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Edition 3.0 2023-06
REDLINE VERSION

INTERNATIONAL STANDARD

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GROUP SAFETY PUBLICATION

Safety of transformers, reactors, power supply units and combinations thereof – Part 2-3: Particular requirements and tests for ignition transformers for gas and oil burners

IEC 61558-2-3:2023-06 RLV(en)

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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 2-3: Particular requirements and tests for ignition transformers for gas and oil burners

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 61558-2-3:2010. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International standard IEC 61558-2-3 has been prepared by IEC technical committee 96: Transformers, reactors, power supply units and combinations thereof. It is an International Standard.

This third edition cancels and replaces the second edition published in 2010. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) adjustment of structure and references in accordance with IEC 61558-1:2017.

The text of this International Standard is based on the following documents:

Draft	Report on voting
96/577/FDIS	96/580/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 ignition transformers for gas and oil burners*.

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.

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, which is about Electrical installations and protection against electric shock, but in certain cases including the limitation of voltage and horizontal safety function for SELV, in accordance with IEC 60364-4-41.

The group safety function (GSF) is used because of responsibility for 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 the IEC 61558-2 series 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 2-3: Particular requirements and tests for ignition transformers for gas and oil burners

1 Scope

Replacement:

This part of IEC 61558 deals with the safety of **ignition transformers** for gas and oil burners. **Ignition transformers** incorporating **electronic circuits** are also covered by this document.

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

Unless otherwise specified, from here onward, the term **transformer** covers **ignition transformers** for gas and oil burners.

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.

This document is applicable to **fixed** single-phase, air-cooled (natural or forced) **associated dry-type transformers** used in the ignition systems of gas and oil burners. The windings ~~may~~ 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** ~~**operational frequency**~~ **operating frequencies** do not exceed 500 Hz.

The **rated short-circuit output current** does not exceed 500 mA AC.

The **no-load output voltage** or the **rated output voltage** does not exceed 15 000 V AC.

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.**

NOTE 2 **Transformers** covered by this document are used in applications where **double or reinforced insulation** between circuits is not required by the installation rules or by the end product standard.

~~NOTE 2~~ 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 3~~ 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 and similar products*~~ *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*

ISO 3864-1:~~2002~~2011, *Graphical symbols – Safety colours and safety signs – Part 1: Design principles for safety signs ~~in workplaces and public areas~~ and safety markings*

3 Terms and definitions

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

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

3.1 Transformers

Addition:

3.1.101
ignition transformer
fixed single-phase, air-cooled **associated transformer** within an ignition system generating an arc between two electrodes connected to the high voltage output of the **transformer**

Note 1 to entry: This **transformer** is intended to be used with a control unit built-in in the ignition system.

3.~~1.102~~3.101
rated duty factor
time interval during which the **transformer** operates, expressed as a percentage of the duration of the entire cycle

3.5.101
rated short-circuit output current
output current at the **rated supply voltage** and the **rated frequency** when the **output winding** is short-circuited, assigned to the **transformer** by the manufacturer

3.5.102
rated no-load output voltage
output voltage when the **transformer** is connected to the **rated supply voltage** at the **rated supply frequency** under no-load conditions, assigned to the **transformer** by the manufacturer

3.5 Ratings

Replacement:

3.5.4 not applicable.

3.5.5 not applicable.

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 no-load output voltage** shall not exceed 15 000 V AC.

6.102 Void.

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

6.104 The **rated supply voltage** shall not exceed 1 000 V AC.

6.105 The **rated short-circuit output current** shall not exceed 500 mA AC.

6.106 Preferred values of the **rated no-load output voltage**, the **rated short-circuit output current**, and the **rated duty factor** are given in ~~Table 101~~ Table 102.

Compliance with the requirements of 6.101 to 6.106 is checked by inspection of the marking.

7 Classification

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

7.1

Replacement:

7.1 According to their protection against electric shock:

– **class I transformers**, for specific use only.

NOTE **Incorporated transformers** are not classified. Their class of protection against electric shock is determined by the way the **transformer** is incorporated.

7.2

Replacement:

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

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

7.4

Replacement:

7.4 According to their mobility:

- fixed **ignition transformers** for gas and oil burners.

7.5

Replacement:

7.5 According to their duty type:

– **continuous duty;**
– **intermittent duty cycle.**

7.6

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

Replacement:

7.6.2 This subclause of IEC 61558-1:2017 is not applicable.

7.8

Replacement:

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

- **overvoltage category II**.

8 Marking and other information

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

8.1

Replacement:

Items b), c), d), and f) are not applicable.

~~**8.1** h) *Replacement:*~~

~~**Transformers** shall be marked with one of the graphical symbols shown in 8.11;~~

h)

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

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

~~**8.1** q) *Replacement:*~~

p)

Replacement:

Transformers for **intermittent duty cycle** shall be marked with the **rated duty factor** expressed as a percentage and the duration of the entire cycle expressed in minutes.

NOTE Preferred value for the entire cycle of **intermittent duty** is 3 min.

Addition:

8.1.101 **Transformers** shall be marked with the graphical symbol according to 8.11 with the colour in accordance with ISO 3864-1.

