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INTERNATIONAL STANDARD

Corrected version
2025-12



GROUP SAFETY PUBLICATION

Safety of ~~power~~ transformers, ~~power supplies~~, reactors, power supply units and
~~similar products~~ combinations thereof –
Part 1: General requirements and tests



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Part 1: General requirements and tests

INTERNATIONAL
ELECTROTECHNICAL
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SAFETY OF ~~POWER~~ TRANSFORMERS, ~~POWER SUPPLIES~~, REACTORS,
POWER SUPPLY UNITS AND ~~SIMILAR PRODUCTS~~
COMBINATIONS THEREOF –****Part 1: General requirements and tests**

FOREWORD

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International Standard IEC 61558-1 has been prepared by IEC technical committee 96: Transformers, reactors, power supply units and combinations thereof.

This third edition cancels and replaces the second edition published in 2005 and Amendment 1:2009. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) fully insulated winding wires (FIW), new tables and aging tests for FIW constructions,
- b) overvoltage categories 1, 2, 3 and 4 for clearances and dielectric strength tests (new tables) are included,
- c) development of new symbols for the different overvoltage categories,
- d) symbol for maximum altitudes, if higher than 2 000 m,
- e) symbol for plug in power supply units, if the pins are damaged (tumbling barrel test),
- f) symbol for minimum temperature (even during the transportation),
- g) alternative temperature measurement, simulated load and back to back method according to IEC 60076-11,
- h) short circuit and overload protection, simulated load and back to back method according to IEC 60076-11,
- i) adjustment of temperatures in Table 2 according to CENELEC Guide 29,
- j) establishing partial discharge test above 750 V for FIW constructions,
- k) requirements for toroidal core constructions, division for basic and for supplementary isolation,
- l) modification of protection indexes for enclosures (IP-code),
- m) dimensioning of rectangular cross section connectors for transformers,
- n) repetition test, 80 % of required dielectric strength test voltage of Table 14,
- o) vibration test for vehicles and railway applications,
- p) two Y1 Capacitors for working voltages above 250 V and not exceeding 500 V with overvoltage category 3.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
96/466/FDIS	96/468/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.

It has the status of a group safety publication in accordance with IEC Guide 104.

A list of all parts of the IEC 61558 series, published under the general title *Safety of transformers, reactors, power supply units and combination thereof*, can be found on the IEC website.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

In this document, the following print types are used:

- proper requirements: in roman type;
- *test specifications: in italic type*;
- explanatory matters: in smaller roman type.

In the text of the document, the words in **bold** are defined in Clause 3.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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The content of the corrigendum 1 (2025-12) has been included in this copy.

INTRODUCTION

This document covers safety requirements for **transformers**. Where the term **transformer** is used, it covers **transformers**, **reactors** and **power-supplies supply units** where applicable.

During the development of this document, to the extent possible, the requirements of IEC 60364 (all parts) were taken into consideration, so that a **transformer** ~~may~~ can be installed in accordance with the wiring rules contained in that document. However, national wiring rules ~~may~~ can differ.

This document recognizes the internationally accepted levels of protection against the possible electrical, mechanical, and fire hazards caused by **transformers** operating under normal conditions in accordance with the manufacturer's instructions. It also covers abnormal conditions which ~~may~~ can occur in practice.

A **transformer** complying with this document will not necessarily be judged to comply with the safety principles of this document if, when examined and tested, it is found to have other features that impair the level of safety covered by these requirements.

A **transformer** employing materials or having forms of construction differing from those detailed in this document may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be judged to comply with the safety principles of this document.

The document dealing with non-safety aspects of electromagnetic compatibility (EMC) of **transformers** is IEC 62041: ~~Power transformers, power supply units, reactors and similar products — EMC requirements~~. However, that document also includes tests that ~~may~~ can subject the **transformer** to conditions involving safety aspects.

