



SLOVENSKI STANDARD
oSIST prEN IEC 60076-1:2026

01-november-2026

Močnostni transformatorji - 1. del: Splošno

Power transformers - Part 1: General

Leistungstransformatoren - Teil 1: Allgemeines

Transformateurs de puissance - Partie 1: Généralités

Ta slovenski standard je istoveten z: prEN IEC 60076-1:2026

ICS:

29.180

Transformatorji. Dušilke

Transformers. Reactors

oSIST prEN IEC 60076-1:2026

en

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14/1219/CDV

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Ms Stephanie Lavy

OF INTEREST TO THE FOLLOWING COMMITTEES:

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☒ SUBMITTED FOR CENELEC PARALLEL VOTING☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING**Attention IEC-CENELEC parallel voting**

The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting.

The CENELEC members are invited to vote through the CENELEC online voting system.

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TITLE:

Power transformers - Part 1: General

PROPOSED STABILITY DATE: 2031

NOTE FROM TC/SC OFFICERS:

IEC National committees are requested to read the supporting cover letter (14/1217/INF) when considering the CDV for IEC 60075-1

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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POWER TRANSFORMERS –

Part 1: General

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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IEC 60076-1 has been prepared by IEC technical committee 14: Power Transformers. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2011. This edition constitutes a technical revision.

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

- alignment of definitions with IECV;
- new definition introduced for electromagnetic power transformer and change of power transformer definition to allow for alternative technologies;
- new definition introduced for distribution transformer;
- new definition introduced for small, medium and large power transformers;
- incorporation of thermal requirements from IEC 60076-2;
- change from specification of temperature rise limits to specification of temperature limits;
- introduction of rated ambient temperature of external cooling medium as basis for transformer thermal requirements;
- introduction of insulation system thermal class 120;

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- 295 – introduction of different temperature limits for insulation system thermal class 105 and 120;
- 296 – update of references to other standards, for example climatic conditions, components and
- 297 materials;
- 298 – addition of requirement for short-circuit capability;
- 299 – addition of reference to energy performance;
- 300 – addition of specifying internal arcing withstand;
- 301 – changes to rating plate requirements;
- 302 – changes to certain tolerances, for example no-load and load losses;
- 303 – addition of tests applicable to distribution transformers only;
- 304 – addition of site tests;
- 305 – determination of reference temperature;
- 306 – addition of lifetime test for corrugated tanks;
- 307 – change to annex on transformer monitoring;
- 308 – addition of annex on high temperature insulation;
- 309 – addition of annex on offshore applications;
- 310 – addition of annex on modified thermal concept;

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

Draft	Report on voting
XX/XX/FDIS	XX/XX/RVD

312
313 Full information on the voting for its approval can be found in the report on voting indicated in
314 the above table.

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

316 This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in
317 accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available
318 at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are
319 described in greater detail at www.iec.ch/publications.

320 The committee has decided that the contents of this document will remain unchanged until the
321 stability date indicated on the IEC website under webstore.iec.ch in the data related to the
322 specific document. At this date, the document will be

- 323 • reconfirmed,
- 324 • withdrawn, or
- 325 • revised.

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POWER TRANSFORMERS –**Part 1: General****1 Scope**

This part of IEC 60076 applies to power transformers with the exception of certain categories of small and special transformers such as:

- transformers with rated power less than 1 kVA per phase;
- transformers which have no windings with a highest voltage for equipment with a U_m higher than 1 000 V;
- instrument transformers;
- traction transformers mounted on rolling stock;
- starting transformers;
- testing transformers;
- welding transformers;
- explosion-proof and mining transformers;
- transformers for deep water (submerged) applications;
- transformers covered by the scope of TC96.

When IEC standards do not exist for such categories of transformers (in particular transformers which have no windings with a highest voltage for equipment with a U_m higher than 1 000 V for industrial applications), this part of IEC 60076 may still be applicable either as a whole or in part.

This standard does not address the requirements that would make a transformer suitable for mounting in a position accessible to the general public.

For those categories of power transformers and reactors which have their own IEC standards, this part is applicable to the extent to which it is specifically called up by cross-reference in the other standard. Such standards exist for:

- reactors (IEC 60076-6);
- dry-type transformers (IEC 60076-11);
- self-protected transformers (IEC 60076-13);
- gas-filled power transformers (IEC 60076-15);
- transformers for wind turbine applications (IEC/IEEE 60076-16);
- traction transformers and inductors on board rolling stock (IEC 60310);
- converter transformers for industrial applications (IEC 61378-1);
- converter transformers for HVDC applications (IEC/IEEE 60076-57-129);
- phase-shifting transformers (IEC/IEEE 60076-57-1202);
- voltage regulated distribution transformers (IEC 60076-24).

