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Krafttransformatorer – Del 1: Allmänt

*Power transformers –
Part 1: General*

Som svensk standard gäller europastandarden EN 60076-1:2011. Den svenska standarden innehåller den officiella engelska språkversionen av EN 60076-1:2011.

Nationellt förord

Europastandarden EN 60076-1:2011

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 60076-1, Third edition, 2011 - Power transformers - Part 1: General**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 60076-1, utgåva 1, 1998, SS-EN 60076-1/A1, utgåva 1, 2001 och SS-EN 60076-1/A12, utgåva 1, 2002, gäller ej fr o m 2014-05-25.

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SEK Svensk Elstandard

Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

English version

**Power transformers -
Part 1: General
(IEC 60076-1:2011)**

Transformateurs de puissance -
Partie 1: Généralités
(CEI 60076-1:2011)

Leistungstransformatoren -
Teil 1: Allgemeines
(IEC 60076-1:2011)

This European Standard was approved by CENELEC on 2011-05-25. 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 14/675/FDIS, future edition 2 of IEC 60076-1, prepared by IEC TC 14, Power transformers, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60076-1 on 2011-05-25.

This European Standard supersedes EN 60076-1:1997 + A1:2000 + A12:2002.

EN 60076-1:2011 includes the following significant technical changes with respect to EN 60076-1:1997:

- addition of a definition of harmonic content;
- addition of a subclause on transport;
- addition of functional method of specification;
- addition of connection symbols for single phase transformers;
- addition of safety and environmental requirements;
- addition of requirements for liquid preservation systems;
- addition of a clause on DC currents;
- addition of vacuum, pressure and leak tests on tanks;
- the requirements formerly in Annex A are now incorporated in the text and Annex A is now an informative checklist;
- informative annexes have been added on facilities for condition monitoring and environmental and safety considerations.

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

The following dates were fixed:

- | | | |
|--|-------|------------|
| – latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2012-05-04 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2014-05-25 |

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60076-1:2011 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 standards indicated:

IEC 60060 series	NOTE	Harmonized in EN 60060 series (not modified).
IEC 60068-3-3	NOTE	Harmonized as EN 60068-3-3.
IEC 60076-4	NOTE	Harmonized as EN 60076-4.
IEC 60076-6	NOTE	Harmonized as EN 60076-6.
IEC 60076-13	NOTE	Harmonized as EN 60076-13.
IEC 60270	NOTE	Harmonized as EN 60270.
IEC 60310	NOTE	Harmonized as EN 60310.
IEC 60529:1989	NOTE	Harmonized as EN 60529:1991 (not modified).
IEC 61378 series	NOTE	Harmonized in EN 61378 series (not modified).
IEC 61378-1	NOTE	Harmonized as EN 61378-1.
IEC 61378-2	NOTE	Harmonized as EN 61378-2.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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 When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60076-2	-	Power transformers - Part 2: Temperature rise for liquid-immersed transformers	EN 60076-2	-
IEC 60076-3	2000	Power transformers - Part 3: Insulation levels, dielectric tests and external clearances in air	EN 60076-3	2001
IEC 60076-5	2006	Power transformers - Part 5: Ability to withstand short circuit	EN 60076-5	2006
IEC 60076-10	2001	Power transformers - Part 10: Determination of sound levels	EN 60076-10	2001
IEC 60076-11	2004	Power transformers - Part 11: Dry-type transformers	EN 60076-11	2004
IEC 60137	2008	Insulated bushings for alternating voltages above 1 000 V	EN 60137	2008
IEC 60214-1	2003	Tap-changers - Part 1: Performance requirements and test methods	EN 60214-1	2003
IEC 60296	2003	Fluids for electrotechnical applications - Unused mineral insulating oils for transformers and switchgear	EN 60296 + corr. September	2004 2004
IEC 60721-3-4	1995	Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities - Section 4: Stationary use at non-weatherprotected locations	EN 60721-3-4	1995
ISO 9001	2008	Quality management systems - Requirements	EN ISO 9001	2008

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POWER TRANSFORMERS –

Part 1: General

1 Scope

This part of IEC 60076 applies to three-phase and single-phase power transformers (including auto-transformers) with the exception of certain categories of small and special transformers such as:

- single-phase transformers with rated power less than 1 kVA and three-phase transformers less than 5 kVA;
- transformers, which have no windings with rated voltage 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.

When IEC standards do not exist for such categories of transformers (in particular transformer having no winding exceeding 1000 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 only to the extent in which it is specifically called up by cross-reference in the other standard. Such standards exist for:

- reactors in general (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 60076-16);
- traction transformers and traction reactors (IEC 60310);
- converter transformers for industrial applications (IEC 61378-1);
- converter transformers for HVDC applications (IEC 61378-2).

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 purchaser. The matters should preferably be raised at an early stage and the agreements included in the contract specification.

2 Normative references

The following referenced documents are indispensable for the application 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 60076-2, *Power transformers – Part 2: Temperature rise for liquid-immersed transformers*

IEC 60076-3:2000, *Power transformers – Part 3: Insulation levels, dielectric tests and external clearances in air*

IEC 60076-5:2006, *Power transformers – Part 5: Ability to withstand short circuit*

IEC 60076-10:2001, *Power transformers – Part 10: Determination of sound levels*

IEC 60076-11:2004, *Power transformers – Part 11: Dry-type transformers*

IEC 60137:2008, *Insulated bushings for alternating voltages above 1 000 V*

IEC 60214-1:2003, *Tap-changers – Part 1: Performance requirements and test methods*

IEC 60296:2003, *Fluids for electrotechnical applications – Unused mineral insulating oils for transformers and switchgear*

IEC 60721-3-4:1995, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 4: Stationary use at non-weatherprotected locations*

ISO 9001:2008, *Quality management systems – Requirements*