The objective of IEC 61558-1 is to provide a set of requirements and tests considered to be generally applicable to most types of **transformers**, and which can be called up as required by the relevant part of IEC 61558-2. IEC 61558-1 is thus not to be regarded as a specification by itself for any type of **transformer**, and its provisions apply only to particular types of **transformers** to the extent determined by the appropriate part of IEC 61558-2. IEC 61558-1 also contains normative routine tests.

Each part of IEC 61558-2 in conjunction with this document contains all the necessary requirements for the **transformer** being covered and does not contain references to other parts of IEC 61558-2. For **transformers** with a protection index IP00 and associated **transformers**, it is possible to have circuits corresponding to different parts of IEC 61558-2 within the same construction (e.g. SELV output circuit according to IEC 61558-2-6 and a 230 V output circuit according to IEC 61558-2-4). However, if the **transformer** is covered by different parts IEC 61558-2, to the extent reasonable, the relevant part of IEC 61558-2 is applied to each function/application separately. If applicable, the effect of one function on the other is taken into consideration.

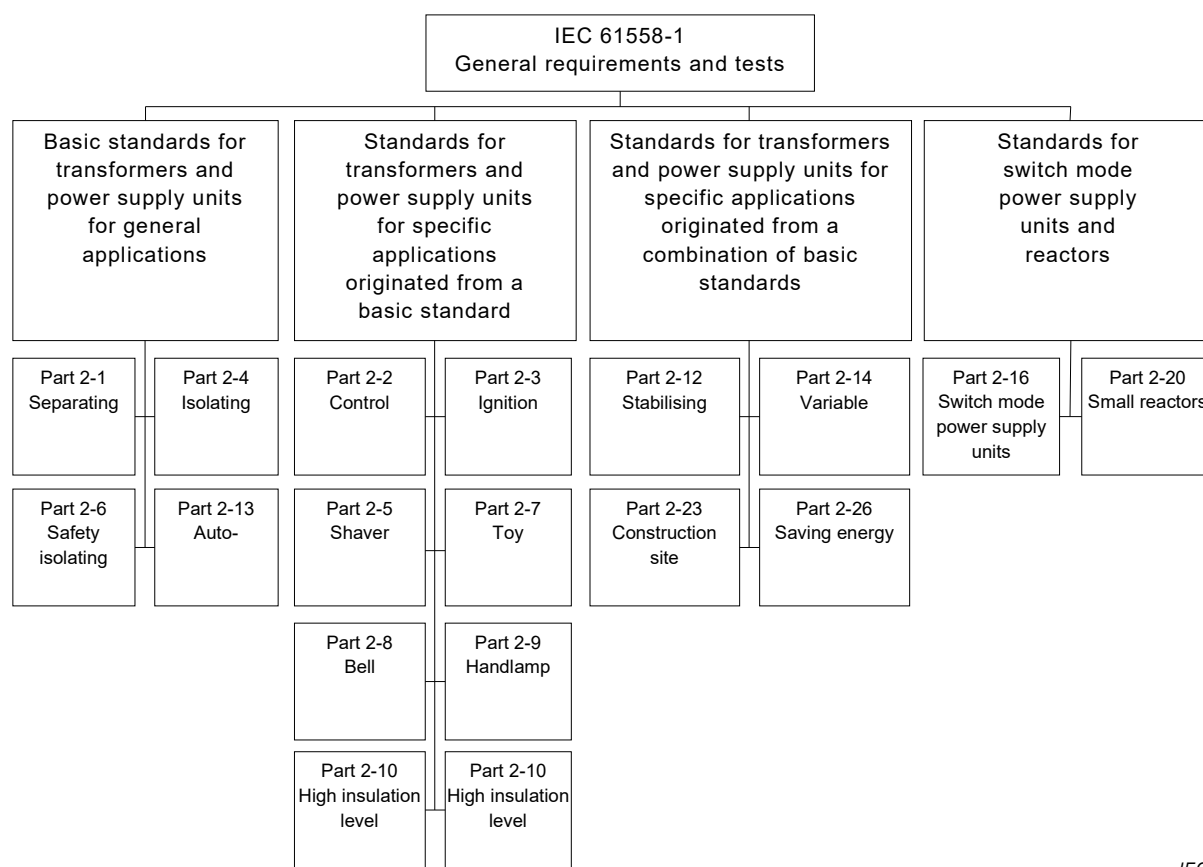
If an appropriate part of IEC 61558-2 does not exist for a particular **transformer** or group of **transformers**, the nearest applicable part may be used as a guide to the requirements and tests.

However, individual countries may wish to consider its application, to the extent reasonable, to transformers not mentioned in the IEC 61558-2 series, and to transformers designed on new principles.

Where the requirements of any of the clauses of a part of IEC 61558-2 refer to IEC 61558-1 by the phrase "This clause of Part 1 is applicable", this phrase means that all the requirements of that clause of IEC 61558-1 are applicable, except those requirements that are

clearly not applicable to the particular type of **transformer** covered by that part of IEC 61558-2.

The principle for the preparation of the different parts of IEC 61558-2 is as shown in Figure 1.



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Figure 1 – IEC 61558 principle

Relevant clauses of this document (e.g. clauses dealing with thermal endurance test for windings) apply also to **transformers** forming an integral part of an appliance and which cannot be tested separately.

~~As an option, the thermal characteristics of **transformers** can be specified by the rated maximum operating temperature of the winding (symbol t_w) which shall not be exceeded to ensure a minimum lifetime as specified in Annex U. In addition, for **transformers** subjected to abnormal conditions as specified in Clause 15, the specified temperature limit shall not be exceeded when the **transformer** is built into an appliance or used as an independent **transformer**.~~

The IEC 61558 series consists of the following parts, under the general title *Safety of transformers, reactors, power supply units and combination thereof*:¹

Part 1: General requirements and tests

Part 2-1: Particular requirements and tests for separating transformers for general applications

Part 2-2: Particular requirements and tests for control transformers

¹ Some of the parts of this series published earlier appeared under the general title *Safety of power transformers, power supplies, reactors and similar products* or *Safety of power transformers, power supply units and similar* or *Safety of power transformers, power supply units and similar devices*. Future editions of these parts will be issued under the new general title indicated above.

- Part 2-3: Particular requirements and tests for ignition transformers for gas and oil burners
- Part 2-4: Particular requirements and tests for isolating transformers
- Part 2-5: Particular requirements and tests for shaver transformers and shaver supply units
- Part 2-6: Particular requirements and tests for safety isolating transformers
- Part 2-7: Particular requirements and tests for transformers for toys
- Part 2-8: Particular requirements and tests for transformers for bells and chimes
- Part 2-9: Particular requirements and tests for transformers for class III handlamps for tungsten filament lamps
- Part 2-10: Particular requirements and tests for separating transformers with high insulation level and separating transformers with output voltages exceeding 1 000 V
- Part 2-12: Particular requirements and tests for constant voltage transformers
- Part 2-13: Particular requirements and tests for auto transformers
- Part 2-14: Particular requirements and tests for variable transformers
- Part 2-15: Particular requirements and tests for isolating transformers for the supply of medical locations
- Part 2-16: Particular requirements and tests for switch mode power supply units and transformers for switch mode power supply units
- Part 2-20: Particular requirements and tests for small reactors
- Part 2-23: Particular requirements and tests for transformers and power supply units for construction sites
- Part 2-26: Particular requirements and tests for transformers and power supply units all for saving energy and other purposes

Other parts are under consideration.

SAFETY OF ~~POWER TRANSFORMERS, POWER SUPPLIES,~~ REACTORS, POWER SUPPLY UNITS AND ~~SIMILAR PRODUCTS~~ COMBINATIONS THEREOF –

Part 1: General requirements and tests

1 Scope

This part of IEC 61558 deals with safety aspects of ~~power transformers, power supplies,~~ reactors, power supply units and ~~similar products~~ combinations thereof such as electrical, thermal and mechanical safety.

