Australian/New Zealand Standard™

Information technology equipment—Safety

Part 1: General requirements (IEC 60950-1, Ed. 2.0 (2005), MOD)

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee TE-001, Safety of Electronic Equipment. It was approved on behalf of the Council of Standards Australia on 28 October 2010 and on behalf of the Council of Standards New Zealand on 23 December 2010.
This Standard was published on 8 February 2011.

The following are represented on Committee TE-001:

Australian Chamber of Commerce and Industry
Australian Communications Authority
Australian Industry Group
Australian Information Industry Association
Australian Subscription Television and Radio Association
CHOICE
Certification Interests, New Zealand
Consumer Electronics Association of New Zealand
Consumer Electronics Suppliers Association
Department of Climate Change and Energy Efficiency
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Part 1: General requirements (IEC 60950-1, Ed. 2.0 (2005), MOD)

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee TE-001, Safety of Electronic Equipment, to supersede AS/NZS 60950.1:2003 and its amendments, 2 years from the date of publication (publication date was 8 February 2011). During this period both Standards will run in parallel.

This Standard incorporates Amendment No. 1 (November 2012). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected

The objective of this Standard is to establish minimum safety requirements for the design, construction and operation of mains-powered or battery-powered information technology equipment. It sets out requirements intended to ensure the safety of the operator and other people who may come into contact with the equipment and, where specifically stated, service personnel.

This Standard is an adoption with national modifications and has been reproduced from IEC 60950-1, Ed. 2.0 (2005), *Information Technology Equipment—Safety*—Part 1: *General requirements*, its Corrigendum 1 (2006), which is incorporated in the source text, its Amendment 1 (2009) which is added at the end of the source text, and the Australian/New Zealand variations, which are listed in Appendix ZZ. This Standard has been varied from the IEC Standard as indicated to take account of Australian/New Zealand conditions.

The changes in this Standard from AS/NZS 60950.1:2003 and its amendments are principally the changes between IEC 60950-1, Ed.1.0 (2001) and IEC 60950-1, Ed.2.0 (2005), which are listed in Annex BB.

The purpose of AS/NZS 60950.1:2011 Amendment 1 (2012) was to—

(a) adopt into the standard, IEC Amendment 1 (2009);

(b) update the Preface;

(c) update AS/NZS 60950.1:2011 Appendix ZZ in line with the changes introduced by IEC Amendment 1 (2009).

The Amendments to Appendix ZZ are only editorial changes to align with IEC Amendment 1 (2009). The only technical changes associated with AS/NZS 60950.1, Ed.2.0 (2011) Amendment (2012) are those introduced by IEC Amendment 1 (2009).

This Standard is structured in the following layout:

(i) Australian/New Zealand Preface (including Australian and New Zealand bibliography).

(ii) IEC 60950-1, Ed. 2.0 (2005) (unedited from the contents page to the final clause of the source document).

(iii) IEC 60950-1, Ed.2.0 (2005) Amd.1 (2009).

(iv) Appendix ZZ—Australian/New Zealand variations to the source document.

A1 The variations listed in Appendix ZZ address issues including the following:

(A) Addition of definition of potential ignition source.

(B) Australian/New Zealand requirements for flexible cords.

(C) Requirements for stability of devices used for television purposes.

(D) Appropriate tests of AS/NZS 3112 for plug in devices.

(E) Alternate resistance to fire tests.

(F) Australian/New Zealand requirements for impulse tests.

The essential safety requirements in AS/NZS 3820, *Essential safety requirements for electrical equipment*, that could be applicable to electrically powered information technology equipment are covered by this Standard.

The variations described in Appendix ZZ form the Australian and New Zealand variations for the purposes of the CB scheme for recognition of testing to standards for safety of electrical equipment.

As this Standard is reproduced from an International Standard, the following applies:

(1) Its number appears on the cover and title page while the International Standard number appears only on the cover.

(2) A full point substitutes for a comma when referring to a decimal marker.

