IEC 61558-2-26

Edition 1.0 2013-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Safety of transformers, reactors, power supply units and combinations thereof – Part 2-26: Particular requirements and tests for transformers and power supply units all for saving energy and other purposes

Sécurité des transformateurs, bobines d'inductance, blocs d'alimentation et des combinaisons de ces éléments – Partie 2-26: Règles particulières et essais pour les transformateurs et les blocs d'alimentation entièrement destinés à l'économie d'énergie et à d'autres fins

IEC 61558-2-26:2013

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 2-26: Particular requirements and tests for transformers and power supply units all for saving energy and other purposes

FOREWORD

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International standard IEC 61558-2-26 has been prepared by IEC technical committee 96: Transformers, reactors, power supply units and combinations thereof.

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

FDIS	Report on voting
96/400/FDIS	96/404/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

This part is intended to be used in conjunction with the latest edition of IEC 61558-1 and its amendments. It is based on the second edition (2005) of that standard.

This part supplements or modifies the corresponding clauses in IEC 61558-1, so as to convert that publication into the IEC standard: *Particular requirements and tests for transformers and power supply units all for saving energy and other purposes.*

A list of all parts of the IEC 61558 series, under the general title: *Safety of transformers, reactors, power supply units and combination thereof*, can be found on the IEC website.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

Where a particular subclause of Part 1 is not mentioned in this part that subclause applies as far as is reasonable. Where this part states "addition", "modification" or "replacement", the relevant text of Part 1 is to be adapted accordingly.

In this part 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 part, the words in **bold** are defined in Clause 3.

Subclauses, notes, figures and tables additional to those in Part 1 are numbered starting from 101; supplementary annexes are entitled AA, BB, etc.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

• reconfirmed,
• withdrawn,
• replaced by a revised edition, or
• amended.

NOTE The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip them for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 12 months from the date of publication.

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

Part 2-26: Particular requirements and tests for transformers and power supply units all for saving energy and other purposes

1 Scope

Replacement:

This part of IEC 61558 deals with the safety of **transformers**, **power supply units and switch mode power supply units all for saving energy** and other purposes in electrical installations by adjusting the output voltage and/or other electrical characteristics on the output circuits without interruption affected by the **transformers**, **power supply unit and switch mode power supply unit.**

NOTE 1 Safety includes electrical, thermal and mechanicals aspects.

The saving of energy is obtained by voltage stabilization and/or voltage adjusting of the electrical installation. This standard may also be used for **power supply units and switch mode power supply units** intended to be used where adjusting of the voltage or other electrical characteristics is required by the final application.

NOTE 2 An example of electrical installation is lighting installations, outdoor or indoor.

NOTE 3 In special applications the reduction of the output voltage may affect the safety and the performance of the supplied equipment.

This part applies to single-phase or three-phase **transformers**, **power supply units and switch mode power supply units all for saving energy** which are air-cooled (natural or forced), **independent** or **incorporated** and containing **transformers** and/or **power supply units** from the following parts of the IEC 61558 series:

Part 2-1: Particular requirements and tests for separating transformers and power supplies incorporating separating transformers for general applications.

Part 2-4: Particular requirements and tests for isolating transformers and power supply units incorporating isolating transformers.

Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers.

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

Part 2-14: Particular requirements and tests for variable transformers and power supply units incorporating variable transformers.

Part 2-16: Particular requirements and tests for switch mode power supply units and transformers for switch mode power supply units.

The **rated supply voltage** does not exceed 1 000 V a.c., and the **rated supply frequency** does not exceed 500 Hz.

This standard is applicable to **linear powers supply units** with **internal operational frequency** not exceeding 500 Hz.

This standard in combination with part 2-16 is also applicable to **switch mode power supply unit** and **transformer** all for saving energy with internal operating frequency higher than 500 Hz.

For specific application corresponding to the other parts 2 of IEC 61558 series, the necessary requirements of the relevant parts 2 are applicable. In addition, the requirements listed in this part apply.

When two requirements are in conflict, the most severe take precedence.

The **rated output** does not exceed:

– 150 kVA for single-phase **transformer, power supply unit and switch mode power supply unit all for saving energy;**

– 400 kVA for three-phase **transformer, power supply unit and switch mode power supply unit all for saving energy.**

This part is also applicable to **transformer, power supply unit and switch mode power supply unit all for saving energy** without limitation of the **rated output** subject to an agreement between the purchaser and the manufacturer.

The standard is also not applicable to external circuits and their components intended to be connected to the input terminals and/or output terminals of the **transformer, power supply unit and switch mode power supply unit all for saving energy**.

This standard is not applicable to other devices having similar functions, for example double level control gears, electronic control gears and specific dimmers covered by other standards.