This document covers the following **independent or associated** stationary or portable types of **dry-type transformers, power-supplies supply units**, including **switch mode power supplies supply units, reactors** and combinations thereof in the field of safety. The windings ~~of which may~~ can be encapsulated or non-encapsulated. They are not forming a part of the distribution network.

NOTE 1 The distinction between transformers, power-~~supplies~~ supply units and switch mode power-~~supplies~~ supply units is as follows:

- for **transformers**, there is no change in frequency. However, **transformers** (e.g. constant voltage transformers) ~~may~~ can have an internal resonance frequency not exceeding 30 kHz;
- for **power-supplies supply units**, the **internal operational frequency** and waveform are different from the **supply frequency** and waveform, and the **internal operational frequency** does not exceed 500 Hz (see definition 3.1.19);
- for **switch mode power-supplies supply units**, the **internal operational frequency** and waveform are different from the **supply frequency** and waveform and the **internal operational frequency** exceeds 500 Hz and does not exceed 100 MHz.

The relevant parts of IEC 61558-2 ~~may~~ can be found in the introduction of this document.

a) Stationary or portable, single-phase or poly-phase, air-cooled (natural or forced), **isolating and safety isolating transformers, independent or associated, not forming a part of distribution networks and** with the following characteristics:

- **rated supply voltage** not exceeding 1 000 V AC;
- **rated supply frequency** not exceeding 500 Hz;

and complying with the following values, unless otherwise specified in the relevant part of IEC 61558-2:

- for **isolating transformers**:
 - rated output for single phase **transformers**, not exceeding 25 kVA, and for poly-phase **transformers** not exceeding 40 kVA;
 - **no-load output voltage** and the **rated output voltage** exceeding 50 V AC, and not exceeding 500 V a.c, or 1 000 V AC to be in accordance with the national wiring rules or for a special application.
- for **safety isolating transformers**:
 - **rated output** for single phase **transformers** not exceeding 10 kVA, and for poly-phase **transformers** not exceeding 16 kVA;
 - **no-load output voltage** and the **rated output voltage** not exceeding 50 V AC between conductors, or between any conductor and protective earthing.

NOTE 2 **Isolating** and **safety isolating transformers** are used where **double or reinforced insulation** between circuits is required by the installation rules or by the appliance specification (for example toys, bells, portable tools, handlamps).

a) **Stationary** or **portable**, single-phase or polyphase, air-cooled (natural or forced) **separating transformers**, **auto-transformers**, **variable transformers** and small **reactors**, **independent** or **associated**, ~~not forming a part of distribution networks and~~ with the following characteristics:

- **rated supply voltage** not exceeding 1 000 V AC;
- **rated supply frequency** not exceeding 500 Hz;

and complying with the following values, unless otherwise specified in the relevant part of IEC 61558-2:

- no-load output voltage or a rated output voltage for both independent and associated **transformers** not exceeding 15 kV AC, and for independent **transformers**, a rated output voltage not less than 50 V AC;
- **rated output** not exceeding the following values:
 - 1 kVA for single-phase **transformers**;
 - 2 kVAR for single-phase **reactors**;
 - 5 kVA for polyphase **transformers**;
 - 10 kVAR for polyphase **reactors**.

NOTE 3 **Separating transformers** are used where **double** or **reinforced insulation** between circuits is not required by the installation rules or by the appliance specification.

