

# INTERNATIONAL STANDARD



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**

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IEC Secretariat  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

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## CONTENTS

FOREWORD.....	3
INTRODUCTION.....	2
1 Scope.....	7
2 Normative references .....	8
3 Terms and definitions .....	8
4 General requirements .....	9
5 General notes on tests .....	9
6 Ratings.....	9
7 Classification.....	9
8 Marking and other information .....	10
9 Protection against electric shock .....	10
10 Change of input voltage setting .....	12
11 Output voltage and output current under load .....	12
12 No-load output voltage .....	12
13 Short-circuit voltage.....	13
14 Heating.....	13
15 Short-circuit and overload protection .....	14
16 Mechanical strength .....	14
17 Protection against harmful ingress of dust, solid objects and moisture .....	14
18 Insulation resistance, dielectric strength and leakage current .....	14
19 Construction .....	14
20 Components .....	16
21 Internal wiring.....	16
22 Supply connection and other external flexible cables or cords .....	16
23 Terminals for external conductors.....	16
24 Provisions for protective earthing.....	16
25 Screws and connections .....	17
26 Creepage distances, clearances and distances through insulation.....	17
27 Resistance to heat, fire and tracking.....	17
28 Resistance to rusting.....	17
Annexes .....	18
Annex F (normative) Requirements for manually operated switches which are parts of transformers assembly.....	18
Bibliography.....	19
Table 101 – Symbols indicating the kind of transformer .....	11

## 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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**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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/standardsdev/publications](http://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](https://webstore.iec.ch) in the data related to the specific document. At this date, the document will be

- reconfirmed,
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- revised.

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## 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.

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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

### 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.

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## 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;~~

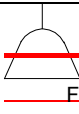

h)

*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**

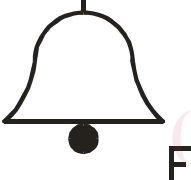
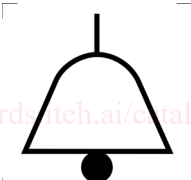

## 8.11

Addition:

Symbol or graphical symbol	Explanation or title	Identification
	Fail-safe <b>bell and chime transformer</b>	Based on Symbol IEC-60417-5013 (2009-05)
	Short-circuit-proof <b>bell and chime transformer</b> (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.