IEC 61558-2-13

Edition 3.0 2022-10
REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

GROUP SAFETY PUBLICATION

Safety of transformers, reactors, power supply units and ~~similar products for supply voltages up to 1 100 V~~ combinations thereof –
Part 2-13: Particular requirements and tests for auto-transformers and power supply units incorporating auto-transformers for general applications

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INTERNATIONAL
ELECTROTECHNICAL
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CONTENTS

FOREWORD 3
INTRODUCTION 6
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 10
8 Marking and other information 10
9 Protection against electric shock 12
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 13
16 Mechanical strength 13
17 Protection against harmful ingress of dust, solid objects and moisture 13
18 Insulation resistance, dielectric strength and leakage current 13
19 Construction 14
20 Components 15
21 Internal wiring 15
22 Supply connection and other external flexible cable or cords 15
23 Terminals for external conductors 15
24 Provisions for protective earthing 15
25 Screws and connections 15
26 Creepage distances, clearances and distances through insulation 15
27 Resistance to heat, fire and tracking 16
28 Resistance to rusting 16
Annexes 17
Bibliography 18

Figure 101 – Windings 9
Figure 102 – Tappings 9
Figure 103 – Windings separated by functional isolation 9

Table 101 – Symbols indicating the kind of transformer 11
Table ~~101~~ 102 – Output voltage ~~difference~~ ratio 13

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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SAFETY OF TRANSFORMERS, REACTORS, POWER SUPPLY UNITS AND ~~SIMILAR PRODUCTS FOR SUPPLY VOLTAGES UP TO 1 100 V~~ COMBINATIONS THEREOF –

Part 2-13: Particular requirements and tests for auto-transformers and power supply units incorporating auto-transformers for general applications

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 61558-2-13:2009. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International standard IEC 61558-2-13 has been prepared by IEC technical committee 96: Transformers, reactors, power supply units and combinations thereof.

This third edition cancels and replaces the second edition published in 2009. 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) description of constructions moved to IEC 61558-1:2017;
c) 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
96/549/FDIS	96/555/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/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 auto-transformers and power supply units incorporating auto-transformers for general applications.*

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 a particular subclause of IEC 61558-1:2017 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 IEC 61558-1:2017 is to be adapted 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 "http://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.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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 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.

SAFETY OF TRANSFORMERS, REACTORS, POWER SUPPLY UNITS AND ~~SIMILAR PRODUCTS FOR SUPPLY VOLTAGES UP TO 1 100 V~~ COMBINATIONS THEREOF –

Part 2-13: Particular requirements and tests for auto-transformers and power supply units incorporating auto-transformers for general applications

1 Scope

Replacement:

This part of IEC 61558 deals with the safety of **auto-transformers** for general applications and **power supply units** incorporating **auto-transformers** for general applications. **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 **auto-transformers** for general applications and **power supply units** incorporating **auto-transformers** for general applications.

~~NOTE 2~~ For **power supply units** (linear) this document is applicable. For **switch mode power supply units** IEC 61558-2-16 is applicable ~~together with this part~~.

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

The **rated supply voltage** does not exceed ~~1 100~~ 1 000 V AC, and the **rated supply frequency** and the **internal operating frequencies** do not exceed 500 Hz.

The **core power** does not exceed:

- 2 kVA for single-phase **transformers**;
- 10 kVA for polyphase **transformers**.

The **rated output** does not exceed:

- 40 kVA for single-phase **transformers**;
- 200 kVA for polyphase **transformers**.

This document is applicable to **transformers** without limitations of the **core power** and the **rated output** both being subject to an agreement between the purchaser and the manufacturer.

Where applicable, the **no-load output voltage** or the **rated output voltage** does not exceed 1 000 V AC or 1 415 V ripple-free DC. For **independent transformers,** the **no-load output voltage** and the **rated output voltage** ~~exceeds~~ is not less than 50 V AC or 120 V ripple-free DC.

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 2 **Transformers** covered by this document are used only in applications where no **insulation** between circuits is required by the installation rules or by the end product standard.

~~NOTE 3~~ 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.) ~~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~~ can be applicable to **transformers** intended for use in special environments.

~~NOTE 4~~ 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.

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, power supply units and ~~similar products~~ combinations thereof – Part 1: General requirements and tests*

3 Terms and definitions

~~This clause of Part 1 is applicable except as follows:~~

~~*Modification:*~~

~~Delete the third paragraph.~~

~~Note 2 of 3.7.22 is not applicable.~~

~~*Addition:*~~

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

Replacement:

3.1.~~101~~5
auto-transformer
transformer in which **input** and **output windings** have a common part

Note 1 to entry: **Auto-transformers** ~~may~~ can have supplementary windings (see Figure 101) or tappings (see Figure 102) for adjustment purposes.

Note 2 to entry: Transformers with windings separated at least by functional insulation and electrically connected, will be treated as **auto-transformers** (see Figure 103).