Unless otherwise indicated in Appendix ZZ, references to International Standards should be replaced by references to Australian or Australian/New Zealand Standards, as follows:

Reference to International Standard		*Australian/New Zealand Standard*	
IEC		AS/NZS	
60068	Environmental testing	60068	Environmental testing
60068-2-78	Part 2-78: Tests—Test Cab: Damp heat, steady state	60068.2.78	Part 2.78: Tests—Test Cab: Damp heat, steady state
60417	Graphical symbols for use on equipment	60417	Graphical symbols for use on equipment
60947	Low voltage switchgear and control gear	60947	Low voltage switchgear and control gear
60947-1	Part 1:General rules	60947.1	Part 1: General rules
60065	Audio, video and similar electronic apparatus—Safety requirements	60065	Audio, video and similar electronic apparatus—Safety requirements
60112	Method for determination of the proof and the comparative tracking indices of insulating materials	60112	Method for determination of the proof and the comparative tracking indices of insulating materials
60227	Polyvinyl chloride insulated cables of rated voltage up to and including 450/750 V	60227	Polyvinyl chloride insulated cables of rated voltage up to and including 450/750 V
60227-5	Part 5: Flexible cables (cords)	60227.5	Part 5: Flexible cables (cords)
60245	Rubber insulated cables—Rated voltages up to and including 450/750 V	60245	Rubber insulated cables—Rated voltages up to and including 450/750 V
60245-4	Part 4: Cords and flexible cables	60245.4	Part 4: Cords and flexible cables

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IEC		AS/NZS	
60309	Appliance couplers for household and similar purposes (series)	60309	Appliance couplers for household and similar purposes (series)
60320	Plugs, socket-outlets and coupler for household and similar general purposes (series)	60320	Plugs, socket-outlets and coupler for household and similar general purposes (series)
60364	Electrical installation of buildings	60364	Electrical installation of buildings
60364-4	Part 4: Fundamental principles, assessment of general characteristics, definitions	60364.4	Part 4: Fundamental principles, assessment of general characteristics, definitions
60695	Fire hazard testing	60695	Fire hazard testing
60695-2-11	Part 2-11: Glowing/hot wire based test methods—Glow wire flammability test method for end products	60695.2.11	Part 2.11: Glowing/hot wire based test methods—Glow wire flammability test method for end products
60695-10-2	Part 10-2: Abnormal test—Ball pressure test	60695.10.2	Part 10.2: Abnormal test—Ball pressure test
60695-11-3	Part 11-3: Test flames—500 W flames—Apparatus and conformational test methods	60695.11.3	Part 11.3: Test flames—500 W flames—Apparatus and conformational test methods
60695-11-4	Part 11-4: Test flames—50 W flames—Apparatus and conformational test methods	60695.11.4	Part 11.4: Test flames—50 W flames—Apparatus and conformational test methods
60695-11-5	Part 11-5: Test flames—Needle—flame test method—Apparatus and confirmatory test arrangement and guidance	60695.11.5	Part 11.5: Test flames—Needle-flame test method—Apparatus and confirmatory test arrangement and guidance
60695-11-10	Part 11-10: Test flames—50 W horizontal and vertical flame test methods	60695.11.10	Part 11.10: Test flames—50 W horizontal and vertical flame test methods
60695-11-20	Part 11-20: Test flames—500 W flame test methods	60695.11.20	Part 11.20: Test flames—500 W flame test methods
60825	Safety of laser products	60825	Safety of laser products
60825-1	Part 1: Equipment classification, requirements and user's guide	60825.1	Part 1: Equipment classification, requirements and user's guide
60825-2	Part 2: Safety of optical fibre communication	60825.2	Part 2: Safety of optical fibre communication
60990	Methods of measurement of touch current and protective conductor current	60990	Methods of measurement of touch current and protective conductor current
61058	Switches for appliances	61058	Switches for appliances
61058-1	Part 1: General requirements	61058.1	Part 1: General requirements

A1 References to International Standards should be replaced by references to Australian or Australian/New Zealand Standards, as follows:

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

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FOREWORD

Except for notes, all text within a normative figure, or in a box under a normative table, is also normative. Text with a superscript reference is linked to a particular item in the table. Other text in a box under a table applies to the whole table.

Informative annexes and text beginning with the word "NOTE" are not normative. They are provided only to give additional information.

"Country" notes are also informative but call attention to requirements that are normative in those countries.

