

|            |                                                                                                                                                                                                                                                      |                                                 |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| <b>STN</b> | <b>Bezpečnosť transformátorov, tlmiviek,<br/>napájacích zdrojov a ich kombinácií<br/>Časť 2-14: Osobitné požiadavky na regulačné<br/>transformátory a napájacie zdroje<br/>so zabudovanými regulačnými transformátormi<br/>na všeobecné použitie</b> | <b>STN EN IEC<br/>61558-2-14</b><br><br>35 1330 |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|

Safety of transformers, reactors, power supply units and combinations thereof - Part 2-14: Particular requirements and tests for variable transformers and power supply units incorporating variable transformers for general applications

Táto norma obsahuje anglickú verziu európskej normy.

This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 05/25

Obsahuje: EN IEC 61558-2-14:2025, IEC 61558-2-14:2022

Oznámením tejto normy sa od 31.03.2028 ruší  
STN EN 61558-2-14 (35 1330) z augusta 2013

**140495**

---

Úrad pre normalizáciu, metrológiu a skúšobníctvo Slovenskej republiky, 2025  
Slovenská technická norma a technická normalizačná informácia je chránená zákonom č. 60/2018 Z. z. o technickej normalizácii  
v znení neskorších predpisov.



EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN IEC 61558-2-14**

March 2025

ICS 29.180

Supersedes EN 61558-2-14:2013

English Version

**Safety of transformers, reactors, power supply units and combinations thereof - Part 2-14: Particular requirements and tests for variable transformers and power supply units incorporating variable transformers for general applications (IEC 61558-2-14:2022)**

Sécurité des transformateurs, bobines d'inductance, blocs d'alimentation et des combinaisons de ces éléments -  
Partie 2-14: Exigences particulières et essais pour les transformateurs variables et les blocs d'alimentation incorporant des transformateurs variables pour applications générales  
(IEC 61558-2-14:2022)

Sicherheit von Transformatoren, Drosseln, Netzgeräten und deren Kombinationen - Teil 2-14: Besondere Anforderungen und Prüfungen für Stelltransformatoren und Netzgeräte, die Stelltransformatoren enthalten  
(IEC 61558-2-14:2022)

This European Standard was approved by CENELEC on 2024-10-16. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.



European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

**EN IEC 61558-2-14:2025 (E)****European foreword**

The text of document 96/507/CDV, future edition 2 of IEC 61558-2-14, prepared by TC 96 "Transformers, reactors, power supply units, and combinations thereof" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61558-2-14:2025.

The following dates are fixed:

- latest date by which the document has to be implemented at national (dop) 2026-03-31 level by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with the (dow) 2028-03-31 document have to be withdrawn

This document supersedes EN 61558-2-14:2013 and all of its amendments and corrigenda (if any).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document is read in conjunction with EN IEC 61558-1:2019.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

**Endorsement notice**

The text of the International Standard IEC 61558-2-14:2022 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standard indicated:

|                   |      |                                                 |
|-------------------|------|-------------------------------------------------|
| IEC 60076-11:2018 | NOTE | Approved as EN IEC 60076-11:2018 (not modified) |
| IEC 61558 series  | NOTE | Approved as EN 61558 series                     |
| IEC 60204-1:2016  | NOTE | Approved as EN 60204-1:2018                     |

## **Annex ZA** (normative)

### **Normative references to international publications with their corresponding European publications**

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

*Annex ZA of EN IEC 61558-1 is applicable, except as follows:*

*Add:*

| <u>Publication</u> | <u>Year</u> | <u>Title</u>                                                                                                           | <u>EN/HD</u>   | <u>Year</u> |
|--------------------|-------------|------------------------------------------------------------------------------------------------------------------------|----------------|-------------|
| IEC 61558-1        | 2017        | Safety of transformers, reactors, power supply units and combinations thereof - Part 1: General requirements and tests | EN IEC 61558-1 | 2019        |



IEC 61558-2-14

Edition 2.0 2022-05

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

GROUP SAFETY PUBLICATION

PUBLICATION GROUPEE DE SÉCURITÉ

**Safety of transformers, reactors, power supply units and combinations thereof –  
Part 2-14: Particular requirements and tests for variable transformers and power  
supply units incorporating variable transformers for general applications**

**Sécurité des transformateurs, bobines d'inductance, blocs d'alimentation et des  
combinaisons de ces éléments –**

**Partie 2-14: Exigences particulières et essais pour les transformateurs variables  
et les blocs d'alimentation incorporant des transformateurs variables pour  
applications générales**

**THIS PUBLICATION IS COPYRIGHT PROTECTED****Copyright © 2022 IEC, Geneva, Switzerland**

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Secretariat  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

**About the IEC**

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

**About IEC publications**

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

**IEC publications search - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)**

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

**IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)**

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

**IEC Customer Service Centre - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)**

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: [sales@iec.ch](mailto:sales@iec.ch).