NOTE 4 Normally, the **transformers** of type b) are intended to be associated with the equipment to provide voltages different from the supply voltage for the functional requirements of the equipment. The protection against electric shock ~~may~~ can be provided or completed by other features of the equipment, such as the **body**. Parts of **output circuits** ~~may~~ can be connected to the **input circuit** or to the protective earthing.

b) **Stationary** or **portable**, single-phase or polyphase, air-cooled (natural or forced), **independent** or **associated power-supplies supply units** and **switch mode power supplies supply units** incorporating one or more **transformer(s)** of type a) or b), ~~not forming a part of distribution networks and~~ with the following characteristics:

- **rated supply voltage** not exceeding 1 000 V AC;
- **rated supply frequency** not exceeding 500 Hz;
- internal operational frequency for power ~~supplies~~ **supply units** not exceeding 500 Hz and for switch mode power ~~supplies~~ **supply units** not exceeding 100 MHz;

and with the following values, unless otherwise specified in the relevant part of IEC 61558-2:

- for power ~~supplies~~ **supply units** and switch mode power ~~supplies~~ **supply units** incorporating isolating **transformers**:
 - **rated output** for single- phase or polyphase **power-supplies supply units** or **switch mode power-supplies supply units** not exceeding 1 kVA;
 - **no-load output voltage** and the **rated output voltage** exceeding 50 V AC or 120 V ripple-free DC, and not exceeding 500 V AC or 708 V ripple-free DC, or 1 000 V AC or 1 415 V ripple- free DC to be in accordance with national wiring rules or for a special application;
- for **power-supplies supply units** and **switch mode power-supplies supply units** incorporating **safety isolating transformers**:
 - **rated output** for single- phase or polyphase **power-supplies supply units** and **switch mode power-supplies supply units** not exceeding 1 kVA;
 - **no-load output voltage** and **rated output voltage** not exceeding 50 V AC or 120 V ripple-free DC between conductors, or between any conductor and protective earthing.

NOTE 5 **Power-supplies supply units** and **switch mode power-supplies supply units** incorporating **isolating** and **safety isolating transformers** are used where **double** or **reinforced insulation** between circuits is required by the installation rules or by the appliance specification (for example toys, bells, portable **tools**, handlamps).

- for **power-supplies supply units** and **switch mode power-supplies supply units** incorporating **separating transformers**, **auto-transformers**, and **variable transformers**:
 - **rated output** for single-phase or polyphase **power-supplies supply units** and **switch mode power-supplies supply units** not exceeding 1 kVA;
 - **no-load output voltage** and **rated output voltage** for both, **independent** and **associated transformers** not exceeding 15 kV AC, and for **independent transformers**, a **rated output voltage** not less than 50 V AC.

NOTE 6 **Power-supplies supply units** and **switch mode power-supplies supply units** incorporating **separating transformers** are used where **double** or **reinforced insulation** between circuits is not required by the installation rules or by the appliance specification.

~~d) This standard is also applicable to t_w -marked transformers with a rated output not exceeding 1 000 VA and where the t_w temperature does not exceed 140 °C (t_w 140). However, t_w -marking of transformers is optional.~~

This document also applies to **transformers**, **power-supplies supply units**, **switch mode power-supplies supply units** and **reactors** incorporating electronic circuits.

This document is applicable to **transformers** without limitation of the **rated output** subject to an agreement between the purchaser and the manufacturer.

This document does not apply to external circuits and their components intended to be connected to the input ~~and~~ or output terminals or socket-outlets of the **transformers**, **power supplies supply units** and **switch mode power-supplies supply units**, and **reactors**.

NOTE Attention is drawn to the following:

- for **transformers** intended to be used in vehicles, on board ships, and aircraft, additional requirements (from other applicable standards, national rules, etc...) may be necessary;
- measures to protect the **enclosure** and the components inside the enclosure against external influences like fungus, vermin, termites, solar-radiation, and icing ~~should also be~~ **are** considered;
- the different conditions for transportation, storage, and operation of the **transformers** should also be considered;
- additional requirements in accordance with other appropriate standards and national rules ~~may~~ **can** be applicable to **transformers** intended for use in special environments, such as tropical environments.

NOTE Future technological development of **transformers** ~~may~~ **can** necessitate a need to increase the upper limit of the frequencies; until then this document ~~may~~ **can** be used as a guidance document.

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.