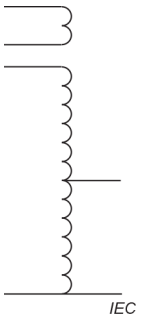


Figure 101 – Windings

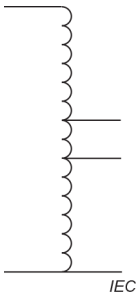


Figure 102 – Tappings

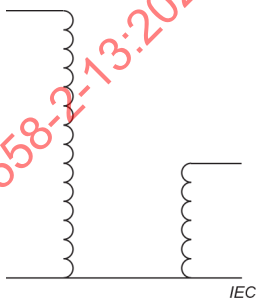


Figure 103 – Windings separated by functional isolation

Addition:

3.5.101
core power
power transformed by the core, if this core was used in a **transformer** with separate windings at the same **supply voltage**, **output voltage**, **frequency**, **power factor** and thermal characteristics

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:

~~*Replacement*~~ *Addition:*

6.101 The **rated output voltage** shall not exceed 1 000 V AC or 1 415 V ripple-free DC. For **independent transformers** the **rated output voltage** shall exceed 50 V AC or 120 V ripple-free DC.

6.102 The **rated output** shall not exceed:

- 40 kVA for single-phase **transformers**;
- 200 kVA for polyphase **transformers**.

Transformers without limitation of the **rated output** shall be subject to agreement between the purchaser and the manufacturer.

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 ~~1 100~~ 1 000 V AC.

6.105 The **core power** shall not exceed:

- 2 kVA for single-phase **transformers**;
- 10 kVA for polyphase **transformers**.

Transformers without limitation of the **core power** shall be subject to agreement between the purchaser and the manufacturer.

The relation between the **core power** and the **rated output** is ~~given~~ determined by Formula (1):

$$\textbf{Core power}\,[\mathrm{VA}] = \frac{V_{\max} - V_{\min}}{V_{\max}} \times \textbf{rated output}\,[\mathrm{VA}] \qquad (1)$$

where

~~V_{max} and V_{min} are the highest and lowest values (**rated supply voltage** or **rated output voltage**).~~

$V_{\max}$ is the highest value of **rated supply voltage** or **rated output voltage**, expressed in V;

$V_{\min}$ is the lowest value of **rated supply voltage** or **rated output voltage**, expressed in V.

NOTE In this case, the limitation of the **core power** is applicable to the **rated output**.

Formula (1) is not applicable to a **transformer** with separate windings which are electrically connected (see Figure 103). In this case, the **core power** of the **transformer** is equal to the **rated output**.

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.

8 Marking and other information

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

8.1 h)

~~*Replacement:*~~

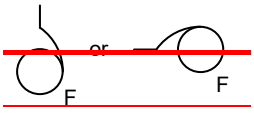
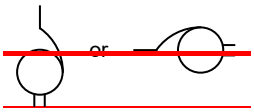
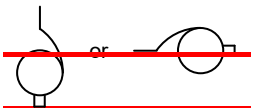
~~The transformers shall be marked with one of the graphical symbols shown in 8.11;~~

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**

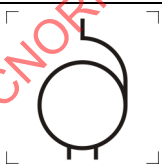
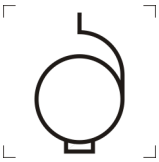
8.11

Addition:

~~Symbol or graphical symbol~~	~~Explanation or title~~	~~Identification~~
	~~Fail-safe **auto-transformer**~~	~~60417-5941~~
	~~Non-short-circuit proof **auto-transformer**~~	~~60417-5942~~
	~~Short-circuit proof **auto-transformer** (inherently or non-inherently)~~	~~60417-5943~~

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 **auto-transformer**	IEC 60417-5941:2002-10
	Non-short-circuit proof **auto-transformer**	IEC 60417-5942:2002-10
	Short-circuit proof **auto-transformer** (inherently or non-inherently)	IEC 60417-5943:2002-10
	**Power supply unit, linear**	IEC 60417-6210:2013-10

Addition:

8.101 If there is a terminal for connection to the star point, the maximum current to the star point shall be marked.

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:

~~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 1 000 V AC or 1 415 V ripple-free DC and for **independent transformers** shall exceed 50 V AC or 120 V ~~ripple-free d.c. but not exceed 1 000 V a.c. or 1 415 V~~ ripple free DC.

For **independent transformers**, this **output voltage** limitation applies even when **output windings**, not intended for interconnection, are connected in series.

NOTE 1 The requirement for series connection does not apply to **associated** or IP 00 **transformers**.

NOTE 2 An **auto-transformer** ~~may~~ can have more than one **output winding** for adjustment reasons.

12.102 The difference between the **no-load output voltage** and the **output voltage** under load shall not be excessive.

*The ratio between the **no-load output voltage** measured in Clause 12 and the **output voltage** under load measured during the test of Clause 11, expressed as a percentage of the latter voltage, shall not exceed the values shown in Table 102.*

~~The difference is expressed as a percentage of the latter voltage calculated according to the following formula:~~ The ratio is determined by Formula (2):

$$\frac{U_{\text{no-load}} - U_{\text{load}}}{U_{\text{load}}} \times 100(\%) \qquad (2)$$

where

$U_{\text{no-load}}$ is the **no-load output voltage**, expressed in V;

U_{load} is the ~~output voltage under load~~ **no-load output voltage**, expressed in V.