**IEC Products & Services Portal - [products.iec.ch](http://products.iec.ch)**

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

**Electropedia - [www.electropedia.org](http://www.electropedia.org)**

The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

**A propos de l'IEC**

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

**A propos des publications IEC**

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

**Recherche de publications IEC - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)**

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, ...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

**IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)**

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

**Service Clients - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)**

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: [sales@iec.ch](mailto:sales@iec.ch).

**IEC Products & Services Portal - [products.iec.ch](http://products.iec.ch)**

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

**Electropedia - [www.electropedia.org](http://www.electropedia.org)**

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 300 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 19 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.



IEC 61558-2-14

Edition 2.0 2022-05

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

GROUP SAFETY PUBLICATION

PUBLICATION GROUPEE DE SÉCURITÉ

**Safety of transformers, reactors, power supply units and combinations thereof –  
Part 2-14: Particular requirements and tests for variable transformers and power  
supply units incorporating variable transformers for general applications**

**Sécurité des transformateurs, bobines d'inductance, blocs d'alimentation et des  
combinaisons de ces éléments –**

**Partie 2-14: Exigences particulières et essais pour les transformateurs variables  
et les blocs d'alimentation incorporant des transformateurs variables pour  
applications générales**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

ICS 29.180

ISBN 978-2-8322-5039-6

**Warning! Make sure that you obtained this publication from an authorized distributor.**

**Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

## CONTENTS

|                                                                                                                         |    |
|-------------------------------------------------------------------------------------------------------------------------|----|
| FOREWORD .....                                                                                                          | 3  |
| INTRODUCTION .....                                                                                                      | 5  |
| 1 Scope .....                                                                                                           | 6  |
| 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 .....                                                                                          | 14 |
| 14 Heating .....                                                                                                        | 15 |
| 15 Short-circuit and overload protection .....                                                                          | 15 |
| 16 Mechanical strength .....                                                                                            | 15 |
| 17 Protection against harmful ingress of dust, solid objects and moisture .....                                         | 16 |
| 18 Insulation resistance, dielectric strength and leakage current .....                                                 | 16 |
| 19 Construction .....                                                                                                   | 16 |
| 20 Components .....                                                                                                     | 16 |
| 21 Internal wiring .....                                                                                                | 16 |
| 22 Supply connection and other external flexible cables or cords .....                                                  | 16 |
| 23 Terminals for external conductors .....                                                                              | 17 |
| 24 Provisions for protective earthing .....                                                                             | 17 |
| 25 Screws and connections .....                                                                                         | 17 |
| 26 Creepage distances, clearances and distances through insulation .....                                                | 17 |
| 27 Resistance to heat, fire and tracking .....                                                                          | 17 |
| 28 Resistance to rusting .....                                                                                          | 17 |
| Annexes .....                                                                                                           | 18 |
| Bibliography .....                                                                                                      | 19 |
| Table 101 – Symbols indicating the kind of transformer .....                                                            | 11 |
| Table 102 – Output voltage ratio for auto-transformers, separating transformers and safety isolating transformers ..... | 14 |
| Table 103 – Output voltage ratio for isolating transformers .....                                                       | 14 |
| Table 104 – Maximum permitted temperatures of the winding .....                                                         | 15 |

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SAFETY OF TRANSFORMERS, REACTORS, POWER  
SUPPLY UNITS AND COMBINATIONS THEREOF –****Part 2-14: Particular requirements and tests for variable  
transformers and power supply units incorporating  
variable 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.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 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.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 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.

IEC 61558-2-14 has been prepared by IEC technical committee 96: Transformers, reactors, power supply units and combinations thereof. It is an International standard.

This second edition cancels and replaces the first edition published in 2012. 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 symbols for **power supply units** with linearly regulated output voltages and required **current collector** position changes.

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

| Draft      | Report on voting |
|------------|------------------|
| 96/507/CDV | 96/528/RVC       |

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

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

This International Standard is to be used in conjunction with IEC 61558-1:2017.

