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REDLINE VERSION

INTERNATIONAL STANDARD

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GROUP ENERGY EFFICIENCY PUBLICATION

Safety of transformers, reactors, power supply units and combinations thereof – Part 2-8: Particular requirements and tests for transformers and power supply units for bells and chimes

IEC 61558-2-8:2024-06 RLV(en)

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COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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SAFETY OF TRANSFORMERS, REACTORS, POWER SUPPLY UNITS AND COMBINATIONS THEREOF –

Part 2-8: Particular requirements and tests for transformers and power supply units for bells and chimes

FOREWORD

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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 61558-2-8:2010. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC 61558-2-8 has been prepared by IEC technical committee 96: Transformers, reactors, power supply units and combinations thereof. It is an International Standard.

This third edition cancels and replaces the second edition published in 2010. This edition constitutes a technical revision.

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

a) adjustment of structure and references in accordance with IEC 61558-1:2017;

b) new symbol for power supply unit with linearly regulated output voltage.

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

Draft	Report on voting
96/592/FDIS	96/598/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this document is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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

This document is to be used in conjunction with IEC 61558-1:2017.

This document supplements or modifies the corresponding clauses in IEC 61558-1:2017, so as to convert that publication into the IEC standard: *Particular requirements and tests for transformers and power supply units for bells and chimes.*

A list of all parts in the IEC 61558 series published under the general title *Safety of transformers, reactors, power supply units and combinations 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.

Where this document states *"addition", "modification"* or *"replacement"*, the relevant text of IEC 61558-1:2017 is to be adopted accordingly.

In this document, the following print types are used:

– requirements proper: in roman type;

– *test specifications: in italic type*;

– explanatory matter: in smaller roman type.

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

Subclauses, notes, figures and tables additional to those in IEC 61558-1:2017 are numbered starting from 101; supplementary annexes are entitled AA, BB, etc.

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

- reconfirmed,
- withdrawn, or
- revised.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

IEC TC 96 has a group safety function in accordance with IEC Guide 104 for transformers other than those intended to supply distribution networks, in particular transformers and power supply units intended to allow the application of protective measures against electric shock as defined by TC 64, which is about Electrical installations and protection against electric shock, but in certain cases including the limitation of voltage and horizontal safety function for SELV, in accordance with IEC 60364-4-41.

The group safety function (GSF) is used because of responsibility for example for safety extra-low voltage (SELV) in accordance with IEC 61140:2016, 5.2.6 and IEC 60364-4-41:2005, 414.3.1 or control circuits in accordance with IEC 60204-1:2016, 7.2.4.

The group safety function is used for each part of IEC 61558-2 because different standards of the IEC 61558 series can be combined in one construction but in certain cases with no limitation of rated output power.

For example an auto-transformer in accordance with IEC 61558-2-13 can be designed with a separate SELV-circuit in accordance with the particular requirements for IEC 61558-2-6 relating to the general requirements of IEC 61558-1.

SAFETY OF TRANSFORMERS, REACTORS, POWER SUPPLY UNITS AND COMBINATIONS THEREOF –

Part 2-8: Particular requirements and tests for transformers and power supply units for bells and chimes

1 Scope

Replacement:

This part of IEC 61558 deals with the safety of **bell and chime transformers** and **power supply units** incorporating **bell and chime transformers**. **Transformers** incorporating **electronic circuits** are also covered by this document.

NOTE 1 Safety includes electrical, thermal and mechanical aspects.

Unless otherwise specified, from here onward, the term **transformer** covers **bell and chime transformers** and **power supply units** incorporating **bell and chime transformers**.

For **power supply units** (linear) this document is applicable. For **switch mode power supply units** IEC 61558-2-16 is applicable together with this document. Where two requirements are in conflict, the most severe take precedence.

This document is applicable to **stationary**, single-phase, air-cooled (natural or forced) **independent** or **associated dry-type transformers.** The windings ~~may~~ can be encapsulated or non-encapsulated.

~~This standard is applicable to **transformers** and **power supply** (linear).~~

~~This standard used in combination with part 2-16 for **switch mode power supply** (**SMPS**) units is also applicable to power supplies with internal operating frequencies higher than 500 Hz. Where the two requirements are in conflict, the most severe takes precedence.~~

The **rated supply voltage** does not exceed 250 V AC and the **rated supply frequency** and ~~does~~ the **internal operating frequencies** do not exceed 500 Hz. ~~This standard is applicable to **transformers** and linear **power supply** units with internal operating frequency not exceeding 500 Hz.~~

The **rated output** ~~shall~~ does not exceed 100 VA.

The **no-load output voltage** does not exceed 33 V AC or 46 V ripple-free DC, and the **rated output voltage** does not exceed 24 V AC, or 33 V ripple-free DC.

Bell and chime transformers are generally intended to supply domestic sound signalling equipment and other similar devices where the load is applied for short periods of time.

NOTE 2 A partial load ~~may~~ can be applied for illumination purposes.

This document is not applicable to external circuits and their components intended to be connected to the input terminals and output terminals of the **transformers**.

NOTE 3 **Transformers** covered by this document are only used in applications where **double** or **reinforced insulation** between circuits is required by the installation rules or by the end product standard.

NOTE 4 Normally the **transformers** are intended to be used with 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 circuits** or to protective earthing.

This document is applicable to **transformers** associated with specific equipment, to the extent decided upon by the relevant IEC technical committees.

~~NOTE 4~~ Attention is drawn to the following, if necessary:

- measures to protect the **enclosure** and the components inside the enclosure against external influences such as fungus, vermin, termites, solar-radiation, and icing ~~should also be 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 environment~~.

~~NOTE 5~~ 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.

This group safety publication focusing on safety guidance is primarily intended to be used as a product safety standard for the products mentioned in the scope but is also intended to be used by technical committees in the preparation of publications for products similar to those mentioned in the scope of this group safety publication, in accordance with the principles laid down in IEC Guide 104 and ISO/IEC Guide 51.

One of the responsibilities of a technical committee is, wherever applicable, to make use of basic safety publications and/or group safety publications in the preparation of its publications.

2 Normative references

This clause of IEC 61558-1:2017 is applicable except as follows:

Addition:

IEC 61558-1:~~2005~~2017, ~~*Safety of power transformers, power supplies, reactors and similar products*~~ *Safety of transformers, reactors, power supply units and combinations thereof – Part 1: General requirements and tests*

IEC 61558-2-16:2021, *Safety of transformers, reactors, power supply units and combinations thereof – Part 2-16: Particular requirements and tests for switch mode power supply units and transformers for switch mode power supply units for general applications*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61558-1:2017 apply, except as follows:

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

3.1 Transformers

Addition:

3.1.101
bell and chime transformer
single-phase **safety isolating transformer** specifically intended to supply household sound signalling equipment and other similar devices

4 General requirements

This clause of IEC 61558-1:2017 is applicable.

5 General notes on tests

This clause of IEC 61558-1:2017 is applicable.

6 Ratings

~~*Replacement :*~~

This clause of IEC 61558-1:2017 is applicable except as follows:

Addition:

6.101 The **rated output voltage** shall not exceed 24 V AC or 33 V ripple-free DC.

For **independent transformers**, this **output voltage** limitation applies even when **output windings**, not intended for interconnection, are connected in series.