Measures to protect the **enclosure** and components inside the **enclosure** against external influences such as fungus, vermin, termites, solar-radiation, and icing shall also be considered.

The different conditions for transportation, storage, and operation of the **transformer, power supply unit and switch mode power supply unit all for saving energy** shall also be considered.

Additional requirements in accordance with other appropriate standards and national rules may be applicable to **transformer, power supply unit and switch mode power supply unit all for saving energy** intended for use in special environments, such as tropical environment.

2 Normative references

This clause of Part 1 is applicable, except as follows.

Addition:

IEC 61558-1:2005, *Safety of power transformers, power supplies, reactors and similar products – Part 1: General requirements and tests*

IEC 61558-2-13, *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V – Part 2-13: Particular requirements and tests for auto transformers and power supply units incorporating auto transformers*

IEC 61558-2-14, *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*

IEC 61558-2-16, *Safety of transformers, reactors, power supply units and similar products for voltages up to 1 100 V – Part 2-16: Particular requirements and tests for switch mode power supply units and transformers for switch mode power supply units*

3 Terms and definitions

This clause of Part 1 is applicable except as follows:

When the term **transformer** is used it covers **transformer**, **power supply unit** and/or **switch mode power supply unit all for saving energy** as defined in this part.

3.1 Transformers

Addition:

3.1.101
transformer, power supply unit and switch mode power supply unit all for saving energy
devices including multiple components which together adjust the output voltage and/or electrical characteristics on the output circuits and thereby saving energy in end-products like streetlights

3.4 Circuits and windings

Addition:

3.4.5.101
internal by-pass
electronic or electromechanical by-pass system included in the **transformer,** which in case of malfunction connects the input supply and the output line

Note 1 to entry: The internal by-pass can operate automatically and/or manually.

Note 2 to entry: Switch-off devices for maintenance tasks or protective devices are not considered **internal by-pass** systems.

3.5 Ratings

Addition:

3.5.1.101
operation rated supply voltage range
supply voltage range assigned by the manufacturer to the **transformer, power supply unit and switch mode power supply unit all for saving energy**, within which the output voltage and/or other electrical characteristics on the output circuits is stabilized during operation

Note 1 to entry: This range shall be not lower than ± 10 % from the **rated supply voltage**, and it will be the one used to calculate the **rated supply voltage range** required for output voltage test.

3.5.4.101
rated minimum output current
output current assigned by the manufacturer to guarantee the correct operating conditions of the **transformer, power supply unit and switch mode power supply unit all for saving energy**

Note 1 to entry: For the definition of **rated output current** see 3.5.4 of Part 1.

3.5.7.101
rated minimum output
rated output assigned by the manufacturer to guarantee the correct operating conditions of the **transformer, power supply unit and switch mode power supply unit all for saving energy**

Note 1 to entry: For the definition of rated output see 3.5.7 of Part 1.

3.5.7.102
output level
level expressed as a voltage or an output that supplies the load and ensure that all the devices connected continue to operate properly assigned by the manufacturer and expressed in volts or as percentage of the **rated output**

Note 1 to entry: When the voltage stabilization and power reduction is performed by adjusting the voltage, the output level is expressed in volt. In other cases the output level is expressed as a percentage of rated output.

3.5.7.102.1
nominal output level
output level assigned by the manufacturer for supplying the load with its rated voltage and 100 % of the output

3.5.7.102.2
start output level
output level assigned by the manufacturer ensuring that all devices connected will start properly

3.5.7.103.3
minimum output level
output level assigned by the manufacturer ensuring that all the devices connected continue to operate properly

3.5.7.103
output level change speed
speed assigned by the manufacturer for changes from one **output level** to another

Note 1 to entry: Depending on how the reduction output is set, the output levels change speed is expressed in volt/minute or in percentage % rated output/minute.

Note 2 to entry: The output level change speed is assigned by the manufacturer.

Note 3 to entry: **Output level change speed** depends of the characteristics of the components to the installation (type of lamps, minimum voltage change speed, etc.).

3.5.7.104
stabilization time
time to return to the output voltage for each **output level** when the rated supply voltage is set from minimum to maximum **operation rated supply voltage range** assigned by the manufacturer for each **output level**

4 General requirements

This clause of Part 1 is applicable.

5 General notes on test

This clause of Part 1 is applicable.

6 Ratings

This clause of Part 1 is applicable except as follows:

Addition:

6.101 The rated supply voltages and rated output voltages shall not exceed 1 000 V a.c. The **rated supply frequency** shall not exceed 500 Hz.

For specific application corresponding to the other parts 2 of IEC 61558 series, the necessary requirements of the relevant parts 2 are applicable in addition to the requirements listed in this part. Where two requirements are in conflict, the most severe take precedence.