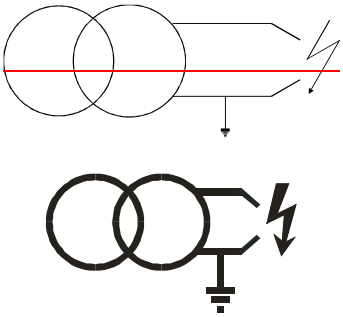
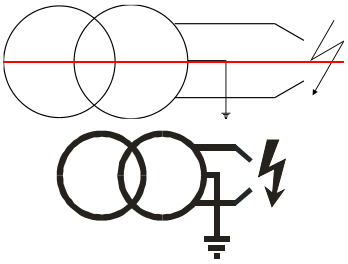
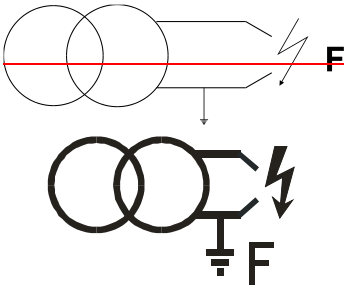
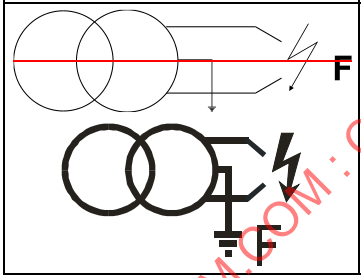
For **incorporated transformers**, the above graphical symbol ~~may~~ can be either on the **transformer** or on the equipment placed close to the **transformer**. If the graphical symbol is not on the **transformer**, the manufacturer shall state in the instruction sheets that this graphical symbol shall be placed on the equipment close to the **transformer**.

8.1.102 **Transformers** shall be marked with the **rated short-circuit output current** in milliamperes and with the **rated no-load output voltage** in kV.

8.11

Addition:

Table 101 – Symbols indicating the kind of transformer

Symbol or graphical symbol	Explanation or title	Identification
	**Inherently short-circuit proof ignition transformer** with one end of the **output winding** for connection to the protective ~~earth~~ earthing	IEC 60417-6198:2013-04
	**Inherently short-circuit proof ignition transformer** with the midpoint of the **output winding** for connection to the protective ~~earth~~ earthing	IEC 60417-6199:2013-04
	**Fail-safe ignition transformer** with one end of the **output winding** for connection to the protective ~~earth~~ earthing	IEC 60417-6198:2013-04
	**Fail-safe ignition transformer** with the midpoint of the **output winding** for connection to the protective ~~earth~~ earthing	IEC 60417-6199:2013-04

8.14

Addition:

Ultimate safety of **transformers** is dependent upon the control unit and this shall be stated in the instruction sheet.

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

Replacement:

11 Output voltage and output current

11.1 The output current shall not differ from the **rated short-circuit output current** by more than 10 %.

Compliance is checked by the following test:

*The output terminals of the **transformer** are short-circuited by means of a suitable ammeter. The **transformer** is connected to the **rated supply voltage** at the **rated frequency** and operated at the **rated duty factor** until steady-state conditions are reached. The output current is then measured.*

*With the supply voltage reduced to 85 %, the minimum output current value shall not be less than 70 % of the **rated short-circuit output current**.*

11.2 *The **no-load output voltage** shall not differ from the **rated no-load output voltage** by more than 10 %.*

Compliance is checked by the following test:

*The **transformer** is connected to the **rated supply voltage** at the **rated frequency**. The RMS value of the **no-load output voltage** is measured. During this test, the protective earthing terminal shall be connected to the protective ~~earth~~ earthing.*

~~NOTE~~ The test equipment should be selected such that no voltage rise occurs due to the capacitance (i.e., increase in the capacitance) in the test equipment or measurement network.

Table ~~101~~ 102 – Preferred values of operational parameters

Type of connection of the output winding to the protective ~~earth~~ earthing	**M**	**M**	**E**	**E**	**M**	**M**	**M**	**E**	**E**	**M**	**M**	**M**
Rated duty factor %	100	100	100	100	33	33	33	33	33	20	20	20
Rated no-load output voltage kV	14	10	7	5	14	10	10	7	5	10	10	10
Rated short-circuit output current mA	20	20	20	20	30	20	16	20	20	23	20	16
M = midpoint of the **output winding** for connection to protective ~~earth~~ earthing **E** = one end of the **output winding** for connection to protective ~~earth~~ earthing												

12 No-load output voltage

This clause of IEC 61558-1:2017 is not applicable.

13 Short-circuit voltage

This clause of IEC 61558-1:2017 is not applicable.

14 Heating

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

14.1.1 Temperature-rise test

Addition after the ~~second~~ third paragraph:

*For **intermittent duty cycle,** the test is carried out at the **rated duty factor**. Temperatures are measured in the middle of the interval during which the **transformer** operates.*

*Replacement of the ~~tenth~~ eleventh paragraph starting with "**Transformers** are supplied at...", by the following:*

***Transformers** are connected to 1,06 times the **rated supply voltage,** at the **rated frequency**, and the **output winding** of the **transformer** or output terminals are short-circuited.*

15 Short-circuit and overload protection

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

15.1.1 Short circuit and overload test method

Replacement of the second paragraph:

*Compliance is checked by inspection and by the following test, which is performed with the **transformer** at ambient temperature, with the same position of the **transformer** as in the test of ~~14.1~~ 14.1.1. The test is carried out at 1,06 times the **rated supply voltage**, or, for **non-inherently short-circuit proof transformers**, at any value of the supply voltage between 0,9 times and 1,1 times the **rated supply voltage**.*

NOTE The overload is only applied to the **transformer** during the first adjustment of the burner when the **transformer** is at ambient temperature.