In this standard, the following print types are used:

- Requirements proper and normative annexes: roman type.
- Compliance statements and test specifications: italic type.
- Notes in the text and in tables: smaller roman type.
- Terms that are defined in 1.2: SMALL CAPITALS.

The contents of the corrigendum of August 2006 have been included in this copy.

INTRODUCTION

0 Principles of safety

The following principles have been adopted by technical committee 108 in the development of this standard.

These principles do not cover performance or functional characteristics of equipment.

Words printed in SMALL CAPITALS are terms that are defined in 1.2 of this standard.

0.1 General principles of safety

It is essential that designers understand the underlying principles of safety requirements in order that they can engineer safe equipment.

These principles are not an alternative to the detailed requirements of this standard, but are intended to provide designers with an appreciation of the basis of these requirements. Where the equipment involves technologies and materials or methods of construction not specifically covered, the design of the equipment should provide a level of safety not less than those described in these principles of safety.

Designers shall take into account not only normal operating conditions of the equipment but also likely fault conditions, consequential faults, foreseeable misuse and external influences such as temperature, altitude, pollution, moisture, overvoltages on the MAINS SUPPLY and overvoltages on a TELECOMMUNICATION NETWORK or a CABLE DISTRIBUTION SYSTEM. Dimensioning of insulation spacings should take account of possible reductions by manufacturing tolerances, or where deformation could occur due to handling, shock and vibration likely to be encountered during manufacture, transport and normal use.

The following priorities should be observed in determining what design measures to adopt:

- where possible, specify design criteria that will eliminate, reduce or guard against hazards;
- where the above is not practicable because the functioning of the equipment would be impaired, specify the use of protective means independent of the equipment, such as personal protective equipment (which is not specified in this standard);
- where neither of the above measures is practicable, or in addition to those measures, specify the provision of markings and instructions regarding the residual risks.

There are two types of persons whose safety needs to be considered, USERS (or OPERATORS) and SERVICE PERSONS.

USER is the term applied to all persons other than SERVICE PERSONS. Requirements for protection should assume that USERS are not trained to identify hazards, but will not intentionally create a hazardous situation. Consequently, the requirements will provide protection for cleaners and casual visitors as well as the assigned USERS. In general, USERS

should not have access to hazardous parts, and to this end, such parts should only be in SERVICE ACCESS AREAS or in equipment located in RESTRICTED ACCESS LOCATIONS.

When USERS are admitted to RESTRICTED ACCESS LOCATIONS they shall be suitably instructed.

SERVICE PERSONS are expected to use their training and skill to avoid possible injury to themselves and others due to obvious hazards that exist in SERVICE ACCESS AREAS of the equipment or on equipment located in RESTRICTED ACCESS LOCATIONS. However, SERVICE PERSONS should be protected against unexpected hazards. This can be done by, for example, locating parts that need to be accessible for servicing away from electrical and mechanical hazards, providing shields to avoid accidental contact with hazardous parts, and providing labels or instructions to warn personnel about any residual risk.

Information about potential hazards can be marked on the equipment or provided with the equipment, depending on the likelihood and severity of injury, or made available for SERVICE PERSONS. In general, USERS shall not be exposed to hazards likely to cause injury, and information provided for USERS should primarily aim at avoiding misuse and situations likely to create hazards, such as connection to the wrong power source and replacement of fuses by incorrect types.

MOVABLE EQUIPMENT is considered to present a slightly increased risk of shock, due to possible extra strain on the supply cord leading to rupture of the earthing conductor. With HAND-HELD EQUIPMENT, this risk is increased; wear on the cord is more likely, and further hazards could arise if the units were dropped. TRANSPORTABLE EQUIPMENT introduces a further factor because it can be used and carried in any orientation; if a small metallic object enters an opening in the ENCLOSURE it can move around inside the equipment, possibly creating a hazard.

0.2 Hazards

Application of a safety standard is intended to reduce the risk of injury or damage due to the following:

- electric shock;
- energy related hazards;
- fire;
- heat related hazards;
- mechanical hazards;
- radiation;
- chemical hazards.

