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INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Particular safety requirements for equipment to be connected to information and communication networks

Exigences de sécurité spécifiques pour les équipements destinés à être connectés aux réseaux d'information et de communication

IEC 62949:2017-01(en-fr)

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PARTICULAR SAFETY REQUIREMENTS FOR EQUIPMENT TO BE CONNECTED TO INFORMATION AND COMMUNICATION NETWORKS

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The text of this standard is based on the following documents:

FDIS	Report on voting
108/664/FDIS	108/676/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

In this standard, the following print types are used:

- requirements proper and normative annexes: in roman type;

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INTRODUCTION

This document is applicable for products intended to be connected as **communication terminal** to an **ICT network** not covered by the scope of IEC 62368-1. It is to be used in conjunction with other product safety standards, examples of which are listed in Annex A.

This document, in accordance with the 'principles of safety' given in the introduction of IEC 62368-1, covers the requirements and compliance criteria under three headings.

- Protection of equipment users from hazards in the equipment. The users are considered to be protected from hazards in the equipment if the equipment complies with a relevant safety standard, for example one of those listed in Annex A, but compliance with those standards is not part of this document.

  NOTE An equipment user could be an **ordinary person** or an **instructed person**.

- Protection of **skilled persons** or **instructed persons** working on an **ICT network** and other users of an **ICT network**, from hazardous conditions on an **ICT network** resulting from the connection of the equipment.
- Protection of equipment users from voltages on an **ICT network**.

Upper limits for **ICT networks** signals have been defined. They include also telephone ringing signals which have been defined taking into account voltages commonly used in the different networks. The electrical hazard criteria have been chosen to be in accordance with IEC TS 60479 (all parts).

Test levels used for the equipment take account of the possibility that overvoltages may occur on **ICT networks**. Special consideration has been given to equipment parts expected to be held or touched during normal use, e.g. telephone handsets.

It is recognised that in high overvoltages risk areas, requirements of this document may not be sufficient. Additional protective devices, not covered by this document, may be installed in the **ICT networks** to better meet extreme conditions.

A comparison of terms introduced in this document with existing IEC standards is given in Annex C.

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PARTICULAR SAFETY REQUIREMENTS FOR EQUIPMENT TO BE CONNECTED TO INFORMATION AND COMMUNICATION NETWORKS

1 Scope

This document applies to the interface of equipment designed and intended to be connected as a **communication terminal** to an **information and communication technology (ICT) network** termination.

This document does not apply to:

- equipment covered by IEC 62368-1; and
- interfaces to other networks.

NOTE 1 An example of 'other networks' is a dedicated Home and Building Electronic Systems/Building Automation and Control Systems HBES/BACS network covered by EN 50491-3.

This document specifies the safety requirements of the interface to the **ICT network** only.

NOTE 2 See Annex D.

Requirements additional to those specified in this document may be necessary for

- equipment intended for operation while exposed, for example, to extremes of temperature, to excessive dust, moisture, or vibration, to flammable gases, to corrosive or explosive atmospheres,
- electro medical applications with physical connections to the patient.

The following requirements are not covered by this document:

- functional safety of equipment;
- functional reliability of equipment;
- communication facilities with remote supply using hazardous voltage;
- protection of equipment connected to **ICT networks** from functional damage.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE Lists of other related documents can be found in Annex A and in the Bibliography.

IEC 62368-1:2014, *Audio/video, information and communication technology equipment – Part 1: Safety requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62368-1and the following apply.

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ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

NOTE Defined terms are printed in bold.

3.1
information and communication technology network
ICT network
metallically terminated transmission medium consisting of paired conductors intended for communication between equipment that may be located in separate buildings, excluding:

- the mains system for supply, transmission and distribution of electrical power, if used as a communication transmission medium;
- a dedicated HBES/BACS networks;
- **external circuits** operating at ES1 levels connecting units of audio/video, information and communication technology equipment

Note 1 to entry: This network may include twisted pairs, and may include circuits, which are subjected to transients as indicated in Table 14 of IEC 62368-1:2014, ID1 (assumed to be 1,5 kV).

