IEC®

IEC 61558-2-8

Edition 2.0 2010-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

GROUP SAFETY PUBLICATION

PUBLICATION GROUPÉE DE SÉCURITÉ

**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: Règles particulières et essais pour les transformateurs et blocs d'alimentation pour sonneries et carillons**

IEC 61558-2-8:2010

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

PRICE CODE
CODE PRIX N

ICS 29.180

ISBN 978-2-88912-036-9

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

This second edition cancels and replaces the first edition published in 1998. It constitutes a technical revision. The main changes consist of updating this part in accordance with IEC 61558-1:2005.

This part has the status of a group safety publication in accordance with IEC Guide 104: 1997, *The preparation of safety publications and the use of basic safety publications and group safety publications*.

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

FDIS	Report on voting
96/354/FDIS	96/361/RVD

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

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

This part is intended to be used in conjunction with the latest edition of IEC 61558-1 and its amendments. It is based on the second edition (2005) of that standard.

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

A list of all parts of the IEC 61558 series, 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 a particular subclause of Part 1 is not mentioned in this part, that subclause applies as far as is reasonable. Where this part states "addition", "modification" or "replacement", the relevant text of Part 1 is to be adopted accordingly.

In this part, the following print types are used:

– requirements proper: in roman type;

– *test specifications: in italic type*;

– explanatory matters: in smaller roman type.

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

Subclauses additional to those in Part 1 are numbered starting from 101; supplementary annexes are entitled AA, BB, etc.

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

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

NOTE The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 12 months from the date of 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

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 standard.

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**.

This part is applicable to **stationary**, single-phase, air-cooled (natural or forced) **independent** or **associated dry-type transformers.** The windings may 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 a.c., and the **rated supply frequency** and does 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 not exceed 100 VA.

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

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 be applied for illumination purposes.

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

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

NOTE 3 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 be provided (or completed) by other features of the equipment, such as the **body**. Parts of **output circuits** may be connected to the **input circuits** or to protective earth.

This part 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:

- 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 **transformer** should also be considered;
- additional requirements in accordance with other appropriate standards and national rules may be applicable to **transformers** intended for use in special environments, such as tropical environment.

NOTE 5 Future technological development of **transformers** may necessitate a need to increase the upper limit of the frequencies, until then this part may be used as a guidance document.

2 Normative references

This clause of Part 1 is applicable except as follows:

Addition:

IEC 61558-1:2005, *Safety of power transformers, power supplies, reactors and similar products – Part 1: General requirements and tests*

3 Terms and definitions

This clause of Part 1 is applicable except as follows:

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 Part 1 is applicable.

5 General notes on tests

This clause of Part 1 is applicable.

6 Ratings

Replacement:

6.101 The **rated output voltage** shall not exceed 24 V a.c. or 33 V ripple-free d.c..

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 a.c.

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

7 Classification

This clause of Part 1 is applicable except as follows:

7.2 *Replacement:*

According to short-circuit protection or protection against abnormal use:

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

7.4 *Replacement:*

According to their mobility:

– **fixed transformers.**

7.5 *Replacement:*

According to their **duty-type**:

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

NOTE A partial load for illumination may be applied continuously.

Addition:

7.101 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.

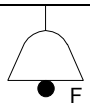
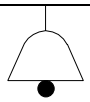
8 Marking and other information

This clause of Part 1 is applicable except as follows:

8.1 h) *Replacement:*

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

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)

9 Protection against electric shock

This clause of Part 1 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. 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 Part 1 is applicable.

11 Output voltage and output current under load

This clause of Part 1 is applicable except as follows:

11.1 *Replacement*

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 a.c. 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 Part 1 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 a.c. or 46 V ripple free d.c.. The 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 between the **no-load output voltage** measured in this clause 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 defined as follows: $\frac{U_{\text{no-load}} - U_{\text{load}}}{U_{\text{load}}} \times 100\ \%$

where $U_{\text{no-load}}$ is the **no-load output voltage** and U_{load} is the output voltage under load.

*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 frequency**.*

13 Short-circuit voltage

This clause of Part 1 is applicable.

14 Heatingss

This clause of Part 1 is applicable except as follows:

14.1 *Replacement of the second paragraph by the following*:

Temperatures are determined under the following conditions.

Replacement of the tenth paragraph by the following:

***Transformers** are supplied at **rated supply voltage** and loaded with an impedance Z producing **rated output** at the **rated output voltage** and, for a.c. 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.*

Addition:

Addition of the following footnote to table “f“ *to* "external **enclosures**" *in Table 1*:

f The external **enclosure** of a **transformer** only includes the parts accessible to the standard test finger when mounted in accordance with 14.1.

Addition of the following footnote to table “g“ *to* "supports" *in Table 1*:

g 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 Part 1 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 Part 1 is applicable except as follows:

Replacement:

16.2 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 Part 1 is applicable.

18 Insulation resistance, dielectric strength and leakage current

This clause of Part 1 is applicable.

19 Construction

This clause of Part 1 is applicable except as follows:

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 Clauses 18 and 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**).