At several places in this part it is specified or recommended that an 'agreement' should be reached concerning alternative or additional technical solutions or procedures. Such agreement is made between the manufacturer and the customer. The matters should preferably be raised at an early stage and the agreements included in the contract specification.

2 Normative references

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.

IEC 60060 (all parts), *High-voltage test techniques*

IEC 60076-2, *Power transformers – Part 2: Thermal performance measurement and test procedures for liquid-immersed transformers*

IEC 60076-3, *Power transformers – Part 3: Insulation levels, dielectric tests and external clearances in air*

IEC 60076-5, *Power transformers – Part 5: Ability to withstand short circuit*

IEC 60076-7, *Power transformers – Part 7: Loading guide for oil-immersed power transformers*

IEC 60076-8, *Power transformers – Part 8: Application guide*

IEC 60076-10, *Power transformers – Part 10: Determination of sound levels*

IEC 60076-11, *Power transformers – Part 11: Dry-type transformers*

IEC 60076-14, *Power transformers – Part 14: Liquid-immersed power transformers using high-temperature insulation materials*

IEC 60076-15, *Power transformers – Part 15: Gas-filled power transformers*

IEC 60076-18, *Power transformers - Part 18: Measurement of frequency response*

IEC 60076-22 (all parts), *Power transformers – Part 22: Power transformer and reactor fittings*

IEC 60137, *Insulated bushings for alternating voltages above 1 000 V*

IEC 60214-1:2014, *Tap-changers – Part 1: Performance requirements and test methods*

IEC 60296, *Fluids for electrotechnical applications – Unused mineral insulating oils for transformers and switchgear*

IEC 60317, *Specifications for particular types of winding wires*

IEC 60404 (all parts), *Magnetic materials*

IEC 60422, *Mineral insulating oils in electrical equipment - Supervision and maintenance guidance*

IEC 60554, *Cellulosic papers for electrical purposes*

IEC 60599, *Mineral oil-filled electrical equipment in service - Guidance on the interpretation of dissolved and free gases analysis*

IEC 60641, *Pressboard and presspaper for electrical purposes*

- 404 IEC 60721-3-4:2019, *Classification of environmental conditions – Part 3: Classification of*
 405 *groups of environmental parameters and their severities – Section 4: Stationary use at non-*
 406 *weather protected locations*
- 407 IEC 60836, *Specifications for unused silicone insulating liquids for electrotechnical purposes*
- 408 IEC 61039, *Classification of insulating liquids*
- 409 IEC 61099, *Specifications for unused synthetic organic esters for electrical purposes*
- 410 IEC 61203, *Synthetic organic esters for electrical purposes - Guide for maintenance of*
 411 *transformer esters in equipment*
- 412 IEC 62770, *Fluids for electrotechnical applications - Unused natural esters for transformers and*
 413 *similar electrical equipment*
- 414 IEC 62975, *Natural esters - Guidelines for maintenance and use in electrical equipment*
- 415 IEC 63012, *Insulating liquids – Unused modified or blended esters for electrotechnical*
 416 *applications*
- 417 ISO 2409, *Paints and varnishes — Cross-cut test*
- 418 ISO 7000, *Graphical symbols for use on equipment — Registered symbols*
- 419 ISO 9001, *Quality management systems – Requirements*
- 420 ISO 12944 (all parts), *Paints and varnishes – Corrosion protection of steel structures by*
 421 *protective paint systems*
- 422 ISO 19840, *Paints and varnishes — Corrosion protection of steel structures by protective paint*
 423 *systems — Measurement of, and acceptance criteria for, the thickness of dry films on rough*
 424 *surfaces*

425 **3 Terms and definitions**

426 For the purposes of this document, the following terms and definitions apply.

427 ISO and IEC maintain terminology databases for use in standardization at the following
 428 addresses:

- 429 • IEC Electropedia: available at <https://www.electropedia.org/>
- 430 • ISO Online browsing platform: available at <https://www.iso.org/obp>

431 NOTE Other terms use the meanings ascribed to them in the International Electrotechnical Vocabulary (IEV).

432 **3.1 General**

433 **3.1.1**

434 **power transformer**

435 transformer (IEV 151-13-42) with the purpose of transmitting electric power (IEV 113-03-52)

436 **3.1.2**

437 **electromagnetic power transformer**

438 power transformer with two or more electromagnetically coupled windings

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3.1.3**electronic power transformer**

power transformer based on power electronic devices

Note 1 to entry: Electronic power transformers are not yet covered by any TC 14 standard but it is introduced to prepare for this emerging technology.