Addition:

– *additionally by the tests of ~~15.1.101~~ 15.1.1.101.*

15.1.1.101 The **transformer** is connected to an arcing horn as shown in Figure 101 and supplied at 1,06 times the **rated supply voltage** at the **rated frequency**, taking into consideration the **rated duty factor**. During the test the arcing horn shall be in a vertical position and in a draught-free location.

The arcing horn shall be so designed that the rising spark reaches repetitive extinction. Distance A and angle α shall be adjusted accordingly. The test is carried out for a period of 50 days.

NOTE For **transformers** having a **rated no-load output voltage** less than 10 kV, the angle of horn ~~may~~ can be adjusted for the test in order to reach extinction of the spark.

The length of the high voltage leads shall be less than 300 mm. The leads shall not have metal sheaths and shall have a copper cross-sectional area of at least 1 mm^2. The average distance between these leads should be approximately 40 mm.

*During the test, the **insulation** of the **transformer** shall not fail.*

*After this test, the **transformer** shall withstand the tests according to Clauses 11 and 18, except the values of Clause 18 shall be reduced by 35 %.*

15.2 Inherently short-circuit proof transformers

Replacement:

*For **inherently short-circuit proof transformers** for **continuous operation**, this test is covered by the test of ~~14.1~~ 14.1.1.*

*For **inherently short-circuit proof transformers** for **intermittent duty cycle**, the tests are performed with the output terminals of the **output winding** short-circuited. The test time for **transformers** for gas burners is twice the time interval during which the **transformer** operates (to be calculated from the **rated duty factor** and the duration of the cycle). The test time for oil burners is stated in ~~Table 102~~ Table 103.*

Table ~~102~~ 103 – Test time for short-circuit test

Rated duty factor %	Test time min
Less than 20	8
20 up to 30	15
30 up to and less than 100	30

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, except as follows:

Addition:

17.101 Transformers for **specific use** shall have ~~an IP X4 code of~~ a protection index of IP X4 or higher.

18 Insulation resistance, dielectric strength and leakage current

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

18.2 Insulation resistance

~~Table 7: values for **double** or **reinforced insulation** are not applicable.~~

Replacement:

The values of Table 13 for **double** or **reinforced insulation** are not applicable.

18.3 Dielectric strength test

~~Table 8a:~~

~~– lines 2 and 4 are not applicable;~~

~~– lines 1 and 3 are applicable only for the **input circuits** of **transformers** with the core connected to protective earth.~~

Replacement:

The values of Table 14 for dielectric strength test voltages apply as follows:

– **double** or **reinforced insulation** is not applicable;

– **basic insulation** is applicable only for the **input circuits** of **transformers** with the core connected to **protective earthing**.

18.4 Insulation between and within windings

Replacement of the first paragraph with the following:

*After the test of 18.3, **transformers** are tested for 1 min at twice the **rated frequency** and with the **input voltage** increased until the **output voltage** corresponds to 1,5 times the rated value. No load is connected.*

19 Construction

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

19.1 General construction

Replacement:

The **input** and **output circuits** shall be electrically separated from each other, and the construction shall be such that there is no possibility of any connection between these circuits, either directly or indirectly, via other **conductive parts**, except by deliberate action.

Compliance is checked by inspection and measurements, taking Clauses 18 and 26 into consideration.

19.1.101 The insulation between **input** and **output winding(s)** shall consist of at least **basic insulation.**

In addition, the following apply:

The insulation between the **input windings** and the **body**, and between the **input windings** and the core, shall consist of **basic insulation** according to the **rated supply voltage**. The insulation between the **output circuit(s)** and the **body** and between the **output circuit(s)** and the core shall be **functional insulation**. These insulations shall be checked by the tests of ~~15.1.101~~ 15.1.1.101 and 18.4.

19.1.102 For **transformers** with **intermediate conductive parts** not connected to the **body** or core, and located between the **input** and **output windings**, the insulation between the **intermediate conductive parts** and the **input windings** or between the **intermediate conductive parts** and the **output windings** shall consist of at least **basic insulation**. The **basic insulation** shall be in accordance with the **rated supply voltage**.

NOTE An **intermediate conductive part** not separated from the **input** or **output windings** or the **body** by at least **basic insulation**, is considered to be connected to the relevant part(s).

19.15 Strain on fixed socket-outlets caused by pin-transformers connection

This subclause of IEC 61558-1:2017 is not applicable.

19.19 Flexible cable or flexible cord connection for class I portable transformers

Modification:

Transformers designed for connection by means of a flexible cable or cord, shall be provided with a non-detachable flexible cable or cord with a protective ~~earth~~ earthing conductor.

Addition:

19.101 The **output circuit(s)** shall be connected to protective ~~earth~~ earthing.

However, the **output circuit(s)** need not to be connected to protective ~~earth~~ earthing if the **output circuit** is connected to a measuring device, e.g. an ionisation flame monitor. In this case either the **output circuit** needs to be earthed as long as the input circuit is energized, or the voltage supplied to the measuring device shall be limited to less than 400 V RMS.

NOTE 1 The voltage supplied to the measuring device can e.g. be done by an external voltage limiter and a series resistor.

NOTE 2 The above requirement serves to avoid voltages higher than 400 V RMS on the subsequent signal wire between the **transformer** and the ionisation flame monitor.

19.102 The core, if accessible, shall be connected to protective ~~earth~~ earthing.

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:

Modification:

This clause applies only to **input circuit(s)** as the **output circuit(s)** is (are) connected to protective ~~earth~~ earthing. In this case, the **functional insulation** between the core and the **output circuit(s)** is considered to be sufficiently checked by the test of ~~15.1.101~~ 15.1.1.101 and 18.4.

