 2-1/4 pages**
- Bibliography moved to a new section after the Annexes

# 60950-1, 2nd Edition Changes

- CABLE DISTRIBUTION SYSTEMS, voltage tests clarified (7.4.2, 7.4.3).
- Cathode ray tubes, requirements aligned with IEC 60065 (4.2.8).
- Connectors, lower minimum CLEARANCES and CREEPAGE DISTANCES (2.10.3.1, 2.10.4.3, G.6).
  - **BOUNDING SURFACE of a connector and conductive parts**

# 60950-1, 2nd Edition Changes

- Data ports for additional equipment, requirements added to limit power output (3.5.4)
- Definitions added:
  - CHEESECLOTH (1.2.13.15);
  - EQUIPMENT, PLUGGABLE (1.2.5.3);
  - INSULATION, SOLID (1.2.10.4);
  - RATING, PROTECTIVE CURRENT (1.2.13.17);
  - SUPPLY, MAINS (1.2.8.3);
  - TIME, RATED RESTING (1.2.2.3);
  - TISSUE, WRAPPING (1.2.13.16);
  - VOLTAGE, RMS WORKING (1.2.9.7).

# 60950-1, 2nd Edition Changes

- DC MAINS SUPPLIES, more detailed requirements regarding:
  - CLEARANCES [2.10.3.2 b) and c), 2.10.3.7, 2.10.3.9, G.2.2, G.2.3, G.4.1 c), G.5 a)];
  - shock hazard (2.1.1.7, 2.1.1.8).
  - (**Comment - 60Vdc ratings - lots more evaluation**)

# 60950-1, 2nd Edition Changes

- Distance through insulation, requirements clarified (2.10.5) in particular:
  - optocouplers, aligned with IEC 60747 (2.10.5.4, Figure F.17);
  - non-separable thin sheet material (2.10.5.8).
- ″Hiccup″ mode of power supplies (2.2.3).
- Insulation having starting pulses, requirements added (2.10.1.7, 2.10.2.1, 2.10.3.5).

# 60950-1, 2nd Edition Changes

- Insulation in non-separable thin sheets, aligned with IEC 61558-1 (2.10.5.8, 2.10.5.9, Annex AA).
- Insulation in wound components, requirements clarified (2.10.5.11, 2.10.5.14, Annex U)
  - including:
  - winding wire (2.10.5.12);
  - solvent-based enamel on winding wire (2.10.5.1, 2.10.5.13).
  - **Comment - UL requires that detailed description of insulation (manufacturer and type) for magnetics, other than Class 105, even if R/C OBJY2**

# 60950-1, 2nd Edition Changes

- Language for marking, requirement for local language removed (1.7.2.1 Note 3).
  - **Local language i.e., Canada, Germany.**
- Limited power sources, tests clarified (2.5).
- Mechanical strength, tests clarified (4.2.5, 4.2.6).
- Motor test, alternative procedure added (B.6.3).
- Non-continuous operation, requirements clarified (1.2.2, 1.7.3, 4.5.2, 5.3.8).

# 60950-1, 2nd Edition Changes

- Overcurrent protective devices to be specified if required externally (1.7.2.3).
- Overvoltage categories III and IV, requirements added or clarified (2.10.3.1, 5.2.2, G.1.1, Annex Z).
- Pollution degrees 2 and 3, CLEARANCES modified to align with IEC 60664-1 (Table G.2).

# 60950-1, 2nd Edition Changes

- PROTECTIVE BONDING CONDUCTORS, requirements and test procedure modified (2.6.3.3, 2.6.3.4).
- Resistors, bridging insulation (1.5.7).
  - This section greatly expanded from one paragraph to a page and a half.
- Ringing signals, test procedure for ″Part 68″ corrected and clarified (M.3).

# 60950-1, 2nd Edition Changes

- Scope clarified, this standard can be used for:
  - partial compliance of component subassemblies (1.1.1);
  - electronic parts of certain other equipment (1.1.1 Note 2). SELV CIRCUIT and TNV CIRCUIT requirements for separation aligned (2.3.2, 2.3.3, 2.9.4).
- Single pole isolators, rules clarified (3.4.6).
- Starting pulses, requirements added (2.10.1.7, 2.10.2.1, 2.10.3.5)

# 60950-1, 2nd Edition Changes

- Surge suppressors:
  - VDRs in PRIMARY CIRCUITS, requirements clarified (1.5.9);
    - **Annex Q added - IEC 61051-2**
  - more detail to determine minimum rated operating voltage (6.1.2.1).
    - **NOTE -**
    - **1.2.8.11 TNV CIRCUIT: circuit that is in the equipment and to which the accessible area of contact is limited and that is so designed and protected that, under normal operating conditions and single fault conditions (see 1.4.14), the voltages do not exceed specified limit values**
    - **A TNV CIRCUIT is considered to be a SECONDARY CIRCUIT in the meaning of this standard.**

# 60950-1, 2nd Edition Changes

- **1.5.9 Surge suppressors**
  - **1.5.9.1 General**
    - It is permitted to use any type of surge suppressor, including a voltage dependent resistor (VDR), in a SECONDARY CIRCUIT.
    - If a surge suppressor is used in a PRIMARY CIRCUIT, it shall be a VDR and it shall comply with Annex Q.
      - NOTE 1 A VDR is sometimes referred to as a varistor or a metal oxide varistor (MOV). Devices such as gas discharge tubes, carbon blocks and semiconductor devices with non-linear voltage/current characteristics are not considered as VDRs in this standard.