6.102 The **rated output** shall not exceed 100 VA.

6.103 The **rated supply frequency** and the **internal operating frequencies** shall not exceed 500 Hz.

6.104 The **rated supply voltage** shall not exceed 250 V AC.

Compliance with the requirements of 6.101 to 6.104 is checked by inspection of the marking.

7 Classification

This clause of IEC 61558-1:2017 is applicable except as follows:

7.2

Replacement:

7.2 Transformers are classified according to the short-circuit ~~protection~~ characteristic or protection against abnormal use:

- **inherently short-circuit proof transformers**;
- **non-inherently short-circuit proof transformers**;
- **fail-safe transformers**.

7.4

Replacement:

7.4 Transformers are classified according to their mobility:

– **fixed transformers**.

7.5

Replacement:

7.5 Transformers are classified according to their **duty-type**:

– **short-time duty cycle**;
– **intermittent duty cycle**.

NOTE 1 A partial load for illumination ~~may~~ can be applied continuously.

7.8

Replacement:

7.8 Transformers are classified according to their transient overvoltage condition:

– **overvoltage category II**

Addition:

7.101 Transformers are classified according to the method of mounting:

– mounting in a distribution assembly;
– mounting in sound signalling devices (bells, chimes, buzzers, etc.);
– mounting on an outlet box or cabinet;
– flush mounted;
– surface mounted.

8 Marking and other information

This clause of IEC 61558-1:2017 is applicable except as follows:

8.1 ~~**h)** *Replacement:*~~

~~The transformers shall be marked with one of the graphical symbols shown in 8.11;~~

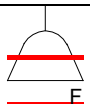
h)

Replacement of the content up to the first semi-colon by the following:

relevant graphical symbols shown in Table 101 that indicate the kind of **transformer**

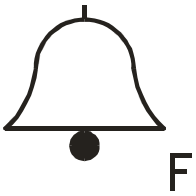
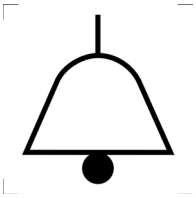
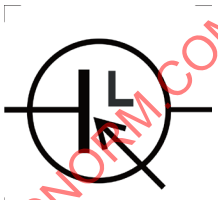
8.11

Addition:

~~Symbol or graphical symbol~~	~~Explanation or title~~	~~Identification~~
	~~Fail-safe **bell and chime transformer**~~	~~Based on Symbol IEC 60417-5013 (2009-05)~~
	~~Short-circuit proof **bell and chime transformer** (inherently or non-inherently)~~	~~IEC 60417-5013 (2009-05)~~

The symbol for linear **power supply units** shall be used in conjunction with the symbol indicating the kind of **transformer**.

Table 101 – Symbols indicating the kind of transformer

Symbol or graphical symbol	Explanation or title	Identification
	**Fail-safe bell and chime transformer**	IEC 60417-5013:2002-10 modified
	**Short-circuit-proof bell and chime transformer** (inherently or non-inherently)	IEC 60417-5013:2002-10
	**Power supply unit, linear**	IEC 60417-6210:2013-10

9 Protection against electric shock

This clause of IEC 61558-1:2017 is applicable except as follows:

Addition:

9.101 Protection against accidental contact with windings and **hazardous live parts** of the **input circuit** shall be ensured while connecting conductors to the output terminals.

*Compliance is checked by inspection and by the application of the standard test finger shown in Figure ~~2~~ 4. It shall not be possible to touch windings or **hazardous live parts** of the **input circuit** with the test finger.*

10 Change of input voltage setting

This clause of IEC 61558-1:2017 is applicable.

11 Output voltage and output current under load

This clause of IEC 61558-1:2017 is applicable except as follows:

11.1

Replacement:

11.1 When the **transformer** is connected to the **rated supply voltage**, at the **rated supply frequency**, and loaded with an impedance resulting in the **rated output** at the **rated output voltage** and, for AC current, at the **rated power factor**, the output voltage shall not differ from the rated value by more than:

a) 15 % for the output voltage of **inherently short-circuit proof transformers** with one **rated output voltage**;

b) 15 % for the highest output voltage of **inherently short-circuit proof transformers** with more than one **rated output voltage**;

c) 20 % for the other output voltages of **inherently short-circuit proof transformers** with more than one **rated output voltage**;

d) 15 % for the output voltages of other **transformers**.

*Compliance is checked by measuring the output voltage 2 min after the **transformer** is connected to the **rated supply voltage**, at the **rated supply frequency**, and loaded with an impedance resulting in the **rated output**, at the **rated output voltage** and the **rated power factor**.*

*For **transformers** with more than one **rated supply voltage**, the requirement is applicable for each of the **rated supply voltages**.*

*For **transformers** with multiple **output windings**, the loads are applied to every multiple section simultaneously, unless otherwise declared.*

12 No-load output voltage

This clause of IEC 61558-1:2017 is applicable except as follows:

Addition:

~~The **no-load output voltage** is measured when the **transformer** is connected to the **rated supply voltage** at the **rated supply frequency** at ambient temperature.~~

12.101 The **no-load output voltage** shall not exceed 33 V AC or 46 V ripple free DC.

For **independent transformers**, this **output voltage** limitation applies even when ~~independent~~ **output windings**, not intended for interconnection, are connected in series.

12.102 The difference between the **no-load output voltage** and the **output voltage** under load shall not be excessive.

The ~~difference~~ ratio between the **no-load output voltage** measured in Clause 12 and the **output voltage** under load measured during the test of Clause 11, expressed as a percentage of the latter voltage, shall not exceed 100 %.

~~NOTE~~ The ratio is determined by Formula (1):

$$\frac{U_{\text{no-load}} - U_{\text{load}}}{U_{\text{load}}} \times 100(\%) \quad (1)$$

where

$U_{\text{no-load}}$ is the no-load output voltage, expressed in V;

U_{load} is the output voltage under load, expressed in V.

*Compliance with the requirements of 12.101 and 12.102 is checked by measuring the **no-load output voltage** at the **ambient temperature** when the **transformer** is connected to **the rated supply voltage** at the **rated supply frequency**.*

13 Short-circuit voltage

This clause of IEC 61558-1:2017 is applicable.

14 Heating

This clause of IEC 61558-1:2017 is applicable except as follows:

14.1.1 Temperature-rise test

Replacement of the ~~second~~ third paragraph:

Temperatures are determined under the following conditions.

Replacement of the ~~tenth~~ eleventh paragraph:

***Transformers** are supplied at **rated supply voltage** and loaded with an impedance Z producing **rated output** at the **rated output voltage** and, for AC current, at the **rated power factor**. The value of output current is measured after 1 min. Then the supply voltage is increased by 10 % and the output impedance is adjusted so that the new impedance Z' gives the same output current than the value measured before. **Transformers** are submitted to 20 cycles of 1 min operation with the impedance Z' and 5 min operation with 5 times the impedance Z'. Temperature rises are measured during the last cycle.*

14.1.3 Determination of steady-state conditions

*Addition of the following footnote ~~to table "f" to "External **enclosures**" in Table 1~~ "g" in Table 2 to "External **enclosures**":*

~~f~~g The external **enclosure** of a **transformer** only includes the parts accessible to the standard test finger when mounted in accordance with 14.1.1.

