

TN 91 - IEC 60950

By Mel Pedersen, Midcom, Inc. November 1999
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(Formerly IEC 950)
(EN 60950, UL 1950/CSA 22.2 No. 950, AS/NZS 3260)

Introduction: IEC 60950 (formerly IEC 950) is a safety standard written by the International Electro-technical Commission (IEC). The IEC publishes many standards and recommended practices for the Electrical and Electronics industry worldwide. In particular, IEC 60950 is a standard for the Safety of Information Technology Equipment (ITE). This standard covers safety requirements for a broad range of products including Personal Computers, Telecommunication Equipment (both Customer Premise, Central Office, and Network Equipment), Modems, Fax Machines, Copiers & Printers, even Pencil Sharpeners.

National Deviations: Many countries do not adopt IEC 60950 outright as their safety standard. One reason for this is that the Power Distribution Systems and Telecommunication Networks vary from country to country. They evolved separately and differently. Consequently, the electrical codes in each country are different from one another. For a safety standard to make sense, it must be consistent with the local electrical codes. Therefore, many countries use IEC 60950 as a basic outline or recommendation from which they derive their own ITE safety standards. Each national version deviates from IEC 60950 in order that particular issues or safety concerns specific to that country's electrical codes and Power Distribution Systems are addressed.

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Standard	Country	Certifying Agency	Comments
IEC 60950	International	Many agencies worldwide which participate in the IEC CB scheme	Think of this as the Mother ITE Safety Standard, the basis from which the others are derived.
EN 60950 Low Voltage Directive (LVD) is the law.	Europe (EU)	BABT, BSI, VDE, TUV (there are three different TUVs) NEMKO, DEMKO, SEMKO, etc. Certification from a third party (BABT, VDE, etc.) not legally required by the European Law (LVD or Low Voltage Directive) for the purpose of demonstrating electrical safety. Most manufacturers obtain a third party certification from an IEC CB or a "Notified Body" to minimize liability.	This standard covers all of Europe (the EU). There are requirements within this standard that may apply to one European Country but not another. C E marking is required by LVD. This is a declaration that all applicable legal requirements are met, including electrical safety. Some countries wishing to become EU members have adopted EN standards.
UL 1950/ CSA 22.2 No. 950	United States	UL, CSA, ETL, or other agency certified as an OSHA NRTL (Nationally Recognized Testing Laboratory) for this purpose. Certification from an NRTL is legally required in most places by local electrical codes. Some local codes only allow certain NRTL's.	The United States and Canada have some requirements that deviate significantly from IEC 60950. Some are: <ul style="list-style-type: none"> • Allowable telecommunication network voltage limits are lower. • "Power Cross" fault current testing is required at network interface.
UL 1950/ CSA 22.2 No. 950	Canada	CSA, UL, or other agency certified by Industry Canada is required.	
AS/NZS 3260 and TS 001	Australia & New Zealand	Any agency participating in the IEC CB scheme. Valid test report referencing all AS/NZS 3260 and TS 001 deviations is required.	Higher dielectric test requirements at telecommunications network. Sometimes up to 3.0kVrms.

Midcom Transformers and IEC 60950: One of the major functions of a transformer is to provide electrical isolation from unsafe voltages. Midcom transformers fill this role in a number of places within our customers IEC 60950 product. The most common are: 1) Providing isolation from hazardous voltages appearing on the Telecommunications Network, or 2) Providing isolation from Mains at the power port. Category 1) transformers include our Analog modem transformers and Digital (T1/E1, xDSL, ISDN, etc.) transformers. In some cases, a power transformer is required at the network interface. Category 2) would primarily be our power product. There are a number of categories or "Grades" of insulation defined by IEC 60950, and each of these Grades of insulation has a purpose. Examples are given in the table on the following page.

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Grade of Insulation	Typical Use	Dielectric Strength Requirement	Creepage & Clearance Required? ¹
TNV-1 to SELV isolation	Low Voltage Digital (ISDN, HDSL, etc.) Telecommunications	1500 VAC (Sometimes 1000VAC may be sufficient)	No
TNV-3 to TNV-2 isolation	Central Office		
BASIC	Network Isolation for Premise Equipment. Northern Europe requires SUPPLEMENTARY INSULATION here instead of BASIC INSULATION.	1500 VAC	YES (1.6mm)
SUPPLEMENTARY		1500 VAC	Yes (2.5mm)
BASIC + Ground	Mains Isolation (Power Port)	1000VAC or 1500VAC	Yes (1.5 or 2.5mm) ²
DOUBLE (= BASIC + SUPPLEMENTARY)	Mains Isolation (Power Port)	2000VAC or 3000VAC ²	Yes (3.2 or 5.0mm) ²
REINFORCED	Mains Isolation (Power Port)		

- 1) All information in this table is "Typical". Depending on the application, requirements could vary. There are many cases not addressed in this table.
- 2) Depends upon Mains Voltage at the power port. For example, lower values typical for the US, Canada, and Japan as mains voltage is 125VAC or less. Higher values typical for Europe as Mains is typically 220VAC.

TNV-1, TNV-2, and TNV-3 circuits are types of Telecommunication lines. SELV means "Safety Extra Low Voltage", and is a circuit that is considered safe to touch. Creepage and Clearance refer to certain physical spacing requirements required within the transformer and on the circuit board. The above table defines the more typical cases. There are others cases, for example, sometimes REINFORCED INSULATION is required at certain Network Interfaces. This is not typical, but is sometimes required. Also, differences that exist in the telecommunications and Power Distribution systems of each country can effect the type of insulation required. These deviations are documented in the National versions of the IEC 60950 documents.

A word about the United States and Canada: The United States and Canada have for a long time had our own safety standards for Telecommunications, Computer, and Business Equipment that were not based on IEC 60950. These Telecommunications standards are UL 1459 (United States) and CSA 22.2 No. 225 (Canada). They differed significantly from IEC 60950. In the interest of international trade and standardization (driven by GATT and NAFTA), the US and Canada adopted IEC 950 as UL 1950 CSA 22.2 No. 950. UL 1459 and CSA 22.2 No. 225 will be obsolete in the near future. (CSA 22.2 No. 225 and CSA 22.2 No. 950 are often commonly referred as CSA 225 and CSA 950). By 1 April 2000, UL will no longer evaluate new product submission for approvals to UL 1459. Old equipment will be grandfathered in until 1 April 2005, after which time it will lose its UL listing. Some time next year, a new edition of UL 1950/CSA 950 will be published, at which time the name of this standard will change to UL 60950/CSA 60950. This change will track the change of the IEC standard from IEC 950 to IEC 60950.

Keep in mind that this is only intended as a brief introduction, and information presented here is very general, intended for Marketing, Sales, and Purchasing Representatives. More technical detail may be found in Midcom Technical Notes # 79 and 83.

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