Note 2 to entry: The terminal pairs are also called ports (IEV 131-12-60) in power electronic domain.

Note 3 to entry: Power electronic devices providing other conversions such as AC/DC, DC/AC, DC/DC, AC/AC with different frequencies on the ports, are defined under IEV 551-12-01 'electronic power converters'.

Note 4 to entry: Terms like 'solid state transformer', 'power electronic transformer' etc. are used for such devices for historical reasons in the power electronic domain but are deprecated in the power transformer domain.

3.1.4**small power transformer**

power transformer with a highest rated power of any winding ≤ 3150 kVA three phase, or ≤ 1050 kVA single phase

[SOURCE: IEV 421-01-24]

3.1.5**medium power transformer**

power transformer with a highest rated power of any winding > 3150 kVA but $\leq 31,5$ MVA three phase or > 1050 kVA but $\leq 10,5$ MVA single phase

[SOURCE: IEV 421-01-25]

3.1.6**large power transformer**

power transformer with a highest rated power of any winding $> 31,5$ MVA three phase or $> 10,5$ MVA single phase

[SOURCE: IEV 421-01-26]

3.1.7**distribution transformer**

small power transformer with the highest $U_m \leq 36$ kV and which is to be used for transferring electrical energy between a distribution circuit and a consumer circuit with $U_m \leq 1,1$ kV

Note 1 to entry: Consumer is defined according to IEV 691-01-04.

Note 2 to entry: This definition refers to a type of transformers produced in large series that do not require the full set of tests as defined in Subclause 10.2.1. For specific types of transformers used for the same purpose, e.g. dry type or voltage regulated distribution transformers, additional tests are prescribed in product relevant standards.

3.1.8**auto-transformer**

electromagnetic power transformer in which at least two windings have a common part

3.1.9**separate winding transformer**

electromagnetic power transformer having windings with no common parts

[SOURCE: IEV 421-01-13, modified by excluding the note to entry]

3.1.10**phase-shifting transformer PST**

power transformer (or combination of electromagnetic power transformers designed to work together) with two sets of line terminals (S and L) which is capable of varying the voltage phase-angle relationship between the S terminals and the L terminals

Note 1 to entry: The rated voltage of the S terminals and the L terminals may be the same or different. In addition, the PST may also be capable of varying the in-phase voltage.

[SOURCE: IEC/IEEE 60076-57-1202]

3.1.11**booster transformer**

electromagnetic power transformer, other than an auto-transformer or PST, of which one winding is intended to be connected in series with a circuit in order to alter its voltage

3.1.12**liquid-immersed type transformer**

electromagnetic power transformer in which the magnetic circuit and windings are immersed in liquid

Note 1 to entry: Liquid-immersed transformer and liquid-filled transformer are synonymous for the purposes of the IEC 60076 series of standards.

Note 2 to entry: If the liquid is oil this transformer type is called oil-immersed type transformer.

[SOURCE: IEC 421-01-14, modified by adding the notes to entry]

3.1.13**dry-type transformer**

electromagnetic power transformer of which the magnetic circuit and windings are not immersed in an insulating liquid

[SOURCE: IEC 421-01-16, modified]

3.1.14**gas-filled type power transformer**

dry-type transformer of which the magnetic circuit and windings are placed in a sealed (IEC 60050-421:1990, IEC 151-16-38) enclosure filled with gas

Note 1 to entry: This transformer type is also called gas-insulated type transformer

3.1.15**liquid preservation system**

system in a liquid-immersed transformer by which the thermal expansion of the liquid is accommodated

Note 1 to entry: Contact between the liquid and external air may sometimes be diminished or prevented.

3.1.16**sealed transformer**

power transformer which is non-breathing, that is, so sealed that there can be no significant interchange between its contents and the external atmosphere

Note 1 to entry: In the case of liquid-immersed transformers, these may or may not have a cushion of gases.

Note 2 to entry: Sealed transformers fall into two categories:

a) power transformers in which the total volume of liquid, together with gases, or any combination thereof, remains constant over the temperature range.