

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

GROUP ENERGY EFFICIENCY PUBLICATION  
PUBLICATION GROUPEE SUR L'EFFICACITE ENERGÉTIQUE

**Safety of transformers, reactors, power supply units and combinations thereof –  
Part 2-5: Particular requirements and tests for transformers for shavers, power  
supply units for shavers and shaver supply units**

**Sécurité des transformateurs, bobines d'inductance, blocs d'alimentation et  
combinaisons de ces éléments –  
Partie 2-5 : Exigences particulières et essais pour les transformateurs pour  
rasoirs, les blocs d'alimentation incorporant un transformateur pour rasoir et les  
blocs d'alimentation pour rasoirs**



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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SAFETY OF TRANSFORMERS, REACTORS,  
POWER SUPPLY UNITS AND COMBINATIONS THEREOF –****Part 2-5: Particular requirements and tests for transformers for shavers,  
power supply units for shavers and shaver supply units**

## FOREWORD

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IEC 61558-2-5 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 International Standard is based on the following documents:

Draft	Report on voting
96/599/FDIS	96/600/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 International Standard 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/publications](http://www.iec.ch/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 for shavers, power supply units for shavers and shaver supply units*.

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](http://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 60364-4-41:2017, 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 2-5: Particular requirements and tests for transformers for shavers, power supply units for shavers and shaver supply units

#### 1 Scope

##### *Replacement:*

This part of IEC 61558 deals with the safety of **shaver transformers, power supply units** incorporating a **shaver transformer**, and **shaver supply units**. **Shaver 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 **shaver transformers** and **power supply units** incorporating **shaver transformers** and **shaver supply units**.

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** is not less than 20 VA and does not exceed 50 VA.

The **no-load output voltage** does not exceed 275 V AC and the **rated output voltage** does not exceed 250 V AC.

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

NOTE 2 **Transformers** covered by this document are only used in applications where **double** or **reinforced insulation** between circuits is specified by the installation rules for bathrooms and similar locations, or by the appliance specifications.

NOTE 3 **Transformers** covered by this document can be flush or surface mounted or incorporated in luminaires, mirrors, and other equipment containing one or more socket-outlet(s).

Attention is drawn to the following, if applicable:

- for **transformers** intended to be used in vehicles, on board ships, and aircraft, additional requirements (from other applicable standards, national rules, etc.);
- 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 60068-2-62:1991, *Environmental testing – Part 2: Test methods – Test Ef: Impact, pendulum hammer*<sup>1</sup>

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

IEC 60670 (all parts), *Boxes and enclosures for electrical accessories for household and similar fixed electrical installations*

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

IEC 61558-2-16, *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 terminology databases for use in standardization at the following addresses:

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

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<sup>1</sup> This publication was withdrawn and replaced with IEC 60068-2-75 (1997), but for the purposes of this document IEC 60068-2-62 is cited.

### 3.1 Transformers

*Addition:*

#### 3.1.101

##### **shaver transformer**

**isolating transformer** for fixed installation and with a limited output, designed to supply electric shavers, toothbrushes, and similar appliances rated 50 VA or less used in a bathroom which supplies only one shaver, or the like, at a time

#### 3.1.102

##### **shaver supply unit**

accessory embodying a **shaver transformer** or a **power supply unit** incorporating a **shaver transformer**, and one or more socket outlets allowing the use of only one plug at a time

## 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 250 V AC.

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 be less than 20 VA and shall not exceed 50 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** According to short-circuit characteristic or protection against abnormal use:

- **inherently short-circuit proof transformers;**
- **non-inherently short-circuit proof transformers;**

### 7.8

*Replacement:*

**7.8** According to their transient overvoltage condition:

- **overvoltage category II**

## 8 Marking and other information

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

### 8.1

h)

*Replacement:*

Replace the content up to the first semi-colon by the following:

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

m)

*Modification:*

indication of the degree of protection (IP code) for **transformers**, if higher than IP00;

indication of the degree of protection (IP code) for **shaver supply units**, if higher than IP21.

### 8.7

*Addition:*



For **shaver supply units** provided with a single-pole switch, the switched pole shall be connected to the line.

### 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
	Shaver supply units and shaver transformers	IEC 60417-5225:2002-10
	Power supply unit, linear	IEC 60417-6210:2013-10

**8.13**

*Addition:*

For **shaver supply units**, the marking for **rated output voltage(s)** and for the symbol of 8.11 shall be indicated on the front of the **enclosure** so as to be visible when the unit is mounted as in normal use. For **shaver supply units** intended to provide different output voltages, the selected output voltage setting shall be clearly discernible.

For **transformers**, the marking with the symbol of 8.11 shall be provided only if the **transformer** is supplied separately.

**9 Protection against electric shock**

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

**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.

**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 275 V AC.

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.