This standard in combination with part 2-16 is also applicable to **switch mode power supply** and for **transformer, power supply unit and switch mode power supply unit all for saving energy** with **internal operational frequency** higher than 500 Hz and with **rated output** exceeding to 1 kVA.

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

– 150 kVA for single-phase **transformer, power supply unit and switch mode power supply unit all for saving energy**, except for **transformer and power supply unit all for saving energy** subject to an agreement between the purchasers and the manufacturer;
– 400 kVA for three-phase **transformer and power supply unit all for saving energy**, except for **transformer and power supply unit all for saving energy** subject to an agreement between the purchaser and the manufacturer.

7 Classification

This clause of Part 1 is applicable except as follows:

Replacement:

7.3 According to the location:

– Indoor, or
– outdoor

and according to the degree of protection ensured by the **enclosure** and defined in accordance with IEC 60529 (IP code).

Addition:

7.101 According to the type of regulation of the output voltages for three phase **transformer, power supply unit and switch mode power supply unit all for saving energy**:

– designed to supply single phase load;
– designed to supply three phase load.

8 Marking and other information

This clause of Part 1 is applicable except as follows:

8.6

Addition:

If auxiliary input terminals are used, it (control signal, communication channel, etc.) shall be clearly indicated in the **transformer, power supply unit and switch mode power supply unit all for saving energy**.

8.11

Addition:

Symbol or graphical symbol	Explanation or title	Identification
	**Transformer and power supply unit all for saving energy.**	IEC 60417-6177 (DB:2012-11)

8.13

Addition:

Three-phase **transformer, power supply unit and switch mode power supply unit all for saving energy** that is formed by three or more independent single-phase **transformer, power supply unit and switch mode power supply unit all for saving energy**; marking shall be on each one of the single-phase **transformers, power supply unit and switch mode power supply unit all for saving energy.**

Addition:

8.101 Additional information

The details for a correct usage and maintenance of the installation shall be either registered somewhere on the device itself or on the instructions that the manufacturer supplies. They are as follows:

- installation instructions set up service and maintenance, for safe functions;
- external functioning conditions if required by the end applications (e.g. vibrations);
- declared values from manufacturer to comply 11.1.101 to 11.1.103;
- classification according to type of regulation, 7.101;
- classification according to the location, 7.3. and the IP degree;
- **incorporated transformer, power supply unit and switch mode power supply unit all for saving energy** shall include documentation by the manufacturer, including the methods to obtain the IP degree of protection defined, according to 19.101;
- information on internal failure procedures when **internal by-pass** shall be put into practice, according to 19.102;
- the technology and the type of **incorporated transformers** used. A guide for this information is in Annex BB.

9 Protection against electric shock

This clause of Part 1 is applicable except as follows:

9.1.2 Accessibility to hazardous live parts

Addition:

Hazardous live parts shall not be accessible by the standard test finger after opening of doors which give access the user to switch or regulating device like push button, handles, operating levers, knobs, even if this operation is made by tools.

10 Change of input voltage setting

This clause of part 1 is applicable.

11 Output voltage and output current under load

This clause of Part 1 is applicable except as follows:

11.1

Addition:

In case of three phase **transformer, power supply unit and switch mode power supply unit all for saving energy** designed to supply single phase load, the test shall be carried out by changing the input voltage, as required, on each phase at any time and verifying the output voltage on all the phases. For all other three phase **transformers and power supply units all for saving energy** the input voltage shall be changed simultaneously on the three phases.

In case of specific application it is recommended to use the specific load (e.g. luminaries), for checking.

Addition:

11.1.101 The **output voltage** for each **output level** shall not differ from the assigned value and the tolerance declared by the manufacturer.

The **minimum output level** shall not differ from the assigned value by more than - 0,5 %.

*Compliance is checked with the **transformer, power supply unit and switch mode power supply unit all for saving energy** successively connected to the minimum and maximum supply voltage of the **operation rated supply range**, while the **transformer and power supply unit all for saving energy** is loaded with an impedance or specific load resulting in the **rated output**.*

1.1.102 The **stabilization time** shall not exceed the values declared by the manufacturer for each **output level.**

*Compliance is checked with the **transformer, power supply unit and switch mode power supply unit all for saving energy** successively connected to the minimum and maximum supply voltage of the **operation rated supply range**, while the **transformer and power supply unit all for saving energy** is loaded with an impedance or specific load resulting to the **rated output**. The maximum time to return to the output voltage for each output level is measured.*

11.1.103 The **output level change speed** shall be checked as follows**:**

*Compliance is checked with the **transformer, power supply unit and switch mode power supply unit all for saving energy** connected to the maximum supply voltage of the*