Table ~~101~~ 102 – Output voltage ~~difference~~ ratio

Type of ~~auto-~~transformer Rated output	~~Difference~~ Ratio between no-load output voltage and output voltage under load
VA	%
Inherently short-circuit-proof ~~auto-~~transformers:	
– up to and including 63	100
– over 63 up to and including 630	50
– over 630	20
Other ~~auto-~~transformers:	
– up to and including 10	100
– over 10 up to and including 25	50
– over 25 up to and including 63	20
– over 63 up to and including 250	15
– over 250 up to and including 630	10
– over 630	5

*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~~ ratio shall not exceed the values shown in Table 102.

13 Short-circuit voltage

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

14 Heating

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

15 Short-circuit and overload protection

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

16 Mechanical strength

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

17 Protection against harmful ingress of dust, solid objects and moisture

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

18 Insulation resistance, dielectric strength and leakage current

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

Modification:

18.2 ~~Table 7:~~ In accordance with Table 13 of IEC 61558-1:2017 the values between **input circuits** and **output circuits**, between each **input circuit** and all other **input circuits**, between each **output circuits** and all other **output circuits** are not applicable.

18.3 ~~Table 8a: lines 1) and 2)~~ In accordance with Table 14 of IEC 61558-1:2017 the values between **input circuits** and **output circuits** are not applicable.

19 Construction

~~This clause of Part 1 is applicable except as follows:~~

~~*Addition:*~~

~~**19.106** Plug connected **auto-transformers** where the **rated input voltage** is higher than the **rated output voltage**, shall not have any potential to earth at the output socket higher than the **rated output voltage**.~~

~~This requirement shall be fulfilled by using one of the following methods.~~

~~**19.106.1** Polarised input and output plug and socket-outlet system~~

~~In this case, an instruction shall be given for not using such a **transformer** with a non-polarised plug and socket-outlet system.~~

~~**19.106.2** Polarity detecting device (for non-polarised input and output plug and socket-outlet system)~~

~~A polarity detecting device shall only energise the output circuit when the potential to earth at the poles of the output socket does not exceed the **rated output voltage**. The contact separation of the breaking device shall be at least of 3 mm in each pole.~~

~~NOTE A magnetic relay is an example of polarity detecting device.~~

~~*Compliance is checked by the following test.*~~

~~*The **auto-transformer** is connected to the mains at 1,06 times the **rated input voltage** under the most unfavourable condition of load and output voltage. The test is repeated with the polarity of the input reversed. During the test, the measured potential to earth of each pole shall not exceed the maximum **output voltage** under load (1,06 times the **rated output voltage** taking into account the permissible deviations of Clause 11).*~~

~~*Compliance is checked by measurement.*~~

~~If the polarity detecting device uses a current flowing to the earth for the detection, this current shall not exceed 0,75 mA and shall only be flowing for the period of measurement until the polarity is reversed.~~

~~*Compliance is checked by measurement.*~~

~~All the tests are repeated under the fault conditions of H.2 of Annex H of Part 1. In this case the potential to earth of each pole shall not exceed 1,06 times the maximum output voltage under load for more than 5 s.~~

~~*Compliance is checked by measurement.*~~

~~**19.111** Protection against direct contact with the live parts (contact path and drive) shall be ensured.~~

~~*Compliance is checked by inspection.*~~

This clause of IEC 61558-1:2017 is applicable and general requirements for **auto-transformers** are defined in 19.1.2 of IEC 61558-1:2017.

Addition:

19.101 Protection against direct contact with the live parts (contact path and drive) shall be ensured.

Compliance is checked by inspection.

20 Components

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

21 Internal wiring

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

22 Supply connection and other external flexible cable or cords

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

23 Terminals for external conductors

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

24 Provisions for protective earthing

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

25 Screws and connections

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

26 Creepage distances, clearances and distances through insulation

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

~~*Addition:*~~

~~**26.101** The values for creepage distances, clearances and distances through insulation for working voltages above 1 000 V may be found by extrapolation~~.

27 Resistance to heat, fire and tracking

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

28 Resistance to rusting

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

Annexes

The annexes of IEC 61558-1:2017 are applicable ~~except as follows:~~.

~~Annex C~~

~~Creepage distances (cr), clearances (cl) and distances through insulation (dti) Material group II (400 ≤CTI <600)~~

~~This annex of Part 1 is applicable, except as follows:~~

~~*Addition:*~~

~~The values for creepage distances, clearances and distances through insulation for working voltages above 1 000 V may be found by extrapolation.~~

~~Annex D~~

~~Creepage distances (cr), clearances (cl) and distances through insulation (dti) Material group I (CTI ≥600)~~

~~This annex of Part 1 is applicable, except as follows:~~

~~*Addition:*~~

~~The values for creepage distances, clearances and distances through insulation for working voltages above 1 000V may be found by extrapolation.~~

~~Annex R~~

~~Explanations of the application of 4.2 of IEC 60664-1:2007 (see IEC 61558-1 Subclause 26.2)~~