Addition of the following footnote ~~to table "g" to "supports" in Table 1~~ "h" in Table 2 to "Supports":

gh Support includes any area of the black painted plywood support, but excludes any metal parts of the mounting system (rails, outlet boxes, etc.).

15 Short-circuit and overload protection

This clause of IEC 61558-1:2017 is applicable except as follows:

Addition:

15.101 The maximum short-circuit output current shall not exceed 10 A, measured 5 s after applying the short-circuit, the **transformer** being supplied with 1,1 times the **rated supply voltage**.

16 Mechanical strength

This clause of IEC 61558-1:2017 is applicable except as follows:

16.2 Stationary transformers

Replacement:

The impact hammer shall have an energy of (0,2 ± 0,05) J.

17 Protection against harmful ingress of dust, solid objects and moisture

This clause of IEC 61558-1:2017 is applicable.

18 Insulation resistance, dielectric strength and leakage current

This clause of IEC 61558-1:2017 is applicable.

19 Construction

This clause of IEC 61558-1:2017 is applicable except as follows:

19.1 General construction

Replacement:

19.1 The **input** and **output circuits** shall be electrically separated from each other, and the construction shall be such that there is no possibility of any connection between these circuits, either directly or indirectly, through other **conductive parts**, except by deliberate action.

Compliance is checked by inspection and measurements, taking Clause 18 and Clause 26 into consideration.

19.1.1 The insulation between **input** and **output winding**(s) shall consist of **double** or **reinforced insulation** (rated for the **working voltage**).

In addition, the following applies:

– for **class I transformers** not intended for connection to the mains supply by means of a plug, the insulation between the **input windings** and the **body** connected to earthing shall consist of at least **basic insulation** rated for the **input voltage**. The insulation

between the **output windings** and the **body** connected to earthing, shall consist of at least **basic insulation** (rated for the **output voltage**);

– for **class I transformers** intended for connection to the mains supply by means of a plug, the insulation between the **input windings** and the **body** shall consist of at least **basic insulation**, and the insulation between the **output windings** and the **body** shall consist of at least **supplementary insulation** (both **basic** and **supplementary insulation**s rated for the **working voltage**);

– for **class II transformers**, the insulation between the **input windings** and the **body** shall consist of **double** or **reinforced insulation** (rated for the **input voltage**). The insulation between the **output windings** and the **body** shall consist of **double** or **reinforced insulation** (rated for the **output voltage**).

19.1.2 For **transformers** with **intermediate conductive parts** (e.g. the iron core) not connected to the **body** and located between the **input** and **output windings** the insulation between the **input windings** and any **intermediate conductive part** shall consist of at least **basic insulation**, and the insulation between the **output windings** and any **intermediate conductive part** shall consist of at least **supplementary insulation** (both basic and **supplementary insulation**s rated for the **working voltage**).

NOTE 1 An **intermediate conductive part** not separated from the **input** or **output windings** or the **body** by at least **basic insulation** is considered to be connected to the relevant part(s).

NOTE 2 **Basic insulation** and **supplementary insulation** are interchangeable.

In addition, the following applies:

– for **class I transformers**, the insulation between the **input** and **output windings** via the **intermediate conductive parts** (even if they are connected to earthing) shall consist of double or **reinforced insulation** (rated for the **working voltage**);

– for **class II transformers**, the insulation between the **input windings** and the **body** via the **intermediate conductive parts** (if any) shall consist of **double** or **reinforced insulation** (rated for the **input voltage**), and the insulation between the **body** and the **output windings** via the **intermediate conductive parts** (if any) and the **body** via the **intermediate conductive parts** shall consist of double or **reinforced insulation** (rated for the **input** and **output voltage**);

– for **transformers** different from **independent** (IP00), the insulation between the **input** and **output windings** via the **intermediate conductive parts** shall consist of **double** or **reinforced insulation** (rated for the **working voltage**).

NOTE 3 In 19.1.2 the possibility to consider the intermediate metal part connected to earthing and consequently to require **basic insulation** in both circuits (primary and secondary) is not allowed for the following reason:

– the intermediate metal part is normally the iron core made by laminated plates insulated to each other by oxide. It is not assured that all foils are correctly connected to the earthing.

– for **transformers** different from **independent**, it is not assured that in the final applications the iron core will be connected to earthing.

Addition:

19.101 There shall be no connections between the **output circuit** and the protective earthing, unless allowed by the relevant equipment standard for **associated transformers**.

19.102 There shall be no connections between the **output circuit** and the **body**, unless this is allowed by the relevant equipment standard for **associated transformers**.

Compliance is checked by inspection.

19.103 These **input** and **output terminals** for the connection of external wiring shall be so located that the distance measured between the points of introduction of the conductors into these terminals is not less than 25 mm. If a barrier is used to obtain this distance, the

measurement shall be made over and around the barrier which shall be of insulating material and permanently fixed to the **transformer**.

Compliance is checked by inspection and by measurement disregarding ***intermediate conductive parts****.*

20 Components

This clause of IEC 61558-1:2017 is applicable. except as follows:

20.4

Modification:

20.4 If the **transformer** incorporates a switch intended to disconnect the **input winding** from the supply, this switch ~~may~~ can be of single-pole micro-gap construction and ~~may~~ can disconnect either pole.

21 Internal wiring

This clause of IEC 61558-1:2017 is applicable.

22 Supply connection and other external flexible cables or cords

This clause of IEC 61558-1:2017 is applicable except as follows:

~~*Modification:*~~

22.3

Replacement of the first paragraph as follows:

22.3 Flush-type transformers ~~may~~ can be designed so that connection of the external conductors to the terminals ~~has to be~~ are made before the **transformer** is fitted into a flush mounting box.

22.5

Replacement:

22.5 Power supply cords of **transformers** shall ~~not~~ be ~~lighter than light~~ at least ordinary polyvinyl chloride sheathed flexible cords ~~(code designation 60227 IEC 53)~~ according to IEC 60227-5:2011 – type 60227 IEC 53 or ordinary tough rubber sheathed flexible cords ~~(code designation 60245 IEC 53)~~ according to IEC 60245-4:2011 – type 60245 IEC 53.

23 Terminals for external conductors

This clause of IEC 61558-1:2017 is applicable.

24 Provisions for protective earthing

This clause of IEC 61558-1:2017 is applicable.

25 Screws and connections

This clause of IEC 61558-1:2017 is applicable except as follows:

25.3

Addition:

This requirement is not applicable to electrical connections other than protective earthing connections on the **output circuits** of the **transformers** with a **rated output** not exceeding 12 VA.

26 Creepage distances, clearances and distances through insulation

This clause of IEC 61558-1:2017 is applicable.

27 Resistance to heat, fire and tracking

This clause of IEC 61558-1:2017 is applicable.

28 Resistance to rusting

This clause of IEC 61558-1:2017 is applicable.

Annexes

The annexes of IEC 61558-1:2017 are applicable except as follows:

Annex F
(normative)

Requirements for manually operated switches which are parts of transformers assembly

This annex of IEC 61558-1:2017 is applicable except as follows:

F.2 Switches tested as a separate component

~~*Addition:*~~

~~*Add a third dash after the first paragraph of F.2:*~~

~~– subclause 7.1.4.4: the number of operating cycles shall be 1 000.~~

Addition of a third bullet point after the first paragraph of Clause F.2:

- 7.4.7: the number of operating cycles shall be 1 000.