~~Table 13 is applicable as follows:~~

~~Line 1) is applicable, except the **working voltage** shall be replaced with the **rated supply voltage.**~~

~~Line 3) is applicable only to the **input circuits**.~~

~~Line 4) is applicable only to the **input terminals**. For terminals of the **output circuits,** the values of Table 103 apply.~~

~~Line 5) is applicable with the **working voltage** replaced with the **rated supply voltage**.~~

Replacement:

The values of Table 20, Table 21 and Table 22 apply as follows:

- **basic insulation** is applicable, except the **working voltage** shall be replaced with the **rated supply voltage**.
- **basic insulation** between adjacent circuits is applicable only to the input circuits.

The values of Table 23 for terminals for external connection is applicable only to the input terminals. For terminals of the **output circuits**, the values of Table 104 apply.

Table ~~103~~ 104 – Creepage distances and clearances for output terminals

Connections to earth	Type of insulation	Creepage distance mm	Clearance mm
One end of the **output winding** (s) for connection to protective earth	**Creepage distance** and **clearance** between output terminals and protective earth	$5{,}1\frac{\text{mm}}{\text{kV}}\times U$	$3{,}4\frac{\text{mm}}{\text{kV}}\times U$
Midpoint of the **output winding** (s) for connection to protective earth	**Creepage distance** and **clearance** between output terminals	$5{,}1\frac{\text{mm}}{\text{kV}}\times U$	$3{,}4\frac{\text{mm}}{\text{kV}}\times U$
	Creepage distance and **clearance** between output terminals and protective earth	$2{,}55\frac{\text{mm}}{\text{kV}}\times U$	$1{,}7\frac{\text{mm}}{\text{kV}}\times U$
NOTE U is the rated **no-load output voltage** in kV.			

27 Resistance to heat, fire and tracking

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

27.2 Resistance to heat

This subclause of IEC 61558-1:2017 is not applicable.

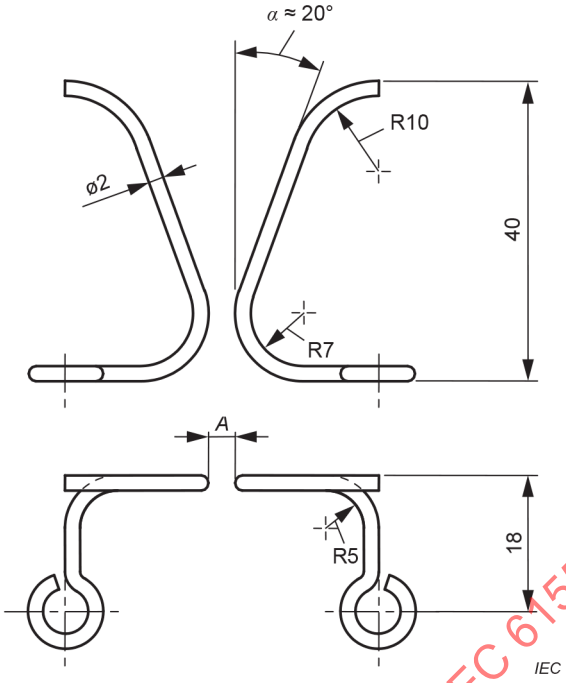
27.3 Resistance to abnormal heat under fault conditions

This subclause of IEC 61558-1:2017 is not applicable.

28 Resistance to rusting

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

Dimensions in millimetres



Rated output voltage kV	Approximate gap A mm
– up to and including 6	2
– ~~More than~~ over 6 up to and including 10	3
– ~~More than~~ over 10 up to and including 15	5

Figure 101 – Arcing horn

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)~~

~~The Annex C of Part 1 is applicable, except as follows:~~

~~Table C.1 is applicable, except as follows:~~

~~Line 1) is applicable, except the **working voltage** shall be replaced by the **rated supply voltage**.~~

~~Line 3) is applicable only to the **input circuits**.~~

~~Line 4) is applicable only to the input terminals. For terminals of the **output circuits,** the values of Table 103 apply.~~

~~Line 5) is applicable, except the **working voltage** shall be replaced with the **rated supply voltage**.~~

~~Annex D~~

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

~~The Annex D of Part 1 is applicable, except as follows:~~

~~Table D.1 is applicable, except as follows:~~

~~Line 1) is applicable, except the **working voltage** shall be replaced with the **rated supply voltage**.~~

~~Line 3) is applicable only to the **input circuits**.~~

~~Line 4) is applicable only to the input terminals. For terminals of the **output circuits,** the values of Table 103 apply.~~

~~Line 5) is applicable, except the **working voltage** shall be replaced with the **rated supply voltage**.~~

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

IEC 61558-2-6, *Safety of transformers, reactors, power supply units and combinations thereof – Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers for general applications*

IEC 61558-2-13, *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*

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

IEC 61558-2-3

Edition 3.0 2023-06

INTERNATIONAL STANDARD

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GROUP SAFETY PUBLICATION
PUBLICATION GROUPÉE DE SÉCURITÉ

Safety of transformers, reactors, power supply units and combinations thereof – Part 2-3: Particular requirements and tests for ignition transformers for gas and oil burners

Sécurité des transformateurs, bobines d'inductance, blocs d'alimentation et des combinaisons de ces éléments – Partie 2-3: Exigences particulières et essais pour les transformateurs d'allumage pour brûleurs à gaz et combustibles liquides

IEC 61558-2-3:2023-06(en-fr)

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 2-3: Particular requirements and tests for ignition transformers for gas and oil burners

FOREWORD

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International standard IEC 61558-2-3 has been prepared by IEC technical committee 96: Transformers, reactors, power supply units and combinations thereof. It is an International Standard.