IEC 60065:2001 2014, *Audio, video and similar electronic apparatus – Safety requirements for mains operated electronic and related apparatus for household and similar general use*

~~IEC 60068-2-2:1974, Environmental testing – Part 2: Tests – Test B: Dry heat~~

IEC 60068-2-6, *Environmental testing – Part 2-6: Tests – Test FC: Vibration (sinusoidal)*

IEC 60068-2-14, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-31, *Environmental testing – Part 2-31: Tests – Test Ec: Rough handling shocks, primarily for equipment-type specimens*

~~IEC 60068-2-32, *Environmental testing – Part 2: Tests – Test Ed: Free fall*~~

IEC 60068-2-75, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC 60076-1, *Power transformers – Part 1: General*

IEC 60076-11:2004, *Power transformers – Part 11: Dry-type transformers*

IEC TR 60083, *Plugs and socket-outlets for domestic and similar general use standardized in member countries of IEC*

IEC 60085:1984 2007, *Electrical insulation – Thermal evaluation and ~~classification of electrical insulation~~ designation*

IEC 60112:2003, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60127 (all parts), *Miniature fuses*

IEC 60127-3, *Miniature fuses – Part 3: Sub-miniature fuse-links*

IEC 60216 (all parts), *Electrical insulating materials – ~~Properties of~~ Thermal endurance properties*

IEC 60227 (all parts), *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V*

IEC 60227-5:2011, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V – Part 5: Flexible cables (cords)*

IEC 60245 (all parts), *Rubber insulated cables – Rated voltages up to and including 450/750 V*

IEC 60245-4:2011, *Rubber insulated cables – Rated voltages up to and including 450/750 V – Part 4: Cords and flexible cables*

IEC 60269 (all parts), *Low voltage fuses*

IEC 60269-2:2013, *Low voltage fuses – Part 2: Supplementary requirements for fuses for use by authorized persons (fuses mainly for industrial application) – Examples of standardized systems of fuses A to K*

~~IEC 60269-2-1, *Low voltage fuses – Part 2: Supplementary requirements for fuses for use by authorized persons (fuses mainly for industrial application) – Sections I to VI: Examples of types of standardized fuses*~~

IEC 60269-3:2010, *Low voltage fuses – Part 3: Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household ~~and~~ or similar applications) – Examples of standardized systems of fuses A to F*

~~IEC 60269-3-1, Low voltage fuses – Part 3: Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household and similar applications) – Sections I to IV: examples of types of standardized fuses~~

IEC 60309 (all parts), *Plugs, socket-outlets and couplers for industrial purposes*

IEC 60317 (all parts), *Specifications for particular types of windings wires*

IEC 60317-0-7:2012, *Specifications for particular types of winding wires – Part 0-7: General requirements – Fully insulated (FIW) zero-defect enamelled round copper wire with nominal conductor diameter of 0,040 mm to 1,600 mm*

IEC 60317-56, *Specifications for particular types of winding wires – Part 56: Solderable fully insulated (FIW) zero-defect polyurethane enamelled round copper wire with nominal conductor diameter 0,040 mm to 1,600 mm, class 180*

IEC 60320 (all parts), *Appliance couplers for household and similar general purposes*

IEC 60320-2-3, *Appliance couplers for household and similar general purposes – Part 2-3: Appliance couplers with a degree of protection higher than IPX0*

IEC 60384-14:2013, *Fixed capacitors for use in electronic equipment – Part 14: Sectional specification: Fixed capacitors for electromagnetic interference suppression and connection to the supply mains*

IEC 60417-DB:2002²⁾, *Graphical symbols for use on equipment*
(available at <http://www.graphical-symbols.info/equipment>)

~~IEC 60449:1973, Voltage bands for electrical installations of buildings~~

IEC 60454 (all parts), ~~Specification for~~ *Pressure-sensitive adhesive tapes for electrical purposes*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*
IEC 60529:1989/AMD1:1999
IEC 60529:1989/AMD2:2013

IEC 60664-1:1992 2007, *Insulation coordination for equipment within low voltage systems – Part 1: Principles, requirements and tests*

IEC 60664-3:2003 2016, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

IEC 60691:2002 2015, *Thermal-links – Requirements and application guide*

IEC 60695-2-10:2013, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC 60695-2-11:2000 2014, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods –Glow-wire flammability test method for end-products*

~~IEC 60695-10-2, Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test~~

2) "DB" refers to the IEC on-line database.