Bibliography

The bibliography of IEC 61558-1:2017 is applicable, except as follows:

Addition:

IEC 60204-1:2016, *Safety of machinery – Electrical equipment of machines – Part 1: General requirements*

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

IEC 61558 (all parts), *Safety of transformers, reactors, power supply units and combinations thereof*

IEC 61558-2-13, *Safety of transformers, reactors, power supply units and combinations thereof – Part 2-13: Particular requirements and tests for auto-transformers and power supply units incorporating auto-transformers for general applications*

~~IEC 61558-2-16:2009, *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V – Part 2-16: Particular requirements and tests for switch mode power supply units and transformers for switch mode power supply units*~~

ISO/IEC GUIDE 51:2014, *Safety aspects – Guidelines for their inclusion in standards*

IEC 61558-2-8

Edition 3.0 2024-06

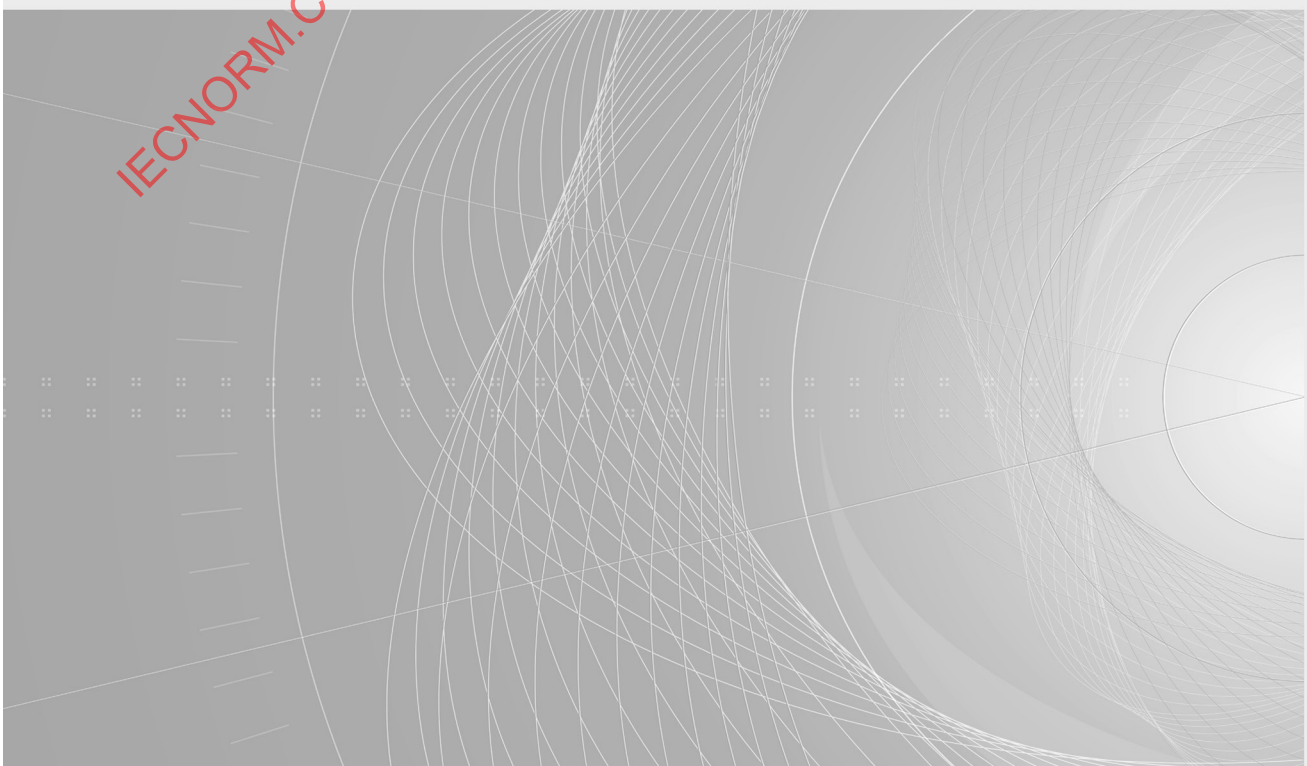
INTERNATIONAL STANDARD

NORME INTERNATIONALE

GROUP ENERGY EFFICIENCY PUBLICATION
PUBLICATION GROUPÉE SUR L'EFFICACITÉ ÉNERGÉTIQUE

Safety of transformers, reactors, power supply units and combinations thereof – Part 2-8: Particular requirements and tests for transformers and power supply units for bells and chimes

Sécurité des transformateurs, bobines d'inductance, blocs d'alimentation et des combinaisons de ces éléments – Partie 2-8 : Exigences particulières et essais pour les transformateurs et blocs d'alimentation pour sonneries et carillons



IEC 61558-2-8:2024-06(en-fr)

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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SAFETY OF TRANSFORMERS, REACTORS, POWER SUPPLY UNITS AND COMBINATIONS THEREOF –

Part 2-8: Particular requirements and tests for transformers and power supply units for bells and chimes

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
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8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 61558-2-8 has been prepared by IEC technical committee 96: Transformers, reactors, power supply units and combinations thereof. It is an International Standard.

This third edition cancels and replaces the second edition published in 2010. This edition constitutes a technical revision.

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

a) adjustment of structure and references in accordance with IEC 61558-1:2017;
b) new symbol for power supply unit with linearly regulated output voltage.

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

Draft	Report on voting
96/592/FDIS	96/598/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this document is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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

This document is to be used in conjunction with IEC 61558-1:2017.

This document supplements or modifies the corresponding clauses in IEC 61558-1:2017, so as to convert that publication into the IEC standard: *Particular requirements and tests for transformers and power supply units for bells and chimes.*

A list of all parts in the IEC 61558 series published under the general title *Safety of transformers, reactors, power supply units and combinations 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.

Where this document states *"addition"*, *"modification"* or *"replacement"*, the relevant text of IEC 61558-1:2017 is to be adopted accordingly.

In this document, the following print types are used:

– requirements proper: in roman type;

– *test specifications: in italic type*;

– explanatory matter: in smaller roman type.

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

Subclauses, notes, figures and tables additional to those in IEC 61558-1:2017 are numbered starting from 101; supplementary annexes are entitled AA, BB, etc.

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

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

IEC TC 96 has a group safety function in accordance with IEC Guide 104 for transformers other than those intended to supply distribution networks, in particular transformers and power supply units intended to allow the application of protective measures against electric shock as defined by TC 64, which is about Electrical installations and protection against electric shock, but in certain cases including the limitation of voltage and horizontal safety function for SELV, in accordance with IEC 60364-4-41.

The group safety function (GSF) is used because of responsibility for example for safety extra-low voltage (SELV) in accordance with IEC 61140:2016, 5.2.6 and IEC 60364-4-41:2005, 414.3.1 or control circuits in accordance with IEC 60204-1:2016, 7.2.4.

The group safety function is used for each part of IEC 61558-2 because different standards of the IEC 61558 series can be combined in one construction but in certain cases with no limitation of rated output power.

For example an auto-transformer in accordance with IEC 61558-2-13 can be designed with a separate SELV-circuit in accordance with the particular requirements for IEC 61558-2-6 relating to the general requirements of IEC 61558-1.