0.2.1 Electric shock

Electric shock is due to current passing through the human body. The resulting physiological effects depend on the value and duration of the current and the path it takes through the body. The value of the current depends on the applied voltage, the impedance of the source and the impedance of the body. The body impedance depends in turn on the area of contact, moisture in the area of contact and the applied voltage and frequency. Currents of approximately half a milliampere can cause a reaction in persons in good health and may cause injury indirectly due to involuntary reaction. Higher currents can have more direct effects, such as burn or muscle tetanization leading to inability to let go or to ventricular fibrillation.

Steady state voltages up to 42,4 V peak, or 60 V d.c., are not generally regarded as hazardous under dry conditions for an area of contact equivalent to a human hand. Bare parts that have to be touched or handled should be at earth potential or properly insulated.

Some equipment will be connected to telephone and other external networks. Some TELECOMMUNICATION NETWORKS operate with signals such as voice and ringing superimposed on a steady d.c. supply voltage; the total may exceed the values given above for steady-state voltages. It is common practice for the SERVICE PERSONS of telephone companies to handle parts of such circuits bare-handed. This has not caused serious injury, because of the use of cadenced ringing and because there are limited areas of contact with bare conductors normally handled by SERVICE PERSONS. However, the area of contact of a part accessible to the USER, and the likelihood of the part being touched, should be further limited (for example, by the shape and location of the part).

It is normal to provide two levels of protection for USERS to prevent electric shock. Therefore, the operation of equipment under normal conditions and after a single fault, including any consequential faults, should not create a shock hazard. However, provision of additional protective measures, such as protective earthing or SUPPLEMENTARY INSULATION, is not considered a substitute for, or a relief from, properly designed BASIC INSULATION.

Harm may result from:	**Examples of measures to reduce risks:**
Contact with bare parts normally at HAZARDOUS VOLTAGES.	Prevent USER access to parts at HAZARDOUS VOLTAGES by fixed or locked covers, SAFETY INTERLOCKS, etc. Discharge accessible capacitors that are at HAZARDOUS VOLTAGES.
Breakdown of insulation between parts normally at HAZARDOUS VOLTAGES and accessible conductive parts.	Provide BASIC INSULATION and connect the accessible conductive parts and circuits to earth so that exposure to the voltage which can develop is limited because overcurrent protection will disconnect the parts having low impedance faults within a specified time; or provide a metal screen connected to protective earth between the parts, or provide DOUBLE INSULATION or REINFORCED INSULATION between the parts, so that breakdown to the accessible part is not likely to occur.

Contact with circuits connected to TELECOMMUNICATION NETWORKS that exceed 42,4 V peak or 60 V d.c.	Limit the accessibility and area of contact of such circuits, and separate them from unearthed parts to which access is not limited.
Breakdown of USER-accessible insulation.	Insulation that is accessible to the USER should have adequate mechanical and electrical strength to reduce the likelihood of contact with HAZARDOUS VOLTAGES.
TOUCH CURRENT (leakage current) flowing from parts at HAZARDOUS VOLTAGES to accessible parts, or failure of a protective earthing connection. TOUCH CURRENT may include current due to EMC filter components connected between PRIMARY CIRCUITS and accessible parts.	Limit TOUCH CURRENT to a specified value, or provide a high integrity protective earthing connection.

0.2.2 Energy related hazards

Injury or fire may result from a short-circuit between adjacent poles of high current supplies or high capacitance circuits, causing:

- burns;
- arcing;
- ejection of molten metal.

Even circuits whose voltages are safe to touch may be hazardous in this respect.

Examples of measures to reduce risks include:

- separation;
- shielding;
- provision of SAFETY INTERLOCKS.

0.2.3 Fire

Risk of fire may result from excessive temperatures either under normal operating conditions or due to overload, component failure, insulation breakdown or loose connections. Fires originating within the equipment should not spread beyond the immediate vicinity of the source of the fire, nor cause damage to the surroundings of the equipment.

Examples of measures to reduce risks include:

- providing overcurrent protection;
- using constructional materials having appropriate flammability properties for their purpose;
- selection of parts, components and consumable materials to avoid high temperature which might cause ignition;
- limiting the quantity of combustible materials used;

– shielding or separating combustible materials from likely ignition sources;
– using ENCLOSURES or barriers to limit the spread of fire within the equipment;
– using suitable materials for ENCLOSURES so as to reduce the likelihood of fire spreading from the equipment.