IEC 60721-3-2, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 2: Transportation*

IEC 60730 (all parts), *Automatic electrical controls* ~~for household and similar use~~

IEC 60730-1: ~~1999~~ 2013, *Automatic electrical controls* ~~for household and similar use~~ – Part 1: *General requirements*

IEC 60851-3: ~~1996~~ 2009, *Winding wires – Test methods: Part 3: Mechanical properties*

IEC 60851-5: ~~1996~~ 2008, *Winding wires – Test methods: Part 5: Electrical properties*

IEC 60851-6: ~~1996~~ 2012, *Winding wires – Test methods: Part 6: Thermal properties*

IEC 60884-1:2002, *Plugs and socket-outlets for household and similar purposes – Part 1: General requirements*

IEC 60884-1:2002/AMD1:2006

IEC 60884-1:2002/AMD2:2013

IEC 60884-2-4, *Plugs and socket-outlets for household and similar purposes – Part 2-4: Particular requirements for plugs and socket-outlets for SELV*

IEC 60898 (all parts), *Electrical accessories – Circuit-breakers for overcurrent protection for household and similar installations*³⁾

IEC 60906-1, *IEC system of plugs and socket-outlets for household and similar purposes – Part 1: Plugs and socket-outlets 16 A 250 V a.c.*

IEC 60906-3, *IEC system of plugs and socket-outlets for household and similar purposes – Part 3: SELV plugs and socket-outlets, 16 A 6 V, 12 V, 24 V, 48 V, a.c. and d.c.*

IEC 60947-7-1, *Low-voltage switchgear and controlgear – Part 7-1: Ancillary equipment – Terminal blocks for copper conductors*

IEC 60990: ~~1990~~ 2016, *Methods of measurement of touch current and protective conductor current*

IEC 60998-2-1, *Connecting devices for low-voltage circuits for household and similar purposes – Part 2-1: Particular requirements for connecting devices as separate entities with screw-type clamping units*

IEC 60998-2-2, *Connecting devices for low-voltage circuits for household and similar purposes – Part 2-2: Particular requirements for connecting devices as separate entities with screwless-type clamping units*

IEC 60999-1, *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units* ~~for electrical copper conductors~~ – Part 1: *General requirements and particular requirements for clamping units for conductors from 0,5 mm² up to 35 mm² (included)*

IEC 61032: ~~1997~~, *Protection of persons and equipment by enclosures – Probes for verification*

IEC 61058-1: ~~2000~~ 2016, *Switches for appliances – Part 1: General requirements*

³⁾ IEC 60898-2 is published under the general title *Circuit-breakers for overcurrent protection for household and similar installations* (i.e. without the element of "Electrical accessories" in the title).

IEC 61058-1-1:2016, *Switches for appliances – Part 1-1: Requirements for mechanical switches*

IEC 61140:2016, *Protection against electric shock – Common aspects for installation and equipment*

IEC 61373, *Railway applications – Rolling stock equipment – Shock and vibration tests*

~~ISO 4046-4:2002, *Paper, board, pulp and related terms – Vocabulary*~~

ISO 8820 (all parts), *Road vehicles – Fuse-links*

EN 50075:1990, *Specification for flat non-wirable two-pole plugs 2.5 A 250 V, with cord, for the connection of class II-equipment for household and similar purposes*

DIN 43671:1975, *Copper bus bars; design for continuous current*

DIN 43670:1975, *Aluminium bus bars; design for continuous current*

DIN 43670-2:1985, *Aluminium bus bars copper cladding; design for continuous current*