SAFETY OF TRANSFORMERS, REACTORS, POWER SUPPLY UNITS AND COMBINATIONS THEREOF –

Part 2-8: Particular requirements and tests for transformers and power supply units for bells and chimes

1 Scope

Replacement:

This part of IEC 61558 deals with the safety of **bell and chime transformers** and **power supply units** incorporating **bell and chime transformers**. **Transformers** incorporating **electronic circuits** are also covered by this document.

NOTE 1 Safety includes electrical, thermal and mechanical aspects.

Unless otherwise specified, from here onward, the term **transformer** covers **bell and chime transformers** and **power supply units** incorporating **bell and chime transformers**.

For **power supply units** (linear) this document is applicable. For **switch mode power supply units** IEC 61558-2-16 is applicable together with this document. Where two requirements are in conflict, the most severe take precedence.

This document is applicable to **stationary**, single-phase, air-cooled (natural or forced) **independent** or **associated dry-type transformers.** The windings can be encapsulated or non-encapsulated.

The **rated supply voltage** does not exceed 250 V AC and the **rated supply frequency** and the **internal operating frequencies** do not exceed 500 Hz.

The **rated output** does not exceed 100 VA.

The **no-load output voltage** does not exceed 33 V AC or 46 V ripple-free DC, and the **rated output voltage** does not exceed 24 V AC, or 33 V ripple-free DC.

Bell and chime transformers are generally intended to supply domestic sound signalling equipment and other similar devices where the load is applied for short periods of time.

NOTE 2 A partial load can be applied for illumination purposes.

This document is not applicable to external circuits and their components intended to be connected to the input terminals and output terminals of the **transformers**.

NOTE 3 **Transformers** covered by this document are only used in applications where **double** or **reinforced insulation** between circuits is required by the installation rules or by the end product standard.

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

This document is applicable to **transformers** associated with specific equipment, to the extent decided upon by the relevant IEC technical committees.

Attention is drawn to the following, if necessary:

- measures to protect the **enclosure** and the components inside the enclosure against external influences such as fungus, vermin, termites, solar-radiation, and icing;
- the different conditions for transportation, storage, and operation of the **transformers**;
- additional requirements in accordance with other appropriate standards and national rules can be applicable to **transformers** intended for use in special environments.

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

This group safety publication focusing on safety guidance is primarily intended to be used as a product safety standard for the products mentioned in the scope but is also intended to be used by technical committees in the preparation of publications for products similar to those mentioned in the scope of this group safety publication, in accordance with the principles laid down in IEC Guide 104 and ISO/IEC Guide 51.

One of the responsibilities of a technical committee is, wherever applicable, to make use of basic safety publications and/or group safety publications in the preparation of its publications.

2 Normative references

This clause of IEC 61558-1:2017 is applicable except as follows:

Addition:

IEC 61558-1:2017, *Safety of transformers, reactors, power supply units and combinations thereof – Part 1: General requirements and tests*

IEC 61558-2-16:2021, *Safety of transformers, reactors, power supply units and combinations thereof – Part 2-16: Particular requirements and tests for switch mode power supply units and transformers for switch mode power supply units for general applications*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61558-1:2017 apply, except as follows:

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

3.1 Transformers

Addition:

3.1.101
bell and chime transformer
single-phase **safety isolating transformer** specifically intended to supply household sound signalling equipment and other similar devices

4 General requirements

This clause of IEC 61558-1:2017 is applicable.

5 General notes on tests

This clause of IEC 61558-1:2017 is applicable.

6 Ratings

This clause of IEC 61558-1:2017 is applicable except as follows:

Addition:

6.101 The **rated output voltage** shall not exceed 24 V AC or 33 V ripple-free DC.

For **independent transformers**, this **output voltage** limitation applies even when **output windings**, not intended for interconnection, are connected in series.

6.102 The **rated output** shall not exceed 100 VA.

6.103 The **rated supply frequency** and the **internal operating frequencies** shall not exceed 500 Hz.

6.104 The **rated supply voltage** shall not exceed 250 V AC.

Compliance with the requirements of 6.101 to 6.104 is checked by inspection of the marking.

7 Classification

This clause of IEC 61558-1:2017 is applicable except as follows:

7.2

Replacement:

7.2 **Transformers** are classified according to the short-circuit characteristic or protection against abnormal use:

- **inherently short-circuit proof transformers**;
- **non-inherently short-circuit proof transformers**;
- **fail-safe transformers**.

7.4

Replacement:

7.4 **Transformers** are classified according to their mobility:

- **fixed transformers**.

7.5

Replacement:

7.5 **Transformers** are classified according to their **duty-type**:

– **short-time duty cycle**;
– **intermittent duty cycle**.

NOTE 1 A partial load for illumination can be applied continuously.

7.8

Replacement:

7.8 **Transformers** are classified according to their transient overvoltage condition:

– **overvoltage category II**

Addition:

7.101 **Transformers** are classified according to the method of mounting:

– mounting in a distribution assembly;
– mounting in sound signalling devices (bells, chimes, buzzers, etc.);
– mounting on an outlet box or cabinet;
– flush mounted;
– surface mounted.

8 Marking and other information

This clause of IEC 61558-1:2017 is applicable except as follows:

8.1 h)

Replacement of the content up to the first semi-colon by the following:

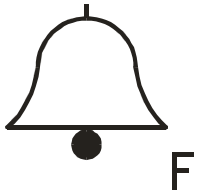
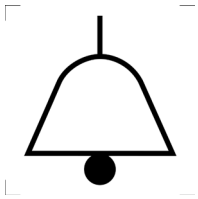
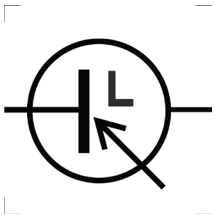
relevant graphical symbols shown in Table 101 that indicate the kind of **transformer**

8.11

Addition:

The symbol for linear **power supply units** shall be used in conjunction with the symbol indicating the kind of **transformer**.

Table 101 – Symbols indicating the kind of transformer

Symbol or graphical symbol	Explanation or title	Identification
	**Fail-safe bell and chime transformer**	IEC 60417-5013:2002-10 modified
	**Short-circuit-proof bell and chime transformer** (inherently or non-inherently)	IEC 60417-5013:2002-10
	**Power supply unit, linear**	IEC 60417-6210:2013-10

9 Protection against electric shock

This clause of IEC 61558-1:2017 is applicable except as follows:

Addition:

9.101 Protection against accidental contact with windings and **hazardous live parts** of the **input circuit** shall be ensured while connecting conductors to the output terminals.

*Compliance is checked by inspection and by the application of the standard test finger shown in Figure 4. It shall not be possible to touch windings or **hazardous live parts** of the **input circuit** with the test finger.*

10 Change of input voltage setting

This clause of IEC 61558-1:2017 is applicable.

11 Output voltage and output current under load

This clause of IEC 61558-1:2017 is applicable except as follows:

11.1

Replacement:

11.1 When the **transformer** is connected to the **rated supply voltage**, at the **rated supply frequency**, and loaded with an impedance resulting in the **rated output** at the **rated output voltage** and, for AC current, at the **rated power factor**, the output voltage shall not differ from the rated value by more than:

a) 15 % for the output voltage of **inherently short-circuit proof transformers** with one **rated output voltage**;

b) 15 % for the highest output voltage of **inherently short-circuit proof transformers** with more than one **rated output voltage**;

c) 20 % for the other output voltages of **inherently short-circuit proof transformers** with more than one **rated output voltage**;

d) 15 % for the output voltages of other **transformers**.