This third edition cancels and replaces the second edition published in 2010. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) adjustment of structure and references in accordance with IEC 61558-1:2017.

The text of this International Standard is based on the following documents:

Draft	Report on voting
96/577/FDIS	96/580/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 ignition transformers for gas and oil burners.*

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, which is about Electrical installations and protection against electric shock, but in certain cases including the limitation of voltage and horizontal safety function for SELV, in accordance with IEC 60364-4-41.

The group safety function (GSF) is used because of responsibility for 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 the IEC 61558-2 series 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 2-3: Particular requirements and tests for ignition transformers for gas and oil burners

1 Scope

Replacement:

This part of IEC 61558 deals with the safety of **ignition transformers** for gas and oil burners. **Ignition 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 **ignition transformers** for gas and oil burners.

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.

This document is applicable to **fixed** single-phase, air-cooled (natural or forced) **associated dry-type transformers** used in the ignition systems of gas and oil burners. 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 **rated short-circuit output current** does not exceed 500 mA AC.

The **no-load output voltage** or the **rated output voltage** does not exceed 15 000 V AC.

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.**

NOTE 2 **Transformers** covered by this document are used in applications where **double or reinforced insulation** between circuits is not 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*

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 3864-1:2011, *Graphical symbols – Safety colours and safety signs – Part 1: Design principles for safety signs and safety markings*

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

3.1 Transformers

Addition:

3.1.101
ignition transformer
fixed single-phase, air-cooled **associated transformer** within an ignition system generating an arc between two electrodes connected to the high voltage output of the **transformer**

Note 1 to entry: This **transformer** is intended to be used with a control unit built-in in the ignition system.

3.3.101
rated duty factor
time interval during which the **transformer** operates, expressed as a percentage of the duration of the entire cycle

3.5.101
rated short-circuit output current
output current at the **rated supply voltage** and the **rated frequency** when the **output winding** is short-circuited, assigned to the **transformer** by the manufacturer

3.5.102
rated no-load output voltage
output voltage when the **transformer** is connected to the **rated supply voltage** at the **rated supply frequency** under no-load conditions, assigned to the **transformer** by the manufacturer

3.5 Ratings

Replacement:

3.5.4 not applicable.

3.5.5 not applicable.

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 no-load output voltage** shall not exceed 15 000 V AC.

6.102 Void.

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

6.104 The **rated supply voltage** shall not exceed 1 000 V AC.

6.105 The **rated short-circuit output current** shall not exceed 500 mA AC.

6.106 Preferred values of the **rated no-load output voltage**, the **rated short-circuit output current**, and the **rated duty factor** are given in Table 102.

Compliance with the requirements of 6.101 to 6.106 is checked by inspection of the marking.

7 Classification

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

7.1

Replacement:

7.1 According to their protection against electric shock:

– **class I transformers**, for specific use only.

NOTE **Incorporated transformers** are not classified. Their class of protection against electric shock is determined by the way the **transformer** is incorporated.

7.2

Replacement:

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

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

7.4

Replacement:

7.4 According to their mobility:

- fixed **ignition transformers** for gas and oil burners.

7.5

Replacement:

7.5 According to their duty type:

– **continuous duty;**
– **intermittent duty cycle.**

7.6

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

Replacement:

7.6.2 This subclause of IEC 61558-1:2017 is not applicable.

7.8

Replacement:

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

- **overvoltage category II**.

8 Marking and other information

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

8.1

Replacement:

Items b), c), d), and f) are not applicable.

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**;

p)

Replacement:

Transformers for **intermittent duty cycle** shall be marked with the **rated duty factor** expressed as a percentage and the duration of the entire cycle expressed in minutes.

NOTE Preferred value for the entire cycle of **intermittent duty** is 3 min.

Addition:

8.1.101 **Transformers** shall be marked with the graphical symbol according to 8.11 with the colour in accordance with ISO 3864-1.

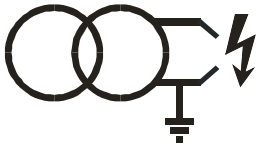
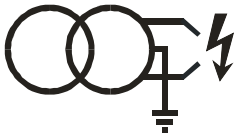
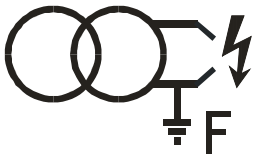
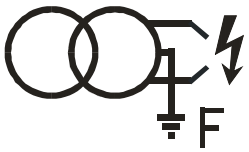
For **incorporated transformers**, the above graphical symbol can be either on the **transformer** or on the equipment placed close to the **transformer**. If the graphical symbol is not on the **transformer**, the manufacturer shall state in the instruction sheets that this graphical symbol shall be placed on the equipment close to the **transformer**.

8.1.102 **Transformers** shall be marked with the **rated short-circuit output current** in milliamperes and with the **rated no-load output voltage** in kV.

8.11

Addition:

Table 101 – Symbols indicating the kind of transformer

Symbol or graphical symbol	Explanation or title	Identification
	**Inherently short-circuit proof ignition transformer** with one end of the **output winding** for connection to the protective earthing	IEC 60417-6198:2013-04
	**Inherently short-circuit proof ignition transformer** with the midpoint of the **output winding** for connection to the protective earthing	IEC 60417-6199:2013-04
	**Fail-safe ignition transformer** with one end of the **output winding** for connection to the protective earthing	IEC 60417-6198:2013-04
	**Fail-safe ignition transformer** with the midpoint of the **output winding** for connection to the protective earthing	IEC 60417-6199:2013-04

8.14

Addition:

Ultimate safety of **transformers** is dependent upon the control unit and this shall be stated in the instruction sheet.