NOTE When "Part 1" is mentioned in this standard, it refers to 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 variable transformers and power supply units incorporating variable 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 this document 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 [webstore.iec.ch](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 limitation of voltage and horizontal safety function for SELV in accordance with IEC 60364-4-41.

The group safety function (GSF) is necessary because of responsibility e.g. 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 needed 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 2-14: Particular requirements and tests for variable transformers and power supply units incorporating variable transformers for general applications

#### 1 Scope

##### *Replacement*

This part of IEC 61558 deals with the safety of **variable transformers** for general applications and **power supply units** incorporating **variable transformers** for general applications. **Transformers** incorporating **electronic circuits** are also covered by this document.

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

Unless otherwise specified, from here onward, the term **transformer** covers **variable transformers** for general applications and **power supply units** incorporating **variable 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 together with this document. Where two requirements are in conflict, the most severe take precedence.

This document does not apply to **transformers** covered by IEC 60076-11.

This document is applicable to **stationary** or **portable**, single-phase or polyphase, air-cooled (natural or forced) **independent** or **associated variable dry-type transformers**:

- **variable auto-transformers**;
- **variable separating transformers**;
- **variable isolating transformers**;
- **variable safety isolating 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 operational frequencies** do not exceed 500 Hz.

The **rated output** does not exceed:

- 40 kVA for single-phase **variable auto-transformers**;
- 200 kVA for polyphase **variable auto-transformers**;
- 1 kVA for single-phase **variable separating transformers**;
- 5 kVA for polyphase **variable separating transformers**;
- 25 kVA for single-phase **variable isolating transformers**;
- 40 kVA for polyphase **variable isolating transformers**;
- 10 kVA for single-phase **variable safety isolating transformers**;
- 16 kVA for polyphase **variable safety isolating transformers**.

This document is applicable to **variable transformers** without limitation of the **rated output** subject to an agreement between the purchaser and the manufacturer.

NOTE 2 **Transformers** intended to supply distribution networks are not included in the scope.

**For variable auto-transformers:**

- 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 variable auto-transformers** the **rated output voltage** does exceed 50 V AC or 120 V ripple-free DC but does not exceed 250 V AC.

NOTE 3 Normally, **variable auto-transformers** are intended to be associated with equipment to provide voltages different from the supply voltage for the functional requirements of the equipment. The protection against electric shock can be provided or completed by other features of the equipment, such as the **body**.

NOTE 4 **Variable auto-transformers** intended to be used by technically skilled or trained personnel are considered as **associated variable transformers** and can have a **rated output voltage** less than 50 V AC.

**For variable separating transformers:**

- 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 **portable variable separating transformers** the **rated output voltage** does exceed 50 V AC or 120 V ripple-free DC;
- are only used where **double** or **reinforced insulation** between circuits is not required by the installation rules or by the end product standard.

NOTE 5 Normally, **variable separating transformers** are intended to be associated with equipment to provide voltages different from the supply voltage for the functional requirements of the equipment. The protection against electric shock can be provided or completed by other features of the equipment, such as the **body**. Parts of **output circuits** can be connected to the protective earthing.

NOTE 6 **Variable separating transformers** intended to be used by technically skilled or trained personnel are considered as **associated variable transformers** and can have a **rated output voltage** less than 50 V AC or 120 V ripple-free DC.

**For variable isolating transformers:**

- the **no-load output voltage** or the **rated output voltage** does not exceed 500 V AC or 708 V ripple-free DC. The **no-load output voltage** and the **rated output voltage** can be up to 1 000 V AC or 1 415 V ripple-free DC for special applications or in accordance with the installation rules;
- for **independent variable isolating transformers** the **rated output voltage** does not exceed 250 V AC;
- are used where **double** or **reinforced insulation** between circuits is required by the installation rules or by the end product standard.

**For variable safety isolating transformers:**

- the **no-load output voltage** or the **rated output voltage** does not exceed 50 V AC or 120 V ripple-free DC;
- are used where **double** or **reinforced insulation** between circuits is required by the installation rules or by the end product standard.

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**.

Attention is drawn to the following, if necessary:

- additional requirements for **transformers** intended to be used in vehicles, on board ships, and aircraft, (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 TCs 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 TC is, wherever applicable, to make use of BSPs and/or GSPs in the preparation of its publications.

## 2 Normative references

This clause of Part 1 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*

**koniec náhľadu – text ďalej pokračuje v platenej verzii STN**