~~*Addition:*~~

~~The values for working voltage above 1 000 V may be found by extrapolation.~~

Bibliography

The bibliography of IEC 61558-1:2017 is applicable, except as follows:

Addition:

IEC 60204-1:2016, *Safety of machinery – Electrical equipment of machines – Part 1: General requirements*

IEC 60364-4-41:2005, *Low-voltage electrical installations – Part 4-41: Protection for safety - Protection against electric shock*

IEC 61140:2016, *Protection against electric shock – Common aspects for installation and equipment*

IEC 61558 (all parts), *Safety of transformers, reactors, power supply units and combinations thereof*

IEC 61558-2-16, *Safety of transformers, reactors, power supply units and ~~similar products for supply voltages up to 1 100 V~~ 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*[~~1~~]

ISO/IEC Guide 51:2014, *Safety aspects – Guidelines for their inclusion in standards*

~~1 To be published.~~

IEC 61558-2-13

Edition 3.0 2022-10

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NORME INTERNATIONALE

GROUP SAFETY PUBLICATION
PUBLICATION GROUPÉE DE SÉCURITÉ

Safety of transformers, reactors, power supply units and combinations thereof – Part 2-13: Particular requirements and tests for auto-transformers and power supply units incorporating auto-transformers for general applications

Sécurité des transformateurs, bobines d'inductance, blocs d'alimentation et combinaisons de ces éléments – Partie 2-13: Exigences particulières et essais pour les autotransformateurs et les blocs d'alimentation qui incorporent des autotransformateurs pour applications d'ordre général

IEC 61558-2-13:2022-10(en-fr)

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 9
8 Marking and other information 9
9 Protection against electric shock 10
10 Change of input voltage setting 10
11 Output voltage and output current under load 10
12 No-load output voltage 10
13 Short-circuit voltage 11
14 Heating 11
15 Short-circuit and overload protection 12
16 Mechanical strength 12
17 Protection against harmful ingress of dust, solid objects and moisture 12
18 Insulation resistance, dielectric strength and leakage current 12
19 Construction 12
20 Components 12
21 Internal wiring 12
22 Supply connection and other external flexible cable or cords 12
23 Terminals for external conductors 13
24 Provisions 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 13
Annexes 14
Bibliography 15

Figure 101 – Windings 8
Figure 102 – Tappings 8
Figure 103 – Windings separated by functional isolation 8

Table 101 – Symbols indicating the kind of transformer 10
Table 102 – Output voltage ratio 11

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 2-13: Particular requirements and tests for auto-transformers and power supply units incorporating auto-transformers for general applications

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.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
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4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
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9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International standard IEC 61558-2-13 has been prepared by IEC technical committee 96: Transformers, reactors, power supply units and combinations thereof.

This third edition cancels and replaces the second edition published in 2009. 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) description of constructions moved to IEC 61558-1:2017;
c) 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
96/549/FDIS	96/555/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/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 auto-transformers and power supply units incorporating auto-transformers for general applications.*

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 a particular subclause of IEC 61558-1:2017 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 IEC 61558-1:2017 is to be adapted 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 "http://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 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.

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

Part 2-13: Particular requirements and tests for auto-transformers and power supply units incorporating auto-transformers for general applications

1 Scope

Replacement:

This part of IEC 61558 deals with the safety of **auto-transformers** for general applications and **power supply units** incorporating **auto-transformers** for general applications. **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 **auto-transformers** for general applications and **power supply units** incorporating **auto-transformers** for general applications.

For **power supply units** (linear) this document is applicable. For **switch mode power supply units** IEC 61558-2-16 is applicable.

This document is applicable to **stationary** or **portable**, single-phase or polyphase, 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 1 000 V AC, and the **rated supply frequency** and the **internal operating frequencies** do not exceed 500 Hz.

The **core power** does not exceed:

- 2 kVA for single-phase **transformers**;
- 10 kVA for polyphase **transformers**.

The **rated output** does not exceed:

- 40 kVA for single-phase **transformers**;
- 200 kVA for polyphase **transformers**.

This document is applicable to **transformers** without limitations of the **core power** and the **rated output** both being subject to an agreement between the purchaser and the manufacturer.

Where applicable, the **no-load output voltage** or the **rated output voltage** does not exceed 1 000 V AC or 1 415 V ripple-free DC. For **independent transformers,** the **no-load output voltage** and the **rated output voltage** is not less than 50 V AC or 120 V ripple-free DC.

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 2 **Transformers** covered by this document are used only in applications where no **insulation** between circuits is required by the installation rules or by the end product standard.

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.

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

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

Replacement:

3.1.5
auto-transformer
transformer in which **input** and **output windings** have a common part

Note 1 to entry: **Auto-transformers** can have supplementary windings (see Figure 101) or tappings (see Figure 102) for adjustment purposes.

Note 2 to entry: Transformers with windings separated at least by functional insulation and electrically connected, will be treated as **auto-transformers** (see Figure 103).

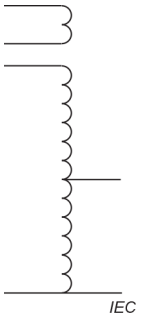


Figure 101 – Windings

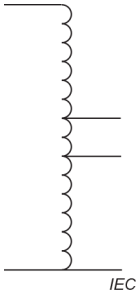


Figure 102 – Tappings

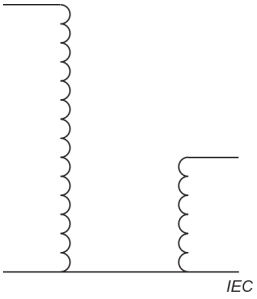


Figure 103 – Windings separated by functional isolation

Addition:

3.5.101
core power
power transformed by the core, if this core was used in a **transformer** with separate windings at the same **supply voltage**, **output voltage**, **frequency**, **power factor** and thermal characteristics

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 1 000 V AC or 1 415 V ripple-free DC. For **independent transformers** the **rated output voltage** shall exceed 50 V AC or 120 V ripple-free DC.

6.102 The **rated output** shall not exceed:

- 40 kVA for single-phase **transformers**;
- 200 kVA for polyphase **transformers**.

Transformers without limitation of the **rated output** shall be subject to agreement between the purchaser and the manufacturer.

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 1 000 V AC.

6.105 The **core power** shall not exceed:

- 2 kVA for single-phase **transformers**;
- 10 kVA for polyphase **transformers**.

Transformers without limitation of the **core power** shall be subject to agreement between the purchaser and the manufacturer.

The relation between the **core power** and the **rated output** is determined by Formula (1):

$$\mathbf{Core\,power}\,[\mathrm{VA}] = \frac{V_{\max} - V_{\min}}{V_{\max}} \times \mathbf{rated\,output}\,[\mathrm{VA}] \quad (1)$$

where

$V_{\max}$ is the highest value of **rated supply voltage** or **rated output voltage**, expressed in V;

$V_{\min}$ is the lowest value of **rated supply voltage** or **rated output voltage**, expressed in V.

NOTE In this case, the limitation of the **core power** is applicable to the **rated output**.

Formula (1) is not applicable to a **transformer** with separate windings which are electrically connected (see Figure 103). In this case, the **core power** of the **transformer** is equal to the **rated output**.

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.

8 Marking and other information

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

8.1 h)

Replacement of the content up to the first semi-colon by the following:

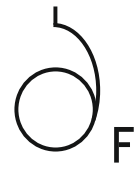
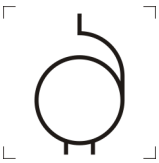
relevant graphical symbols shown in Table 101 that indicate the kind of **transformer**

8.11

Addition:

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 **auto-transformer**	IEC 60417-5941:2002-10
	Non-short-circuit proof **auto-transformer**	IEC 60417-5942:2002-10
	Short-circuit proof **auto-transformer** (inherently or non-inherently)	IEC 60417-5943:2002-10
	**Power supply unit, linear**	IEC 60417-6210:2013-10

Addition:

8.101 If there is a terminal for connection to the star point, the maximum current to the star point shall be marked.

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 1 000 V AC or 1 415 V ripple-free DC and for **independent transformers** shall exceed 50 V AC or 120 V ripple free DC.

For **independent transformers**, this **output voltage** limitation applies even when **output windings**, not intended for interconnection, are connected in series.

NOTE 1 The requirement for series connection does not apply to **associated** or IP 00 **transformers**.

NOTE 2 An **auto-transformer** can have more than one **output winding** for adjustment reasons.

12.102 The difference between the **no-load output voltage** and the **output voltage** under load shall not be excessive.

*The ratio between the **no-load output voltage** measured in Clause 12 and the **output voltage** under load measured during the test of Clause 11, expressed as a percentage of the latter voltage, shall not exceed the values shown in Table 102.*

The ratio is determined by Formula (2):

$$\frac{U_{\text{no-load}} - U_{\text{load}}}{U_{\text{load}}} \times 100(\%) \quad (2)$$

where

$U_{\text{no-load}}$ is the **no-load output voltage**, expressed in V;

U_{load} is the **no-load output voltage**, expressed in V.

Table 102 – Output voltage ratio

Type of transformer **Rated output** VA	**Ratio between no-load output voltage and output voltage under load** %
Inherently short-circuit-proof transformers:	
– up to and including 63	100
– over 63 up to and including 630	50
– over 630	20
Other transformers:	
– up to and including 10	100
– over 10 up to and including 25	50
– over 25 up to and including 63	20
– over 63 up to and including 250	15
– over 250 up to and including 630	10
– over 630	5

*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 ratio shall not exceed the values shown in Table 102.

13 Short-circuit voltage

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

14 Heating

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

15 Short-circuit and overload protection

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

16 Mechanical strength

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

17 Protection against harmful ingress of dust, solid objects and moisture

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

18 Insulation resistance, dielectric strength and leakage current

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

Modification:

18.2 In accordance with Table 13 of IEC 61558-1:2017 the values between **input circuits** and **output circuits**, between each **input circuit** and all other **input circuits**, between each **output circuits** and all other **output circuits** are not applicable.

18.3 In accordance with Table 14 of IEC 61558-1:2017 the values between **input circuits** and **output circuits** are not applicable.

19 Construction

This clause of IEC 61558-1:2017 is applicable and general requirements for **auto-transformers** are defined in 19.1.2 of IEC 61558-1:2017.

Addition:

19.101 Protection against direct contact with the live parts (contact path and drive) shall be ensured.

Compliance is checked by inspection.

20 Components

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

21 Internal wiring

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

22 Supply connection and other external flexible cable or cords

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

23 Terminals for external conductors

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

24 Provisions for protective earthing

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

25 Screws and connections

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

26 Creepage distances, clearances and distances through insulation

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

27 Resistance to heat, fire and tracking

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

28 Resistance to rusting

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

Annexes

The annexes of IEC 61558-1:2017 are applicable.

Bibliography

The bibliography of IEC 61558-1:2017 is applicable, except as follows:

Addition:

IEC 60204-1:2016, *Safety of machinery – Electrical equipment of machines – Part 1: General requirements*

IEC 60364-4-41:2005, *Low-voltage electrical installations – Part 4-41: Protection for safety - Protection against electric shock*

IEC 61140:2016, *Protection against electric shock – Common aspects for installation and equipment*

IEC 61558 (all parts), *Safety of transformers, reactors, power supply units and combinations thereof*

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*

ISO/IEC Guide 51:2014, *Safety aspects – Guidelines for their inclusion in standards*

SOMMAIRE

AVANT-PROPOS 17
INTRODUCTION 20
1 Domaine d'application 21
2 Références normatives 22
3 Termes et définitions 22
4 Exigences générales 23
5 Généralités sur les essais 23
6 Caractéristiques assignées 23
7 Classification 24
8 Marquage et indications 25
9 Protection contre les chocs électriques 25
10 Changement de la tension primaire d'alimentation 26
11 Tension secondaire et courant secondaire en charge 26
12 Tension secondaire à vide 26
13 Tension de court-circuit 27
14 Echauffements 27
15 Protection contre les courts-circuits et les surcharges 27
16 Résistance mécanique 27
17 Protection contre les effets nuisibles dus à la pénétration de poussière, d'objets solides et de l'humidité 27
18 Résistance d'isolement, rigidité diélectrique et courant de fuite 28
19 Construction 28
20 Composants 28
21 Conducteurs internes 28
22 Raccordement à l'alimentation et câbles souples externes 28
23 Bornes pour conducteurs externes 28
24 Dispositions en vue de la mise à la terre de protection 28
25 Vis et connexions 28
26 Lignes de fuite, distances d'isolement et distances à travers l'isolation 29
27 Résistance à la chaleur, au feu et aux courants de cheminement 29
28 Protection contre la rouille 29
Annexes 30
Bibliographie 31

Figure 101 – Enroulements 23
Figure 102 – Prises 23

Figure 103 – Enroulements séparés par une isolation fonctionnelle 23
Tableau 101 – Symboles qui indiquent le type de transformateur 25
Tableau 102 – Rapport de la tension secondaire 27

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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SÉCURITÉ DES TRANSFORMATEURS, BOBINES D'INDUCTANCE, BLOCS D'ALIMENTATION ET COMBINAISONS DE CES ÉLÉMENTS –

Partie 2-13: Exigences particulières et essais pour les autotransformateurs et les blocs d'alimentation qui incorporent des autotransformateurs pour applications d'ordre général

AVANT-PROPOS

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8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
9) L'attention est attirée sur le fait que certains des éléments du présent document de l'IEC peuvent faire l'objet de droits de brevet. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets.

La Norme internationale IEC 61558-2-13 a été établie par le comité d'études 96 de l'IEC: Transformateurs, bobines d'inductance, blocs d'alimentation et combinaisons de ces éléments.

Cette troisième édition annule et remplace la deuxième édition parue en 2009. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

a) la structure et les références ont été alignées sur l'IEC 61558-1:2017;
b) la description des constructions a été déplacée dans l'IEC 61558-1:2017;

c) un nouveau symbole a été ajouté pour les blocs d'alimentation dont la régulation de la tension secondaire est linéaire.

Le texte de ce document est issu des documents suivants:

Projet	Rapport de vote
96/549/FDIS	96/555/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La langue employée pour l'élaboration de cette Norme internationale est l'anglais.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous www.iec.ch/members_experts/refdocs. Les principaux types de documents développés par l'IEC sont décrits plus en détail sous www.iec.ch/standardsdev/publications.

Il a le statut de publication groupée de sécurité conformément au Guide 104 de l'IEC.

Le présent document doit être utilisé conjointement avec l'IEC 61558-1:2017.

Le présent document complète ou modifie les articles correspondants de l'IEC 61558-1:2017, de façon à transformer cette publication en norme IEC: *Exigences particulières et essais pour les autotransformateurs et les blocs d'alimentation qui incorporent des autotransformateurs pour applications d'ordre général.*

Une liste de toutes les parties de la série IEC 61558, publiées sous le titre général *Sécurité des transformateurs, bobines d'inductance, blocs d'alimentation et des combinaisons de ces éléments*, se trouve sur le site web de l'IEC.

Les futures normes de cette série porteront le nouveau titre général cité ci-dessus. Le titre des normes qui existent déjà dans cette série sera mis à jour lors de la prochaine édition.

Lorsqu'un paragraphe particulier de l'IEC 61558-1:2017 n'est pas mentionné dans la présente partie, ce paragraphe s'applique pour autant que cela soit raisonnable. Lorsque la présente partie mentionne "*addition*", "*modification*" ou "*remplacement*", le texte correspondant de l'IEC 61558-1:2017 doit être adapté en conséquence.

Dans le présent document, les caractères d'imprimerie suivants sont utilisés:

- exigences proprement dites: caractères romains;
- *modalités d'essais: caractères italiques*;
- commentaires: petits caractères romains.

Dans le texte du présent document, les termes en **gras** sont définis à l'Article 3.

Les paragraphes, notes, figures et tableaux qui s'ajoutent à ceux de l'IEC 61558-1:2017 sont numérotés à partir de 101; les annexes qui sont ajoutées sont désignées AA, BB, etc.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "http://webstore.iec.ch" dans les données relatives au document recherché. A cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

INTRODUCTION

Le CE 96 de l'IEC a une fonction groupée de sécurité, conformément au Guide 104 de l'IEC relatif aux transformateurs autres que ceux destinés à alimenter les réseaux de distribution, notamment les transformateurs et les blocs d'alimentation destinés à permettre l'application de mesures de protection contre les chocs électriques, comme cela est défini par le CE 64, mais qui incluent également dans certains cas la limitation de la tension et de la fonction de sécurité horizontale pour la TBTS, conformément à l'IEC 60364-4-41.

La fonction groupée de sécurité (GSF, *Group Safety Function*) est utilisée en raison, par exemple, de la responsabilité de la très basse tension de sécurité (TBTS), conformément au 5.2.6 de l'IEC 61140:2016 et au 414.3.1 de l'IEC 60364-4-41:2005, ou des circuits de commande, conformément au 7.2.4 de l'IEC 60204-1:2016.

La fonction groupée de sécurité est utilisée pour chacune des parties de l'IEC 61558-2, car différentes normes de la série IEC 61558 peuvent être combinées en une seule et même construction, mais dans certains cas sans aucune limitation de la puissance secondaire assignée.

Un autotransformateur conforme à l'IEC 61558-2-13 peut par exemple être conçu avec un circuit TBTS séparé, conformément aux exigences particulières de l'IEC 61558-2-6 liées aux exigences générales de l'IEC 61558-1.

SÉCURITÉ DES TRANSFORMATEURS, BOBINES D'INDUCTANCE, BLOCS D'ALIMENTATION ET COMBINAISONS DE CES ÉLÉMENTS –

Partie 2-13: Exigences particulières et essais pour les autotransformateurs et les blocs d'alimentation qui incorporent des autotransformateurs pour applications d'ordre général

1 Domaine d'application

Remplacement:

La présente partie de l'IEC 61558 traite de la sécurité des **autotransformateurs** pour applications d'ordre général et des **blocs d'alimentation** qui incorporent des **autotransformateurs** pour applications d'ordre général. Les **transformateurs** qui incorporent des **circuits électroniques** sont également couverts par le présent document.

NOTE 1 La sécurité comprend les aspects électrique, thermique et mécanique.

Sauf spécification contraire dans la suite du présent document, le terme **transformateur** couvre les **autotransformateurs** pour applications d'ordre général et les **blocs d'alimentation** qui incorporent des **autotransformateurs** pour applications d'ordre général.

Pour les **blocs d'alimentation** (linéaires), le présent document s'applique. Pour les **blocs d'alimentation à découpage**, l'IEC 61558-2-16 s'applique.

Le présent document s'applique aux **transformateurs** de **type sec fixes** ou **mobiles**, monophasés ou polyphasés, à refroidissement par air (naturel ou forcé) **indépendants** ou **associés**. Les enroulements peuvent être enrobés ou non enrobés.

La **tension primaire assignée** ne dépasse pas 1 000 V en courant alternatif, et la **fréquence d'alimentation assignée** et les **fréquences de fonctionnement interne** ne dépassent pas 500 Hz.

La **puissance du noyau** ne dépasse pas:

- 2 kVA pour les **transformateurs** monophasés;
- 10 kVA pour les **transformateurs** polyphasés.

La **puissance assignée** ne dépasse pas:

- 40 kVA pour les **transformateurs** monophasés;
- 200 kVA pour les **transformateurs** polyphasés.

Le présent document s'applique aux **transformateurs** sans limitations de la **puissance du noyau** et de la **puissance assignée**, qui font l'objet d'un accord entre l'acheteur et le fabricant.

Le cas échéant, la **tension secondaire à vide** ou la **tension secondaire assignée** ne dépasse pas 1 000 V en courant alternatif ou 1 415 V en courant continu lissé. Pour les **transformateurs indépendants**, la **tension secondaire à vide** et la **tension secondaire assignée** ne sont pas inférieures à 50 V en courant alternatif ou 120 V en courant continu lissé.