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

Replacement:

11 Output voltage and output current

11.1 The output current shall not differ from the **rated short-circuit output current** by more than 10 %.

Compliance is checked by the following test:

*The output terminals of the **transformer** are short-circuited by means of a suitable ammeter. The **transformer** is connected to the **rated supply voltage** at the **rated frequency** and operated at the **rated duty factor** until steady-state conditions are reached. The output current is then measured.*

*With the supply voltage reduced to 85 %, the minimum output current value shall not be less than 70 % of the **rated short-circuit output current**.*

11.2 *The **no-load output voltage** shall not differ from the **rated no-load output voltage** by more than 10 %.*

Compliance is checked by the following test:

*The **transformer** is connected to the **rated supply voltage** at the **rated frequency**. The RMS value of the **no-load output voltage** is measured. During this test, the protective earthing terminal shall be connected to the protective earthing.*

The test equipment should be selected such that no voltage rise occurs due to the capacitance (i.e., increase in the capacitance) in the test equipment or measurement network.

Table 102 – Preferred values of operational parameters

Type of connection of the output winding to the protective earthing	**M**	**M**	**E**	**E**	**M**	**M**	**M**	**E**	**E**	**M**	**M**	**M**
Rated duty factor %	100	100	100	100	33	33	33	33	33	20	20	20
Rated no-load output voltage kV	14	10	7	5	14	10	10	7	5	10	10	10
Rated short-circuit output current mA	20	20	20	20	30	20	16	20	20	23	20	16
M = midpoint of the **output winding** for connection to protective earthing **E** = one end of the **output winding** for connection to protective earthing												

12 No-load output voltage

This clause of IEC 61558-1:2017 is not applicable.

13 Short-circuit voltage

This clause of IEC 61558-1:2017 is not applicable.

14 Heating

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

14.1.1 Temperature-rise test

Addition after the third paragraph:

*For **intermittent duty cycle,** the test is carried out at the **rated duty factor**. Temperatures are measured in the middle of the interval during which the **transformer** operates.*

*Replacement of the eleventh paragraph starting with "**Transformers** are supplied at...", by the following:*

***Transformers** are connected to 1,06 times the **rated supply voltage,** at the **rated frequency**, and the **output winding** of the **transformer** or output terminals are short-circuited.*

15 Short-circuit and overload protection

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

15.1.1 Short circuit and overload test method

Replacement of the second paragraph:

*Compliance is checked by inspection and by the following test, which is performed with the **transformer** at ambient temperature, with the same position of the **transformer** as in the test of 14.1.1. The test is carried out at 1,06 times the **rated supply voltage**, or, for **non-inherently short-circuit proof transformers**, at any value of the supply voltage between 0,9 times and 1,1 times the **rated supply voltage**.*

NOTE The overload is only applied to the **transformer** during the first adjustment of the burner when the **transformer** is at ambient temperature.

Addition:

– *additionally by the tests of 15.1.1.101.*

15.1.1.101 The **transformer** is connected to an arcing horn as shown in Figure 101 and supplied at 1,06 times the **rated supply voltage** at the **rated frequency**, taking into consideration the **rated duty factor**. During the test the arcing horn shall be in a vertical position and in a draught-free location.

The arcing horn shall be so designed that the rising spark reaches repetitive extinction. Distance A and angle α shall be adjusted accordingly. The test is carried out for a period of 50 days.

NOTE For **transformers** having a **rated no-load output voltage** less than 10 kV, the angle of horn can be adjusted for the test in order to reach extinction of the spark.

The length of the high voltage leads shall be less than 300 mm. The leads shall not have metal sheaths and shall have a copper cross-sectional area of at least 1 mm^2. The average distance between these leads should be approximately 40 mm.

*During the test, the **insulation** of the **transformer** shall not fail.*

*After this test, the **transformer** shall withstand the tests according to Clauses 11 and 18, except the values of Clause 18 shall be reduced by 35 %.*

15.2 Inherently short-circuit proof transformers

Replacement:

*For **inherently short-circuit proof transformers** for **continuous operation**, this test is covered by the test of 14.1.1.*

*For **inherently short-circuit proof transformers** for **intermittent duty cycle**, the tests are performed with the output terminals of the **output winding** short-circuited. The test time for **transformers** for gas burners is twice the time interval during which the **transformer** operates (to be calculated from the **rated duty factor** and the duration of the cycle). The test time for oil burners is stated in Table 103.*

Table 103 – Test time for short-circuit test

Rated duty factor %	**Test time** min
Less than 20	8
20 up to 30	15
30 up to and less than 100	30

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, except as follows:

Addition:

17.101 **Transformers** for **specific use** shall have a protection index of IP X4 or higher.

18 Insulation resistance, dielectric strength and leakage current

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

18.2 Insulation resistance

Replacement:

The values of Table 13 for **double** or **reinforced insulation** are not applicable.

18.3 Dielectric strength test

Replacement:

The values of Table 14 for dielectric strength test voltages apply as follows:

– **double** or **reinforced insulation** is not applicable;

– **basic insulation** is applicable only for the **input circuits** of **transformers** with the core connected to **protective earthing**.

