

INTERNATIONAL STANDARD

NORME INTERNATIONALE

GROUP SAFETY PUBLICATION
PUBLICATION GROUPEE DE SÉCURITÉ

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

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



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CONTENTS

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

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

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.
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International Standard IEC 61558-2-5 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 1997. It constitutes a technical revision. The main changes consist of updating this part in accordance with IEC 61558-1:2005 and adding power supply units to the scope.

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
96/353/FDIS	96/360/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 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 test for transformer for shavers, power supply units for shavers and shaver supply units.*

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 2-5: Particular requirements and test for transformer 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 standard.

NOTE 1 Safety includes electrical, thermal, mechanical and chemical aspects.

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

iTeh STANDARD PREVIEW

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.

IEC 61558-2-5:2010

This standard is applicable to **transformers and power supply** (linear) with **internal operational frequencies** not exceeding 500 Hz.

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

The **rated supply voltage** does not exceed 250 V a.c., and the **rated supply frequency** does 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 a.c and the **rated output voltage** does not exceed 250 V a.c.

This part 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**.

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

NOTE 2 **Transformers** covered by this part may be flush or surface mounted or incorporated in luminaires, mirrors, and other equipment containing one or more socket-outlet(s).

NOTE 3 Attention is drawn to the following:

- for **transformers** intended to be used in vehicles, on board ships, and aircraft, additional requirements (from other applicable standards, national rules, etc.) may be necessary;

- measures to protect the **enclosure** and the components inside the **enclosure** against external influences 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 be applicable to **transformers** intended for use in special environments.

NOTE 4 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 60068-2-62:1:1991, *Environmental testing – Part 2: Test methods – Test Ef: Impact, pendulum hammer*¹

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

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

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. It 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 Part 1 is applicable.

5 General notes on tests

This clause of Part 1 is applicable.

¹ This publication was withdrawn and replaced by IEC 60068-2-75 (1997), but for the purposes of this standard, the IEC 60068-2-62 is cited.

6 Ratings

Replacement:

6.101 The **rated output voltage** shall not exceed 250 V a.c.

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 **internal operating frequency** 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 conditions:

- **inherently short-circuit proof transformer;**
- **non-inherently short-circuit proof transformer.**

8 Marking and other information

This clause of Part 1 is applicable except as follows:

8.1 h) *Replacement of the first sentence by the following:*

relevant graphical symbols shown in 8.11 indicating the kind of **transformer**;

8.1 n) *Modification:*

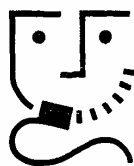
indication of the protection code IP for **transformers**, if higher than IP00;

indication of the protection code IP 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:

Symbol or graphical symbol	Explanation or title	Identification
	Shaver supply units and transformers	IEC 60417-5225 (2009-05)

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

ITeH STANDARD PREVIEW
(standards.iteh.ai)

This clause of Part 1 is applicable.

10 Change of input voltage setting

IEC 61558-2-5:2010
<https://standards.iteh.ai/catalog/standards/sist/2c8d9ebd-4e3f-432e-990e-40fbd5aaf5a0/iec-61558-2-5-2010>

This clause of Part 1 is applicable.

11 Output voltage and output current under load

This clause of Part 1 is applicable.

12 No-load output voltage

This clause of Part 1 is applicable except as follows:

Addition:

12.101 The **no-load output voltage** shall not exceed 275 V a.c.

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.

*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**.*

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 20 %.

NOTE The ratio is defined as follows:

$$\frac{U_{\text{no-load}} - U_{\text{load}}}{U_{\text{load}}} \times 100 \%$$

13 Short-circuit voltage

This clause of Part 1 is applicable.

14 Heating

This clause of Part 1 is applicable.

15 Short-circuit and overload protection

This clause of Part 1 is applicable.

16 Mechanical strength

This clause of Part 1 is applicable except as follows:

16.1 Replacement:

For **shaver supply units** compliance is checked by the test of 16.101.

Addition:

16.101 Shaver supply units are subjected to blows by means of a pendulum hammer, defined as follows:

16.101.1 Blows are applied to the specimen according to IEC 60068-2-62.

For **shaver supply units** other than flush-type mounted, the specimen is mounted as described in 4.2 of IEC 60068-2-62.

For flush-type **shaver supply units**, the specimen is mounted as shown in Figure 3 of IEC 60068-2-62.

Flush-type equipment intended to be installed by means of screws to lugs recessed in the mounting block; flush-type equipment for claw fixing is fixed directly to the block by means of the claws.

The specimen is mounted as in normal use such that the point of impact lies in the vertical plane through the axis of the pivot of the pendulum.

Before applying the blows, mounting screws of bases, covers and the like are tightened with a torque equal to two thirds of that specified in Table 11 of 25.1 of Part 1.

The striking element is allowed to fall from a height equal to that shown in Table 101.

Table 101 – Values of heights of fall

Height of fall cm	Approximate energy J	Relevant parts
10 ± 0,1	0,2	Cover plates of shaver supply units for flush-type mounting and for those parts which are recessed to a depth of at least one quarter of the largest dimension of the recessed part
15 ± 0,1	0,3	Enclosures
25 ± 0,1	0,5	Other parts

16.101.2 *The specimens shall be subjected to 10 blows which are evenly distributed over the sample.*

Five blows shall be applied as follows:

- *for **shaver supply units** intended to be flush mounted, one blow in the centre, one at each extremity of the area over the recess in the block, and the other two approximately midway between the previous blows, the specimen being moved horizontally;*
- *for **shaver supply units** not intended for flush-type mounting, one blow in the centre, one on each side of the specimen after it has been turned as far as possible, but not through more than 60° about a vertical axis, and the other two approximately midway between the previous blows.*

The remaining blows are then applied in the same way after the specimen has been turned around through 90° of its axis perpendicular to the plywood.

If cable entries are provided, the specimen shall be mounted such that the two lines of the blows are as far as possible and equidistant from these entries.

16.101.3 *After the test, the specimen shall show no damage within the meaning of this standard. In particular, **live parts** shall not become accessible.*

NOTE 1 Damage to the finish, small dents which do not reduce **creepage distances** or **clearances** below the values specified in Clause 26, and small chips which do not adversely affect the protection against electric shock or moisture are disregarded.

NOTE 2 Cracks not visible with normal vision or corrected vision without magnification and surface cracks in fibre reinforced mouldings and the like are disregarded.

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:

19.1 Replacement: