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INTERNATIONAL STANDARD

NORME INTERNATIONALE

GROUP SAFETY PUBLICATION
PUBLICATION GROUPÉE DE SÉCURITÉ

Safety of transformers, reactors, power supply units and combinations thereof – Part 2-7: Particular requirements and tests for transformers and power supply units for toys

Sécurité des transformateurs, bobines d'inductance, blocs d'alimentation et des combinaisons de ces éléments – Partie 2-7: Exigences particulières et essais pour les transformateurs et blocs d'alimentation pour jouets



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CONTENTS

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

Figure 101 – Small test finger 11
Figure 102 – Arrangement for impact test for transformers (see 16.101) 14

Table 101 – Symbols indicating the kind of transformer 10
Table 2 – Values of maximum temperatures in normal use 13
Table 5 – Maximum values of temperatures under short-circuit or overload conditions 13

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 2-7: Particular requirements and tests for transformers and power supply units for toys

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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IEC 61558-2-7 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 2007. 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
96/579/FDIS	96/581/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. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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

This International Standard 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 toys.*

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

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, 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 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 2-7: Particular requirements and tests for transformers and power supply units for toys

1 Scope

Replacement:

This part of IEC 61558 deals with the safety of **transformers for toys** and **power supply units** incorporating **transformers for toys**. **Transformers for toys** 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 **transformers** for toys and **power supply units** incorporating **transformers** for toys.

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

This document is applicable to **independent transformers** and **transformers for specific use**.

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 takes precedence.

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

The **rated output** does not exceed 200 VA and a **rated output current** does not exceed 10 A.

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.

In general, this document does not take into consideration children playing with the **transformers**.

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**.

Attention is drawn to the following if necessary:

- 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;

- for transformers for toys intended to be used as a battery charger for use with children additional requirements can apply.

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

IEC 60227-1:2007, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V – Part 1: General requirements*

IEC 60245-1:2003, *Rubber insulated cables – Rated voltages up to and including 450/750 V – Part 1: General requirements*

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 terminological databases for use in standardization at the following addresses:

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

Addition:

3.1.101
transformer for toys
independent safety isolating transformer designed to supply toys not fixed to, or incorporated in, toys and having a **rated output voltage** not exceeding 24 V AC

3.1.102
power supply unit for toys
power supply unit incorporating a **transformer for toys** not fixed to, or incorporated in, toys and having a **rated output voltage** not exceeding 24 V AC or 33 V ripple-free DC

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.

6.102 The **rated output** shall not exceed 200 VA.

6.103 The **rated supply frequency** shall not exceed 500 Hz.

6.104 There shall be only one **rated supply voltage** not exceeding 250 V AC.

6.105 The **rated output current** shall not exceed 10 A.

Compliance with the requirements of 6.101 to 6.105 is checked by inspection of the marking.

7 Classification

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

7.1

Replacement:

According to their protection against electric shock:

– **class II transformers**.

7.2

Replacement:

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

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