Note 2 to entry: An **ICT network** may be:

- public or privately owned;
- subject to longitudinal (common mode) voltages induced from nearby power lines or electric traction lines.

Note 3 to entry: Examples of **ICT networks** are:

- a public switched telephone network;
- a public data network;
- an Integrated Services Digital Network (ISDN);
- a private network with electrical interface characteristics similar to the above.

Note 4 to entry: For information about circuit voltages and signals, which may be present, see Annex B.

3.2
communication terminal
equipment connected to an **ICT network** to provide access to one or more specific information transfer services

Note 1 to entry: A **communication terminal** may be characterized, for example, as a user's **communication terminal**, a **communication terminal** providing services, a communication terminal acting as an interface between **ICT networks**.

Note 2 to entry: A **communication terminal** may have to translate the signals received from or sent to the network according to the service considered.

4 Safety requirements and compliance criteria

4.1 General

It is assumed that adequate measures according to ITU-T Recommendation K.11 have been taken to reduce the likelihood that the overvoltages presented to the equipment from the **ICT network** exceed 1,5 kV peak. In installations where overvoltages presented to the equipment may exceed 1,5 kV peak, additional measures such as surge suppression may be necessary.

The general conditions for tests of Annex B of IEC 62368-1:2014 apply, unless specified in the relevant product safety standard.

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The references to the requirements of 4.4.4.5, 5.4.2.6 and 5.4.3.2 of IEC 62368-1:2014, may be replaced by the corresponding requirements in other relevant safety standards listed in Annex A, if the equipment is designed to comply with one of these standards.

4.2 Interconnection of equipment

4.2.1 General requirements

Where an equipment is intended to be electrically connected to another equipment via an **ICT network**, interconnection circuits shall be selected to provide continued conformance to the requirements of 5.2 of IEC 62368-1:2014 for ES1 or ES2 circuits, after making connections.

NOTE This is normally achieved by connecting ES2 circuits to ES2 circuits and ES1circuits to ES1 circuits.

4.2.2 Types of interconnection circuits

Interconnection circuits to **ICT networks** shall be ES1 circuits or ES2 circuits according to 5.2 of IEC 62368-1:2014.

4.3 ES1 circuits

4.3.1 Limits

The limits of 5.2.1 of IEC 62368-1:2014 for ES1 apply.

4.3.2 Protection against contact with ES1 circuits

There is no protection required for ES1 circuits.

4.4 ES2 circuits

4.4.1 Limits

The limits of 5.2.2 of IEC 62368-1:2014 for ES2 apply.

4.4.2 Protection against contact with ES2 circuits

For ES2 circuits, the requirements of 5.3.1 and 5.3.2.1 of IEC 62368-1:2014 apply for an **ordinary person** and an **instructed person**.

For ES2 circuits, the requirements of 5.3.1 of IEC 62368-1:2014 apply for a **skilled person**.

4.5 ES3 circuits

4.5.1 Limits

The limits of 5.2.2 of IEC 62368-1:2014 for ES3 apply.

4.5.2 Protection against contact with ES3 circuits

For ES3 circuits, the requirements of 5.3.2.1 of IEC 62368-1:2014 apply for an **ordinary person** and an **instructed person**.

For ES3 circuits, the requirements of 5.3.1 of IEC 62368-1:2014 apply for a **skilled person**.

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4.6 Protection from hazards in the equipment for persons servicing ICT networks, and users of other equipment connected to the network

4.6.1 Protection from ES3

Subclause 5.7.6.2 of IEC 62368-1:2014 applies.

4.6.2 Separation of the ICT network from earth

Subclause 5.4.11 of IEC 62368-1:2014 applies.

4.6.3 Touch current to ICT networks

Subclause 5.7.6.2 of IEC 62368-1:2014 applies.

4.6.4 Summation of touch currents from ICT networks

Subclause 5.7.7 of IEC 62368-1:2014 applies.

4.7 Protection of equipment users from overvoltages on ICT networks

Subclause 5.4.10 of IEC 62368-1:2014 applies.

4.8 Protection of the wiring system of an ICT network from overheating

Subclause 6.5.3 of IEC 62368-1:2014 applies.

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Annex A
(informative)

Relevant safety standards for the application of this document

This annex lists some examples of IEC product safety standards with which this document may be used.

Publication	Title
IEC 60601-1 (all parts)	*Medical electrical equipment – Part 1: General requirements for basic safety and essential performance*
IEC 61010 (all parts)	*Safety requirements for electrical equipment for measurement, control, and laboratory use*
IEC 62504:2014	*General lighting – Light emitting diode (LED) products and related equipment – Terms and definitions*

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Annex B
(informative)

ICT network voltages and signals

B.1 General

Certain voltages within **ICT networks** often exceed the steady state, safe to touch limits set within general safety standards.

NOTE Years of practical experience by world-wide network operators have found ringing and other operating voltages to be electrically safe. Records of accident statistics indicate that electrical injuries are not caused by operating voltages.

Access to connectors carrying such signals with the standard test finger is permitted, provided that inadvertent access is unlikely. The likelihood of inadvertent access is limited by forbidding access with the test probe (Figure V.3 of IEC 62368-1:2014) which has a 6 mm radius tip.

This requirement ensures that:

a) contact by a large part of the human body, such as the back of the hand, is impossible;

b) contact is possible only by deliberately inserting a small part of the body, less than 12 mm across, such as a fingertip, which presents a high impedance;

c) the possibility of being unable to let-go the part in contact does not arise.

This applies both to contact with signals arriving from the network and to signals generated internally in the equipment.

Ventricular fibrillation of the heart is considered to be the main cause of death by electric shock.

Curve c_1 of Figure B.1 (curve c_1 of Figure 20 of IEC TS 60479-1:2005) is the threshold of ventricular fibrillation. The point 500 mA/100 ms has been found to correspond to a fibrillation probability of the order of 0,14 %. Curve b on Figure B.1 (curve b of Figure 20 of IEC TS 60479-1:2005) may be described as the 'let-go' limit curve. Some experts consider curve c_1 to be the appropriate limit for safe design, but use of this curve shall be considered as an absolute limit.