18.4 Insulation between and within windings

Replacement of the first paragraph with the following:

*After the test of 18.3, **transformers** are tested for 1 min at twice the **rated frequency** and with the **input voltage** increased until the **output voltage** corresponds to 1,5 times the rated value. No load is connected.*

19 Construction

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

19.1 General construction

Replacement:

The **input** and **output circuits** shall be electrically separated from each other, and the construction shall be such that there is no possibility of any connection between these circuits, either directly or indirectly, via other **conductive parts**, except by deliberate action.

Compliance is checked by inspection and measurements, taking Clauses 18 and 26 into consideration.

19.1.101 The insulation between **input** and **output winding(s)** shall consist of at least **basic insulation.**

In addition, the following apply:

The insulation between the **input windings** and the **body**, and between the **input windings** and the core, shall consist of **basic insulation** according to the **rated supply voltage**. The insulation between the **output circuit(s)** and the **body** and between the **output circuit(s)** and the core shall be **functional insulation**. These insulations shall be checked by the tests of 15.1.1.101 and 18.4.

19.1.102 For **transformers** with **intermediate conductive parts** not connected to the **body** or core, and located between the **input** and **output windings**, the insulation between the **intermediate conductive parts** and the **input windings** or between the **intermediate conductive parts** and the **output windings** shall consist of at least **basic insulation**. The **basic insulation** shall be in accordance with the **rated supply voltage**.

NOTE An **intermediate conductive part** not separated from the **input** or **output windings** or the **body** by at least **basic insulation**, is considered to be connected to the relevant part(s).

19.15 Strain on fixed socket-outlets caused by pin-transformers connection

This subclause of IEC 61558-1:2017 is not applicable.

19.19 Flexible cable or flexible cord connection for class I portable transformers

Modification:

Transformers designed for connection by means of a flexible cable or cord, shall be provided with a non-detachable flexible cable or cord with a protective earthing conductor.

Addition:

19.101 The **output circuit(s)** shall be connected to protective earthing.

However, the **output circuit(s)** need not to be connected to protective earthing if the **output circuit** is connected to a measuring device, e.g. an ionisation flame monitor. In this case either the **output circuit** needs to be earthed as long as the input circuit is energized, or the voltage supplied to the measuring device shall be limited to less than 400 V RMS.

NOTE 1 The voltage supplied to the measuring device can e.g. be done by an external voltage limiter and a series resistor.

NOTE 2 The above requirement serves to avoid voltages higher than 400 V RMS on the subsequent signal wire between the **transformer** and the ionisation flame monitor.

19.102 The core, if accessible, shall be connected to protective earthing.

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:

Modification:

This clause applies only to **input circuit(s)** as the **output circuit(s)** is (are) connected to protective earthing. In this case, the **functional insulation** between the core and the **output circuit(s)** is considered to be sufficiently checked by the test of 15.1.1.101 and 18.4.

Replacement:

The values of Table 20, Table 21 and Table 22 apply as follows:

– **basic insulation** is applicable, except the **working voltage** shall be replaced with the **rated supply voltage**.

– **basic insulation** between adjacent circuits is applicable only to the input circuits.

The values of Table 23 for terminals for external connection is applicable only to the input terminals. For terminals of the **output circuits**, the values of Table 104 apply.

Table 104 – Creepage distances and clearances for output terminals

Connections to earth	Type of insulation	Creepage distance mm	Clearance mm
One end of the **output winding** (s) for connection to protective earth	**Creepage distance** and **clearance** between output terminals and protective earth	$5{,}1\frac{\text{mm}}{\text{kV}}\times U$	$3{,}4\frac{\text{mm}}{\text{kV}}\times U$
Midpoint of the **output winding** (s) for connection to protective earth	**Creepage distance** and **clearance** between output terminals	$5{,}1\frac{\text{mm}}{\text{kV}}\times U$	$3{,}4\frac{\text{mm}}{\text{kV}}\times U$
	Creepage distance and **clearance** between output terminals and protective earth	$2{,}55\frac{\text{mm}}{\text{kV}}\times U$	$1{,}7\frac{\text{mm}}{\text{kV}}\times U$
NOTE U is the rated **no-load output voltage** in kV.			

27 Resistance to heat, fire and tracking

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

27.2 Resistance to heat

This subclause of IEC 61558-1:2017 is not applicable.

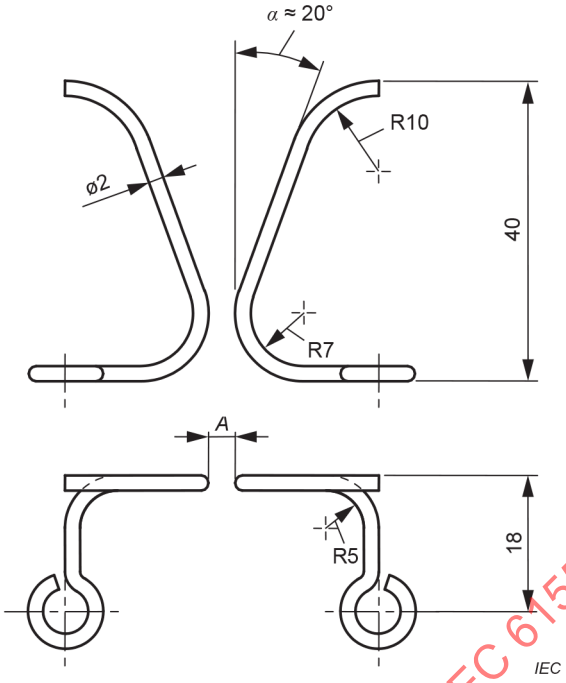
27.3 Resistance to abnormal heat under fault conditions

This subclause of IEC 61558-1:2017 is not applicable.