*Compliance is checked by measuring the output voltage 2 min after the **transformer** is connected to the **rated supply voltage**, at the **rated supply frequency**, and loaded with an impedance resulting in the **rated output**, at the **rated output voltage** and the **rated power factor**.*

*For **transformers** with more than one **rated supply voltage**, the requirement is applicable for each of the **rated supply voltages**.*

*For **transformers** with multiple **output windings**, the loads are applied to every multiple section simultaneously, unless otherwise declared.*

12 No-load output voltage

This clause of IEC 61558-1:2017 is applicable except as follows:

Addition:

12.101 The **no-load output voltage** shall not exceed 33 V AC or 46 V ripple free DC.

For **independent transformers**, this **output voltage** limitation applies even when **output windings**, not intended for interconnection, are connected in series.

12.102 The difference between the **no-load output voltage** and the **output voltage** under load shall not be excessive.

The ratio between the **no-load output voltage** measured in Clause 12 and the **output voltage** under load measured during the test of Clause 11, expressed as a percentage of the latter voltage, shall not exceed 100 %.

The ratio is determined by Formula (1):

$$\frac{U_{\text{no-load}} - U_{\text{load}}}{U_{\text{load}}} \times 100(\%) \quad (1)$$

where

$U_{\text{no-load}}$ is the no-load output voltage, expressed in V;

U_{load} is the output voltage under load, expressed in V.

*Compliance with the requirements of 12.101 and 12.102 is checked by measuring the **no-load output voltage** at the **ambient temperature** when the **transformer** is connected to **the rated supply voltage** at the **rated supply frequency**.*

13 Short-circuit voltage

This clause of IEC 61558-1:2017 is applicable.

14 Heating

This clause of IEC 61558-1:2017 is applicable except as follows:

14.1.1 Temperature-rise test

Replacement of the third paragraph:

Temperatures are determined under the following conditions.

Replacement of the eleventh paragraph:

***Transformers** are supplied at **rated supply voltage** and loaded with an impedance Z producing **rated output** at the **rated output voltage** and, for AC current, at the **rated power factor**. The value of output current is measured after 1 min. Then the supply voltage is increased by 10 % and the output impedance is adjusted so that the new impedance Z' gives the same output current than the value measured before. **Transformers** are submitted to 20 cycles of 1 min operation with the impedance Z' and 5 min operation with 5 times the impedance Z'. Temperature rises are measured during the last cycle.*

14.1.3 Determination of steady-state conditions

*Addition of the following footnote "g" in Table 2 to "External **enclosures**":*

g The external **enclosure** of a **transformer** only includes the parts accessible to the standard test finger when mounted in accordance with 14.1.1.

Addition of the following footnote "h" in Table 2 to "Supports":

h Support includes any area of the black painted plywood support, but excludes any metal parts of the mounting system (rails, outlet boxes, etc.).

15 Short-circuit and overload protection

This clause of IEC 61558-1:2017 is applicable except as follows:

Addition:

15.101 The maximum short-circuit output current shall not exceed 10 A, measured 5 s after applying the short-circuit, the **transformer** being supplied with 1,1 times the **rated supply voltage**.

16 Mechanical strength

This clause of IEC 61558-1:2017 is applicable except as follows:

16.2 Stationary transformers

Replacement:

The impact hammer shall have an energy of (0,2 ± 0,05) J.

17 Protection against harmful ingress of dust, solid objects and moisture

This clause of IEC 61558-1:2017 is applicable.

18 Insulation resistance, dielectric strength and leakage current

This clause of IEC 61558-1:2017 is applicable.

19 Construction

This clause of IEC 61558-1:2017 is applicable except as follows:

19.1 General construction

Replacement:

19.1 The **input** and **output circuits** shall be electrically separated from each other, and the construction shall be such that there is no possibility of any connection between these circuits, either directly or indirectly, through other **conductive parts**, except by deliberate action.

Compliance is checked by inspection and measurements, taking Clause 18 and Clause 26 into consideration.

19.1.1 The insulation between **input** and **output winding**(s) shall consist of **double** or **reinforced insulation** (rated for the **working voltage**).

In addition, the following applies:

– for **class I transformers** not intended for connection to the mains supply by means of a plug, the insulation between the **input windings** and the **body** connected to earthing shall consist of at least **basic insulation** rated for the **input voltage**. The insulation between the **output windings** and the **body** connected to earthing, shall consist of at least **basic insulation** (rated for the **output voltage**);

- for **class I transformers** intended for connection to the mains supply by means of a plug, the insulation between the **input windings** and the **body** shall consist of at least **basic insulation**, and the insulation between the **output windings** and the **body** shall consist of at least **supplementary insulation** (both **basic** and **supplementary insulation**s rated for the **working voltage**);
- for **class II transformers**, the insulation between the **input windings** and the **body** shall consist of **double** or **reinforced insulation** (rated for the **input voltage**). The insulation between the **output windings** and the **body** shall consist of **double** or **reinforced insulation** (rated for the **output voltage**).

19.1.2 For **transformers** with **intermediate conductive parts** (e.g. the iron core) not connected to the **body** and located between the **input** and **output windings** the insulation between the **input windings** and any **intermediate conductive part** shall consist of at least **basic insulation**, and the insulation between the **output windings** and any **intermediate conductive part** shall consist of at least **supplementary insulation** (both basic and **supplementary insulation**s rated for the **working voltage**).

NOTE 1 An **intermediate conductive part** not separated from the **input** or **output windings** or the **body** by at least **basic insulation** is considered to be connected to the relevant part(s).

NOTE 2 **Basic insulation** and **supplementary insulation** are interchangeable.

In addition, the following applies:

- for **class I transformers**, the insulation between the **input** and **output windings** via the **intermediate conductive parts** (even if they are connected to earthing) shall consist of double or **reinforced insulation** (rated for the **working voltage**);
- for **class II transformers**, the insulation between the **input windings** and the **body** via the **intermediate conductive parts** (if any) shall consist of **double** or **reinforced insulation** (rated for the **input voltage**), and the insulation between the **body** and the **output windings** via the **intermediate conductive parts** (if any) and the **body** via the **intermediate conductive parts** shall consist of double or **reinforced insulation** (rated for the **input** and **output voltage**);
- for **transformers** different from **independent** (IP00), the insulation between the **input** and **output windings** via the **intermediate conductive parts** shall consist of **double** or **reinforced insulation** (rated for the **working voltage**).

NOTE 3 In 19.1.2 the possibility to consider the intermediate metal part connected to earthing and consequently to require **basic insulation** in both circuits (primary and secondary) is not allowed for the following reason:

- the intermediate metal part is normally the iron core made by laminated plates insulated to each other by oxide. It is not assured that all foils are correctly connected to the earthing.
- for **transformers** different from **independent**, it is not assured that in the final applications the iron core will be connected to earthing.

Addition:

19.101 There shall be no connections between the **output circuit** and the protective earthing, unless allowed by the relevant equipment standard for **associated transformers**.

19.102 There shall be no connections between the **output circuit** and the **body**, unless this is allowed by the relevant equipment standard for **associated transformers**.