0.2.4 Heat related hazards

Injury may result from high temperatures under normal operating conditions, causing:

– burns due to contact with hot accessible parts;
– degradation of insulation and of safety-critical components;
– ignition of flammable liquids.

Examples of measures to reduce risks include:

– taking steps to avoid high temperature of accessible parts;
– avoiding temperatures above the ignition point of liquids;
– provision of markings to warn USERS where access to hot parts is unavoidable.

0.2.5 Mechanical hazards

Injury may result from:

– sharp edges and corners;
– moving parts that have the potential to cause injury;
– equipment instability;
– flying particles from imploding cathode ray tubes and exploding high pressure lamps.

Examples of measures to reduce risks include:

– rounding of sharp edges and corners;
– guarding;
– provision of SAFETY INTERLOCKS;
– providing sufficient stability to free-standing equipment;
– selecting cathode ray tubes and high pressure lamps that are resistant to implosion and explosion respectively;
– provision of markings to warn USERS where access is unavoidable.

0.2.6 Radiation

Injury to USERS and to SERVICE PERSONS may result from some forms of radiation emitted by equipment. Examples are sonic (acoustic), radio frequency, infra-red, ultraviolet and ionizing radiation, and high intensity visible and coherent light (lasers).

Examples of measures to reduce risks include:

- limiting the energy level of potential radiation sources;
- screening radiation sources;
- provision of SAFETY INTERLOCKS;
- provision of markings to warn USERS where exposure to the radiation hazard is unavoidable.

0.2.7 Chemical hazards

Injury may result from contact with some chemicals or from inhalation of their vapours and fumes.

Examples of measures to reduce risks include:

- avoiding the use of constructional and consumable materials likely to cause injury by contact or inhalation during intended and normal conditions of use;
- avoiding conditions likely to cause leakage or vaporization;
- provision of markings to warn USERS about the hazards.

0.3 Materials and components

Materials and components used in the construction of equipment should be so selected and arranged that they can be expected to perform in a reliable manner for the anticipated life of the equipment without creating a hazard, and would not contribute significantly to the development of a serious fire hazard. Components should be selected so that they remain within their manufacturers' ratings under normal operating conditions, and do not create a hazard under fault conditions.

AUSTRALIAN/NEW ZEALAND STANDARD

Information technology equipment—Safety

Part 1:
General requirements (IEC 60950-1, Ed. 2.0 (2005), MOD)

1 General

1.1 Scope

1.1.1 Equipment covered by this standard

This standard is applicable to mains-powered or battery-powered information technology equipment, including electrical business equipment and associated equipment, with a RATED VOLTAGE not exceeding 600 V.

This standard is also applicable to such information technology equipment:

– designed for use as telecommunication terminal equipment and TELECOMMUNICATION NETWORK infrastructure equipment, regardless of the source of power;

– designed and intended to be connected directly to, or used as infrastructure equipment in, a CABLE DISTRIBUTION SYSTEM, regardless of the source of power;

– designed to use the AC MAINS SUPPLY as a communication transmission medium (see Clause 6, Note 4 and 7.1, Note 4).

This standard is also applicable to components and subassemblies intended for incorporation in information technology equipment. It is not expected that such components and subassemblies comply with every aspect of the standard, provided that the complete information technology equipment, incorporating such components and subassemblies, does comply.

NOTE 1 Examples of aspects with which uninstalled components and subassemblies may not comply include the marking of the power rating and access to hazardous parts.

NOTE 2 This standard may be applied to the electronic parts of equipment even if that equipment does not wholly fall within its Scope, such as large-scale air conditioning systems, fire detection systems and fire extinguishing systems. Different requirements may be necessary for some applications.

This standard specifies requirements intended to reduce risks of fire, electric shock or injury for the OPERATOR and layman who may come into contact with the equipment and, where specifically stated, for a SERVICE PERSON.

This standard is intended to reduce such risks with respect to installed equipment, whether it consists of a system of interconnected units or independent units, subject to installing, operating and maintaining the equipment in the manner prescribed by the manufacturer.