28 Resistance to rusting

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

Dimensions in millimetres



Rated output voltage kV	Approximate gap A mm
– up to and including 6	2
– over 6 up to and including 10	3
– over 10 up to and including 15	5

Figure 101 – Arcing horn

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

IEC 61558-2-6, *Safety of transformers, reactors, power supply units and combinations thereof – Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers for general applications*

IEC 61558-2-13, *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*

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

SOMMAIRE

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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

Partie 2-3: Exigences particulières et essais pour les transformateurs d'allumage pour brûleurs à gaz et combustibles liquides

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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 61558-2-3 a été établie par le comité d'études 96 de l'IEC: Transformateurs, bobines d'inductance, blocs d'alimentation et combinaisons de ces éléments. Il s'agit d'une Norme internationale.

Cette troisième édition annule et remplace la deuxième édition parue en 2010. 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.

Le texte de cette Norme internationale est issu des documents suivants:

Projet	Rapport de vote
96/577/FDIS	96/580/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/publications.

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

La présente Norme internationale doit être utilisée 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 transformateurs d'allumage pour brûleurs à gaz et combustibles liquides.*

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 leur prochaine édition.

Lorsque ce document 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. À 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 pour les 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, qui traite des installations électriques et de la protection contre les chocs électriques, mais en incluant 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 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 DES COMBINAISONS DE CES ÉLÉMENTS –

Partie 2-3: Exigences particulières et essais pour les transformateurs d'allumage pour brûleurs à gaz et combustibles liquides

1 Domaine d'application

Remplacement:

La présente partie de l'IEC 61558 traite de la sécurité des **transformateurs d'allumage** pour brûleurs à gaz et combustibles liquides. Les **transformateurs d'allumage** 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 document, le terme **transformateur** couvre les **transformateurs d'allumage** pour brûleurs à gaz et combustibles liquides.

Pour les **blocs d'alimentation à découpage,** l'IEC 61558-2-16 s'applique conjointement avec le présent document. Lorsque deux exigences sont en contradiction, c'est la plus sévère qui prévaut.

Le présent document s'applique aux **transformateurs secs associés installés à poste fixe**, monophasés, à refroidissement par air (naturel ou forcé) utilisés dans les systèmes d'allumage pour brûleurs à gaz ou combustibles liquides. Les enroulements peuvent être enrobés ou non enrobés.

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

Le **courant secondaire de court-circuit assigné** ne dépasse pas 500 mA en courant alternatif.

La **tension secondaire à vide** ou la **tension secondaire assignée** ne dépasse pas 15 000 V en courant alternatif.

La présente partie ne s'applique pas aux circuits externes et à leurs composants destinés à être connectés aux bornes primaires et secondaires ou aux socles de prises de courant des **transformateurs**.

NOTE 2 Les **transformateurs** couverts par le présent document sont utilisés dans le cadre d'applications pour lesquelles les règles d'installation ou la norme du produit final n'exigent aucune **isolation double ou renforcée** 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 centrée sur les recommandations de sécurité est essentiellement destinée à être utilisée en tant que norme de sécurité des produits pour les produits mentionnés 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 analogues à ceux mentionnés 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*

IEC 61558-2-16, *Sécurité des transformateurs, bobines d'inductance, blocs d'alimentation et des combinaisons de ces éléments – Partie 2-16: Exigences particulières et essais pour les blocs d'alimentation à découpage et les transformateurs pour blocs d'alimentation à découpage pour applications d'ordre général*

ISO 3864-1:2011, *Symboles graphiques – Couleurs de sécurité et signaux de sécurité – Partie 1: Principes de conception pour les signaux de sécurité et les marquages de sécurité*

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

3.1 Transformateurs

Addition:

3.1.101
transformateur d'allumage
transformateur associé installé à poste fixe, monophasé, à refroidissement par air, dans un système d'allumage qui génère un arc entre deux électrodes connectées au secondaire haute tension du **transformateur**

Note 1 à l'article: Ce **transformateur** est destiné à être utilisé avec un bloc de commande intégré au système d'allumage.

3.3.101
facteur de marche assigné
intervalle de temps durant lequel le **transformateur** fonctionne, exprimé en pourcentage de la durée totale du cycle

3.5.101
courant secondaire de court-circuit assigné
courant secondaire à la **tension primaire assignée** et à la **fréquence assignée** quand l'**enroulement secondaire** est mis en court-circuit, assigné au **transformateur** par le fabricant

3.5.102
tension secondaire assignée à vide
tension secondaire quand le **transformateur** est alimenté sous la **tension primaire assignée** à la **fréquence primaire assignée** sans charge, assignée au **transformateur** par le fabricant

3.5 Valeurs assignées

Remplacement:

3.5.4 non applicable.

3.5.5 non applicable.

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 les exceptions suivantes:

Addition:

6.101 La **tension secondaire assignée à vide** ne doit pas dépasser 15 000 V en courant alternatif.

6.102 Vacant

6.103 La **fréquence assignée** ne doit pas dépasser 500 Hz.

6.104 La **tension primaire assignée** ne doit pas dépasser 1 000 V en courant alternatif.

6.105 Le **courant secondaire de court-circuit assigné** ne doit pas dépasser 500 mA en courant alternatif.

6.106 Les valeurs préférentielles de la **tension secondaire assignée à vide**, du **courant secondaire de court-circuit assigné** et du **facteur de marche assigné** sont données dans le Tableau 102.