Compliance is checked by inspection.

19.103 These **input** and **output terminals** for the connection of external wiring shall be so located that the distance measured between the points of introduction of the conductors into these terminals is not less than 25 mm. If a barrier is used to obtain this distance, the measurement shall be made over and around the barrier which shall be of insulating material and permanently fixed to the **transformer**.

Compliance is checked by inspection and by measurement disregarding ***intermediate conductive parts****.*

20 Components

This clause of IEC 61558-1:2017 is applicable. except as follows:

20.4

Modification:

20.4 If the **transformer** incorporates a switch intended to disconnect the **input winding** from the supply, this switch can be of single-pole micro-gap construction and can disconnect either pole.

21 Internal wiring

This clause of IEC 61558-1:2017 is applicable.

22 Supply connection and other external flexible cables or cords

This clause of IEC 61558-1:2017 is applicable except as follows:

22.3

Replacement of the first paragraph as follows:

22.3 Flush-type transformers can be designed so that connection of the external conductors to the terminals are made before the **transformer** is fitted into a flush mounting box.

22.5

Replacement:

22.5 Power supply cords of **transformers** shall be at least ordinary polyvinyl chloride sheathed flexible cords according to IEC 60227-5:2011 – type 60227 IEC 53 or ordinary tough rubber sheathed flexible cords according to IEC 60245-4:2011 – type 60245 IEC 53.

23 Terminals for external conductors

This clause of IEC 61558-1:2017 is applicable.

24 Provisions for protective earthing

This clause of IEC 61558-1:2017 is applicable.

25 Screws and connections

This clause of IEC 61558-1:2017 is applicable except as follows:

25.3

Addition:

This requirement is not applicable to electrical connections other than protective earthing connections on the **output circuits** of the **transformers** with a **rated output** not exceeding 12 VA.

26 Creepage distances, clearances and distances through insulation

This clause of IEC 61558-1:2017 is applicable.

27 Resistance to heat, fire and tracking

This clause of IEC 61558-1:2017 is applicable.

28 Resistance to rusting

This clause of IEC 61558-1:2017 is applicable.

Annexes

The annexes of IEC 61558-1:2017 are applicable except as follows:

Annex F
(normative)

Requirements for manually operated switches which are parts of transformers assembly

This annex of IEC 61558-1:2017 is applicable except as follows:

F.2 Switches tested as a separate component

Addition of a third bullet point after the first paragraph of Clause F.2:

- 7.4.7: the number of operating cycles shall be 1 000.

Bibliography

The bibliography of IEC 61558-1:2017 is applicable, except as follows:

Addition:

IEC 60204-1:2016, *Safety of machinery – Electrical equipment of machines – Part 1: General requirements*

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

IEC 61558 (all parts), *Safety of transformers, reactors, power supply units and combinations thereof*

IEC 61558-2-13, *Safety of transformers, reactors, power supply units and combinations thereof – Part 2-13: Particular requirements and tests for auto-transformers and power supply units incorporating auto-transformers for general applications*

ISO/IEC GUIDE 51:2014, *Safety aspects – Guidelines for their inclusion in standards*

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SOMMAIRE

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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SÉCURITÉ DES TRANSFORMATEURS, BOBINES D'INDUCTANCE, BLOCS D'ALIMENTATION ET DES COMBINAISONS DE CES ÉLÉMENTS –

Partie 2-8: Exigences particulières et essais pour les transformateurs et blocs d'alimentation pour sonneries et carillons

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8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
9) L'IEC attire l'attention sur le fait que la mise en application du présent document peut entraîner l'utilisation d'un ou de plusieurs brevets. L'IEC ne prend pas position quant à la preuve, à la validité et à l'applicabilité de tout droit de brevet revendiqué à cet égard. À la date de publication du présent document, l'IEC n'a pas reçu notification qu'un ou plusieurs brevets pouvaient être nécessaires à sa mise en application. Toutefois, il y a lieu d'avertir les responsables de la mise en application du présent document que des informations plus récentes sont susceptibles de figurer dans la base de données de brevets, disponible à l'adresse https://patents.iec.ch. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets.

L'IEC 61558-2-8 a été établie par le comité d'études 96 de l'IEC: Transformateurs, bobines d'inductance, blocs d'alimentation et combinaisons de ces éléments. Il s'agit d'une Norme internationale.

Cette troisième édition annule et remplace la deuxième édition parue en 2010. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

a) la structure et les références ont été alignées sur l'IEC 61558-1:2017;
b) un nouveau symbole a été ajouté pour les blocs d'alimentation dont la régulation de la tension secondaire est linéaire.

Le texte de ce document est issu des documents suivants:

Projet	Rapport de vote
96/592/FDIS	96/598/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La langue employée pour l'élaboration de ce document est l'anglais.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous www.iec.ch/members_experts/refdocs. Les principaux types de documents développés par l'IEC sont décrits plus en détail sous www.iec.ch/standardsdev/publications.

Il a le statut de publication groupée de sécurité conformément au Guide 104 de l'IEC.

Le présent document doit être utilisé conjointement avec l'IEC 61558-1:2017.

Le présent document complète ou modifie les articles correspondants de l'IEC 61558-1:2017, de façon à transformer cette publication en norme IEC: *Exigences particulières et essais pour les transformateurs et blocs d'alimentation pour sonneries et carillons*.

Une liste de toutes les parties de la série IEC 61558, publiées sous le titre général *Sécurité des transformateurs, bobines d'inductance, blocs d'alimentation et des combinaisons de ces éléments*, se trouve sur le site web de l'IEC.

Les futures normes de cette série porteront le nouveau titre général cité ci-dessus. Le titre des normes qui existent déjà dans cette série sera mis à jour lors de leur prochaine édition.

Lorsque le présent document mentionne *"addition"*, *"modification"* ou *"remplacement"*, le texte correspondant de l'IEC 61558-1:2017 doit être adapté en conséquence.

Dans le présent document, les caractères d'imprimerie suivants sont utilisés:

– exigences proprement dites: caractères romains;
– *modalités d'essais: caractères italiques*;
– commentaires: petits caractères romains.

Dans le texte du présent document, les termes en **gras** sont définis à l'Article 3.

Les paragraphes, notes, figures et tableaux qui s'ajoutent à ceux de l'IEC 61558-1:2017 sont numérotés à partir de 101; les annexes qui sont ajoutées sont désignées AA, BB, etc.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous webstore.iec.ch dans les données relatives au document recherché. À cette date, le document sera

- reconduit,
- supprimé, ou
- révisé.

INTRODUCTION

Le CE 96 de l'IEC a une fonction groupée de sécurité, conformément au Guide 104 de l'IEC relatif aux transformateurs autres que ceux destinés à alimenter les réseaux de distribution, notamment les transformateurs et les blocs d'alimentation destinés à permettre l'application de mesures de protection contre les chocs électriques, comme cela est défini par le CE 64, qui traite des Installations électriques et de la protection contre les chocs électriques, mais incluant également dans certains cas la limitation de la tension et la fonction de sécurité horizontale pour la TBTS, conformément à l'IEC 60364-4-41.