Le présent document ne s'applique pas aux circuits externes et à leurs composants destinés à être connectés aux bornes primaires et bornes secondaires des **transformateurs**.

NOTE 2 Les **transformateurs** couverts par le présent document ne sont utilisés que dans le cadre d'applications pour lesquelles les règles d'installation ou la norme du produit final n'exigent aucune **isolation** entre les circuits.

L'attention est attirée sur les points suivants, si nécessaire:

- exigences supplémentaires (issues d'autres normes applicables, règles nationales, etc.) pour les **transformateurs** destinés à être utilisés dans des véhicules, à bord de navires ou d'avions;
- mesures qui visent à protéger l'**enveloppe** et les composants à l'intérieur de l'enveloppe contre les influences externes, telles que les champignons, la vermine, les termites, le rayonnement solaire et le givre;
- différentes conditions de transport, de stockage et de fonctionnement pour les **transformateurs**;
- exigences supplémentaires qui peuvent s'appliquer aux **transformateurs** destinés à être utilisés dans un environnement particulier, au regard d'autres normes et règles nationales applicables.

Les évolutions techniques futures des **transformateurs** peuvent nécessiter une augmentation de la limite supérieure des fréquences. En attendant, le présent document peut être utilisé à titre de recommandation.

La présente publication groupée de sécurité portant sur des recommandations de sécurité est avant tout destinée à être utilisée en tant que norme en matière de sécurité des produits qui sont cités dans le domaine d'application, mais elle est également destinée à être utilisée par les comités d'études dans le cadre de l'élaboration de publications pour des produits similaires à ceux cités dans le domaine d'application de la présente publication groupée de sécurité, conformément aux principes établis dans le Guide 104 de l'IEC et le Guide 51 de l'ISO/IEC.

L'une des responsabilités d'un comité d'études consiste, le cas échéant, à utiliser les publications fondamentales de sécurité et/ou les publications groupées de sécurité dans le cadre de l'élaboration de ses publications.

2 Références normatives

L'article de l'IEC 61558-1:2017 s'applique, avec l'exception suivante:

Addition:

IEC 61558-1:2017, *Sécurité des transformateurs, bobines d'inductance, blocs d'alimentation et des combinaisons de ces éléments – Partie 1: Exigences générales et essais*

3 Termes et définitions

Pour les besoins du présent document, les termes et définitions de l'IEC 61558-1:2017 s'appliquent, avec les exceptions suivantes:

L'ISO et l'IEC tiennent à jour des bases de données terminologiques destinées à être utilisées en normalisation, consultables aux adresses suivantes:

- IEC Electropedia: disponible à l'adresse http://www.electropedia.org/
- ISO Online browsing platform: disponible à l'adresse http://www.iso.org/obp

Remplacement:

3.1.5
autotransformateur
transformateur dans lequel les **enroulements primaires** et **secondaires** ont une partie commune

Note 1 à l'article: Les **autotransformateurs** peuvent avoir des enroulements supplémentaires (voir Figure 101) ou des prises (voir Figure 102) à des fins de réglage.

Note 2 à l'article: Les transformateurs qui ont des enroulements séparés au moins par une isolation fonctionnelle et reliés électriquement sont considérés comme des **autotransformateurs** (voir Figure 103).

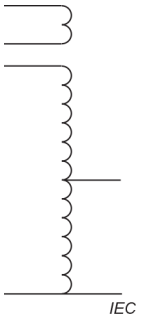

Figure 101 – Enroulements

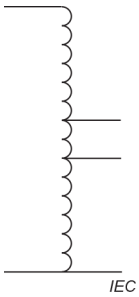

Figure 102 – Prises

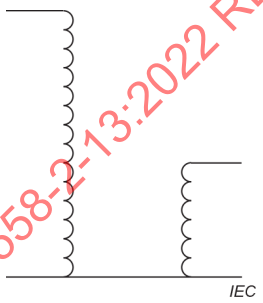

Figure 103 – Enroulements séparés par une isolation fonctionnelle

Addition:

3.5.101
puissance du noyau
puissance transformée par le noyau, si ce noyau était utilisé dans un **transformateur** à enroulements séparés avec les mêmes valeurs de **tension primaire**, de **tension secondaire**, de **fréquence**, de **facteur de puissance** et avec les mêmes caractéristiques thermiques

4 Exigences générales

L'article de l'IEC 61558-1:2017 s'applique.

5 Généralités sur les essais

L'article de l'IEC 61558-1:2017 s'applique.

6 Caractéristiques assignées

L'article de l'IEC 61558-1:2017 s'applique, avec l'exception suivante:

Addition:

6.101 La **tension secondaire assignée** ne doit pas dépasser 1 000 V en courant alternatif ou 1 415 V en courant continu lissé. Pour les **transformateurs indépendants**, la **tension secondaire assignée** doit être supérieure à 50 V en courant alternatif ou 120 V en courant continu lissé.