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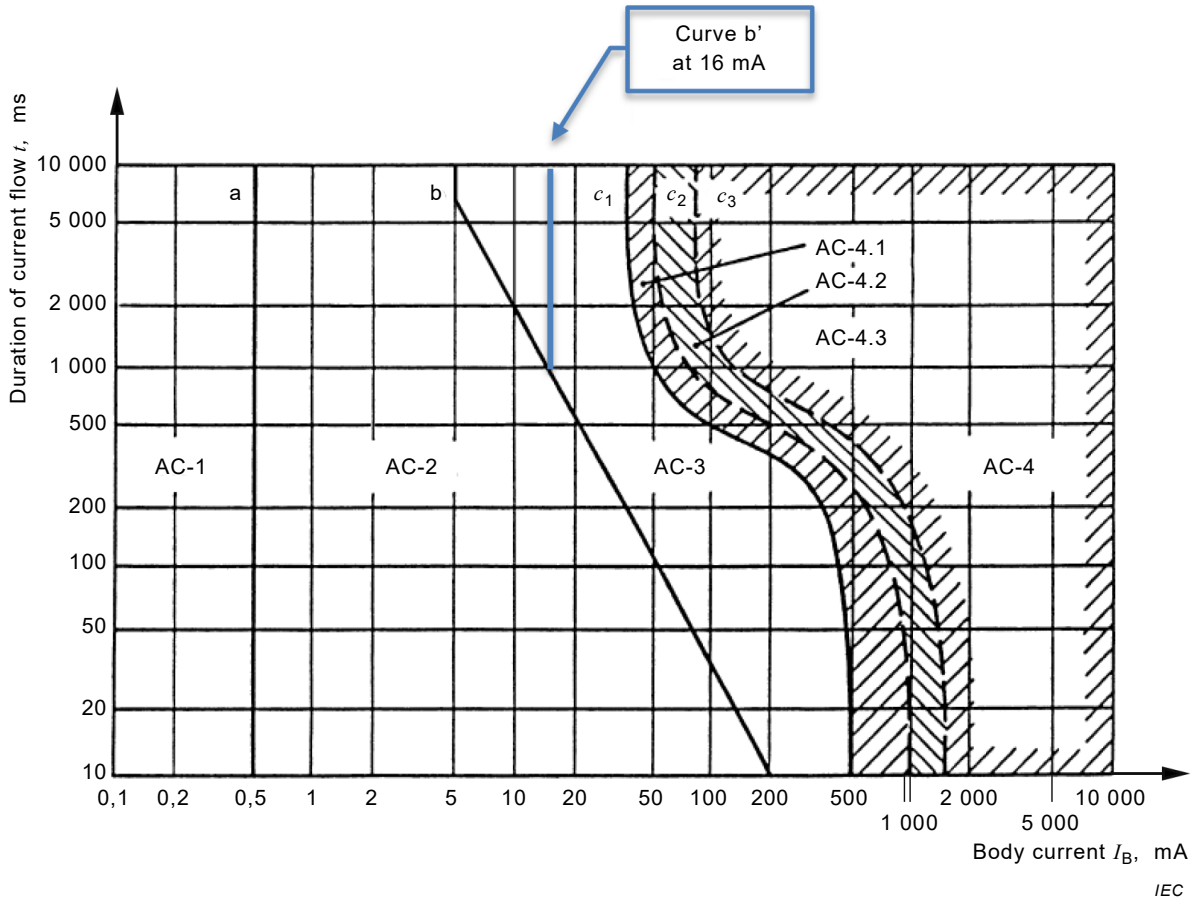

Figure B.1 – Current limit curves

B.2 Contact with operating voltages on ICT networks

Total body impedance consists of two parts, the internal body resistance of blood and tissue and the skin impedance. Operation voltages on **ICT networks** hardly reach the level where skin impedance begins to rapidly decrease due to breakdown. The skin impedance is high at low voltages, its value varying widely. The effects of skin capacitance are negligible at ringing frequencies.

IEC TS 60479-1 body impedance figures are based upon a relatively large contact area of 50 cm^2 to 100 cm^2, which is a realistic value for mains operated domestic appliances. Practical telecommunication contact is likely to be much less than this, typically 10 cm^2 to 15 cm^2 for uninsulated wiring pliers or similar tools and less than 1 cm^2 for finger contact with pins of a telephone wall socket. For contact with thin wires, wiring tags or contact with tools where fingers move beyond insulated handles, the area of contact will again be of the order of 1 cm^2 or less. These much smaller areas of contact with the body produce significantly higher values of body impedance than the IEC TS 60479-1 figures.

For contact with operation voltages on **ICT networks** a body model value of 5 kΩ is used, to provide a margin of safety compared with the higher practical values of body impedance for typical contact areas for equipment connected to **ICT networks**.

The curve b' in Figure B.1 is a version of curve b modified to cover practical situations, where the current limit is maintained constant at 16 mA above 1 667 ms. This 16 mA limit is still well within the minimum current value of curve a.

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The difficulties of defining conditions which will avoid circumstances that prevent let-go have led to a very restricted contact area being allowed.

Contact with areas up to 10 cm^2 can be justified and means of specifying this and still ensuring let-go are for further study.

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