La fonction groupée de sécurité (GSF, *Group Safety Function*) est utilisée pour des raisons de responsabilité, par exemple pour la très basse tension de sécurité (TBTS), conformément au 5.2.6 de l'IEC 61140:2016 et au 414.3.1 de l'IEC 60364-4-41:2005, ou des circuits de commande, conformément au 7.2.4 de l'IEC 60204-1:2016.

La fonction groupée de sécurité est utilisée pour chaque partie de l'IEC 61558-2, car différentes normes de la série IEC 61558 peuvent être combinées dans une seule et même construction, mais dans certains cas sans aucune limitation de la puissance secondaire assignée.

Un autotransformateur conforme à l'IEC 61558-2-13 peut par exemple être conçu avec un circuit TBTS distinct, conformément aux exigences particulières de l'IEC 61558-2-6 liées aux exigences générales de l'IEC 61558-1.

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1 Domaine d'application

Remplacement:

Cette partie de l'IEC 61558 traite de la sécurité des **transformateurs pour sonneries et carillons** et des **blocs d'alimentation** qui incorporent des **transformateurs pour sonneries et carillons**. Les **transformateurs** qui incorporent des **circuits électroniques** sont également couverts par le présent document.

NOTE 1 La sécurité comprend les aspects électriques, thermiques et mécaniques.

Sauf spécification contraire, dans la suite de ce document, le terme **transformateur** couvre les **transformateurs pour sonneries et carillons** et les **blocs d'alimentation** qui incorporent des **transformateurs pour sonneries et carillons.**

Pour les **blocs d'alimentation** (linéaires), le présent document s'applique. Pour les **blocs d'alimentation à découpage**, l'IEC 61558-2-16 s'applique conjointement avec le présent document. Lorsque deux exigences sont contradictoires, la plus contraignante prévaut.

Le présent document s'applique aux **transformateurs de type sec fixes**, monophasés, à refroidissement à air (circulation naturelle ou forcée) **indépendants** ou **associés**. Les enroulements peuvent être enrobés ou non enrobés.

La **tension d'alimentation assignée** ne dépasse pas 250 V en courant alternatif et la **fréquence d'alimentation assignée** et les **fréquences de fonctionnement internes** ne dépassent pas 500 Hz.

La **puissance assignée** ne dépasse pas 100 VA.

la **tension secondaire à vide** ne dépasse pas 33 V en courant alternatif ou 46 V en courant continu lissé et la **tension secondaire assignée** ne dépasse pas 24 V en courant alternatif ou 33 V en courant continu lissé.

Les **transformateurs pour sonneries et carillons** sont généralement destinés à alimenter des avertisseurs sonores domestiques et autres dispositifs similaires quand la charge est appliquée pendant de courtes durées.

NOTE 2 Une charge partielle peut être appliquée à des fins d'indication lumineuse.

Le présent document ne s'applique pas aux circuits externes et à leurs composants destinés à être connectés aux bornes primaires et bornes secondaires des **transformateurs**.

NOTE 3 Les **transformateurs** couverts par le présent document ne sont utilisés que dans le cadre d'applications pour lesquelles les règles d'installation ou la norme du produit final exigent une **isolation double** ou **renforcée** entre les circuits.

NOTE 4 Habituellement les **transformateurs** sont destinés à être utilisés avec des équipements pour fournir des tensions différentes de la **tension d'alimentation** pour satisfaire aux exigences fonctionnelles de l'équipement. La protection contre les chocs électriques peut être fournie ou complétée par d'autres particularités de l'équipement, telles que la **masse**. Des parties de **circuits secondaires** peuvent être connectées aux **circuits primaires** ou à la terre de protection.

Le présent document s'applique aux **transformateurs** associés à des équipements spécifiques, dans la mesure décidée par les comités d'études correspondants de l'IEC.

L'attention est attirée sur les points suivants, si nécessaire:

– des mesures pour protéger l'**enveloppe** et les composants situés à l'intérieur de celle-ci contre les influences externes comme les champignons, la vermine, les termites, les rayonnements solaires et le givre;
– les différentes conditions de transport, de stockage et de fonctionnement des **transformateurs**;
– des exigences supplémentaires qui peuvent s'appliquer aux **transformateurs** destinés à être utilisés dans un environnement particulier, au regard d'autres normes et règles nationales applicables.

Les évolutions techniques futures des **transformateurs** peuvent nécessiter une augmentation de la limite supérieure des fréquences. En attendant, le présent document peut être utilisé à titre de recommandation.

La présente publication groupée de sécurité portant sur des recommandations de sécurité est avant tout destinée à être utilisée en tant que norme en matière de sécurité des produits pour les produits cités dans le domaine d'application, mais elle est également destinée à être utilisée par les comités d'études dans le cadre de l'élaboration de publications pour des produits similaires à ceux cités dans le domaine d'application de la présente publication groupée de sécurité, conformément aux principes établis dans le Guide 104 de l'IEC et le Guide 51 de l'ISO/IEC.

L'une des responsabilités d'un comité d'études consiste, le cas échéant, à utiliser les publications fondamentales de sécurité et/ou les publications groupées de sécurité dans le cadre de l'élaboration de ses publications.

2 Références normatives

L'article de l'IEC 61558-1:2017 s'applique avec les exceptions suivantes:

Addition:

IEC 61558-1:2017, *Sécurité des transformateurs, bobines d'inductance, blocs d'alimentation et des combinaisons de ces éléments – Partie 1: Exigences générales et essais*

IEC 61558-2-16:2021, *Sécurité des transformateurs, bobines d'inductance, blocs d'alimentation et combinaisons de ces éléments – Partie 2-16: Exigences particulières et essais pour les blocs d'alimentation à découpage et les transformateurs pour blocs d'alimentation à découpage pour applications d'ordre général*

3 Termes et définitions

Pour les besoins du présent document, les termes et définitions donnés dans l'IEC 61558-1:2017 s'appliquent, avec l'exception suivante:

L'ISO et l'IEC tiennent à jour des bases de données terminologiques destinées à être utilisées en normalisation, consultables aux adresses suivantes:

- IEC Electropedia: disponible à l'adresse http://www.electropedia.org/
- ISO Online browsing platform: disponible à l'adresse http://www.iso.org/obp

3.1 Transformateurs

Addition:

3.1.101
transformateur pour sonneries et carillons
transformateur de sécurité monophasé spécialement destiné à alimenter des avertisseurs sonores domestiques et autres dispositifs analogues

4 Exigences générales

L'article de l'IEC 61558-1:2017 s'applique.

5 Généralités sur les essais

L'article de l'IEC 61558-1:2017 s'applique.

6 Caractéristiques assignées

L'article de l'IEC 61558-1:2017 s'applique avec les exceptions suivantes:

Addition:

6.101 La **tension secondaire assignée** ne doit pas dépasser 24 V en courant alternatif ou 33 V en courant continu lissé.

Pour les **transformateurs indépendants**, la limitation de la **tension secondaire** s'applique même si les **enroulements secondaires**, non destinés à l'interconnexion, sont connectés en série.

6.102 La **puissance assignée** ne doit pas dépasser 100 VA.

6.103 La **fréquence d'alimentation assignée** et les **fréquences de fonctionnement internes** ne doivent pas dépasser 500 Hz.

6.104 La **tension d'alimentation assignée** ne doit pas dépasser 250 V en courant alternatif.

La conformité aux exigences du 6.101 au 6.104 est vérifiée par examen du marquage.