# 60950-1, 2nd Edition Changes

- **1.5.9 Surge suppressors**
  - **1.5.9.1 General**
    - It is permitted to use any type of surge suppressor, including a voltage dependent resistor (VDR), in a SECONDARY CIRCUIT.
      - NOTE 2 It is not a requirement of this standard to comply with any particular component standard for surge suppressors used in SECONDARY CIRCUITS. However, attention is drawn to the IEC 61643 series of standards, in particular:
        - » – IEC 61643-21 (surge suppressors in telecommunications application)
        - » – IEC 61643-311 (gas discharge tubes)
        - » – IEC 61643-321 (avalanche breakdown diodes)
        - » – IEC 61643-331 (metal oxide varistors).
        - » – IEC 61643-331 (metal oxide varistors).

# 60950-1, 2nd Edition Changes

## Annex Q

- **Voltage dependent resistors (VDRs)** (see 1.5.9.1)
  - A VDR used in a PRIMARY CIRCUIT shall comply with IEC 61051-2, with the following details.
    - a) Preferred climatic categories (2.1.1 of IEC 61051-2)
      - Lower category temperature: - 10 °C
      - Upper category temperature: + 85 °C
      - Duration of damp heat, steady state test: 21 days

# 60950-1, 2nd Edition Changes

## Annex Q

- **Voltage dependent resistors (VDRs)** (see 1.5.9.1)
  - A VDR used in a PRIMARY CIRCUIT shall comply with IEC 61051-2, with the following details.
    - b) Maximum continuous voltage (2.1.2 of IEC 61051-2)
      - The maximum continuous a.c. voltage is selected from the list of preferred voltages and shall be at least 120 % of
        - » – the RATED VOLTAGE of the equipment or
        - » – the upper voltage of the RATED VOLTAGE RANGE of the equipment

# 60950-1, 2nd Edition Changes

## Annex Q

- **Voltage dependent resistors (VDRs)** (see 1.5.9.1)
  - A VDR used in a PRIMARY CIRCUIT shall comply with IEC 61051-2, with the following details.
    - c) Pulse current (Table I group 1 of IEC 61051-2)
      - Combination pulses of 6 kV/3 kA of alternating polarity are used, having a pulse shape of 1,2/50 µs for voltage and 8/20 µs for current.
      - In addition to the performance requirements of Table I group 1, the clamping voltage after the test shall not have changed by more than 10 % when measured with the manufacturer's specified current.

# 60950-1, 2nd Edition Changes

- Thermal classes of insulation, classes 200, 220 and 250 added in line with IEC 60085 (Tables 5D, B.1, B.2, C.1, U.2).

# 60950-1, 2nd Edition Changes

- TRANSPORTABLE EQUIPMENT, requirements for openings in ENCLOSURES (4.6.4).
  - **Expanded from one paragraph to almost a page**
- TOUCH CURRENT:
  - test procedure clarified for equipment with multiple supply connections (5.1.2, 5.1.7.2);
  - requirements extended for PLUGGABLE EQUIPMENT TYPE A (5.1.7.1).
- Wall-mounted equipment, test procedure modified (4.2.10).

# 60950-1, 2nd Edition Changes

- X and Y capacitors bridging insulation, applications clarified, aligned with IEC 60384-14 (1.5.6).

# 60950-1, 2nd Edition Changes

## ADDITIONAL ITEMS

- Output Connectors - Clause 5.3.7
  - Overloading of **internal (e.g., card cage)** SELV CIRCUIT connectors and printed wiring board connectors, or both, that are accessible to the operator and that deliver power. The connectors shall be connected to a load that draws the maximum available output current. The maximum available output current shall be:
    - (1) that current which is just below the trip point of any overcurrent or overtemperature protective device. The trip point of an overcurrent protective device shall be considered to be 110 % of its current rating; or
    - (2) the maximum available output current.

# 60950-1, 2nd Edition Changes

## ADDITIONAL ITEMS

- Output Connectors - Clause 5.1.6
  - **Application of Touch Current requirements to accessible SELV circuits**
    - Table 5A of sub-clause 5.1.6 requires for “All equipment” – “Accessible parts and circuits not connected to protective earth” shall have a maximum Touch Current of 0.25 ma rms (per the first compliance row of the table)
      - For accessible circuits connected to the equipment’s protective earth, via **either a protective bonding or functional conductor**, the touch current requirements at the accessible circuits are considered to be met by nature of the connection of the circuit to protective earth. Actual measurements are not necessary at the accessible circuits.

# 60950-1, 2nd Edition Changes

## ADDITIONAL ITEMS

- Output Connectors - Clause 5.1.6
  - For equipment **not** having all accessible circuits connected to protective earth, including Class II power supplies, or a Class III device powered by a Class II power supply, sub-clause 5.1 & Table 5A require compliance with the Table 5A (first compliance row) and its stated limit of 0.25 mA rms. Compliance is determined via measurement of the Touch Current per 5.1.

# 60950-1, 2nd Edition Changes

## ADDITIONAL ITEMS

- Output Connectors - Clause 5.1.6
  - However, for unearthed accessible circuits having, or supplied by circuits having coupling capacitors and/or resistors bridging Double or Reinforced insulation between Primary and Secondary (SELV) circuits, the limits in the first compliance row of Table 5A (0.25 ma rms) do not apply since the Touch Current measurements are superseded by the requirements in sub-clauses 1.5.6 and 1.5.7, which require compliance with the appropriate steady state current limits measured per 2.4.2 (0.7 ma peak or higher, depending on frequency). Essentially, compliance with the Limited Current Circuit limits per the measurements procedure in 1.5.6 and 2.4 replaces the Touch Current measurements/limits per sub-clause 5.1.6 and Table 5A.