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Krafttransformatorer – Del 6: Reaktorer

*Power transformers –
Part 6: Reactors*

Som svensk standard gäller europastandarden EN 60076-6:2008. Den svenska standarden innehåller den officiella engelska språkversionen av EN 60076-6:2008.

Nationellt förord

Europastandarden EN 60076-6:2008

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 60076-6, First edition, 2007 - Power transformers - Part 6: Reactors**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 60289, utgåva 1, 1995 och SS-EN 60289/A11, utgåva 1, 2002, gäller ej fr o m 2011-06-01.

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English version

**Power transformers -
Part 6: Reactors
(IEC 60076-6:2007)**

Transformateurs de puissance -
Partie 6: Bobines d'inductance
(CEI 60076-6:2007)

Leistungstransformatoren -
Teil 6: Drosselspulen
(IEC 60076-6:2007)

This European Standard was approved by CENELEC on 2008-06-01. 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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, 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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 14/538/CDV, future edition 1 of IEC 60076-6, prepared by IEC TC 14, Power transformers, was submitted to the IEC-CENELEC Parallel Unique Acceptance Procedure and was approved by CENELEC as EN 60076-6 on 2008-06-01.

This European Standard supersedes EN 60289:1994 + A11:2002.

EN 60076-6:2008 includes the following significant technical changes with respect to EN 60289:1994:

- wide extension of the “Definitions”, “Rating” and “Tests” clauses,
- more consequent distinction between definition and rating,
- “Tests” subclauses take into account the latest revisions of relevant EN 60076 standards,
- dielectric testing of reactors is now in line with dielectric testing of transformer according to EN 60076-3:2001,
- consequent distinction between oil-immersed and dry-type reactor,
- document offers an easier handling and is a more stand-alone document than EN 60289,
- introduction of the discharge reactor as part of Clause 9,
- introduction of the turn-to-turn overvoltage test for dry-type reactors (Annex E),
- important background information given by newly introduced informative annexes,
 - Annex A (informative) – Information on shunt reactor switching and on special applications
 - Annex B (informative) – Magnetic characteristic of reactors
 - Annex C (informative) – Mutual reactance, coupling factor and equivalent reactances of three-phase reactors
 - Annex D (informative) – Temperature correction of losses for liquid-immersed gapped-core and magnetically shielded air-core reactors
 - Annex F (informative) – Short-circuit testing
 - Annex G (informative) – Resistors – Characteristics, specification and tests.

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) | 2009-03-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2011-06-01 |

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60076-6:2007 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 60143	NOTE Harmonized in EN 60143 series (not modified).
IEC 60168	NOTE Harmonized as EN 60168:1994 (not modified) + A1:1997 (not modified) + A2:2000 (not modified).
IEC 60273	NOTE Harmonized as HD 578 S1:1992 (not modified).
IEC 60529	NOTE Harmonized as EN 60529:1991 (not modified).
IEC 60871-1	NOTE Harmonized as EN 60871-1:2005 (not modified).
IEC 61378-1	NOTE Harmonized as EN 61378-1:1998 (not modified).
IEC 61378-2	NOTE Harmonized as EN 61378-2:2001 (not modified).
IEC 62271-110	NOTE Harmonized as EN 62271-110:2005 (not modified).

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 60060-1 + corr. March	1989 1990	High-voltage test techniques - Part 1: General definitions and test requirements	HD 588.1 S1	1991
IEC 60076-1 (mod) A1	1993 1999	Power transformers - Part 1: General	EN 60076-1 A1 + A11 + A12	1997 2000 1997 2002
IEC 60076-2 (mod)	1993	Power transformers - Part 2: Temperature rise	EN 60076-2	1997
IEC 60076-3 + corr. December	2000 2000	Power transformers - Part 3: Insulation levels, dielectric tests and external clearances in air	EN 60076-3	2001
IEC 60076-4	2002	Power transformers - Part 4: Guide to the lightning impulse and switching impulse testing - Power transformers and reactors	EN 60076-4	2002
IEC 60076-5	2006	Power transformers - Part 5: Ability to withstand short circuit	EN 60076-5	2006
IEC 60076-7	2005	Power transformers - Part 7: Loading guide for oil-immersed power transformers	-	-
IEC 60076-8	1997	Power transformers - Part 8: Application guide	-	-
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	- ¹⁾	Insulated bushings for alternating voltages above 1 000 V	EN 60137	2003 ²⁾
IEC 60270	- ¹⁾	High-voltage test techniques - Partial discharge measurements	EN 60270	2001 ²⁾
IEC 60721-2-6	- ¹⁾	Classification of environmental conditions - Part 2: Environmental conditions appearing in nature - Earthquake vibration and shock	HD 478.2.6 S1	1993 ²⁾
IEC/TR 60815	- ¹⁾	Guide for the selection of insulators in respect of polluted conditions	-	-

¹⁾ Undated reference.

²⁾ Valid edition at date of issue.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60905	1987	Loading guide for dry-type power transformers	-	-
IEC/TR3 60943	1998	Guidance concerning the permissible temperature rise for parts of electrical equipment, in particular for terminals	-	-

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POWER TRANSFORMERS –

Part 6: Reactors

1 Scope

This part of IEC 60076 applies to the following types of reactors:

- shunt reactors;
- series reactors including current-limiting reactors, neutral-earthing reactors, power flow control reactors, motor starting reactors, arc-furnace series reactors;
- filter (tuning) reactors;
- capacitor damping reactors;
- capacitor discharge reactors;
- earthing transformers (neutral couplers);
- arc-suppression reactors;
- smoothing reactors for HVDC and industrial application;

with the exception of the following reactors:

- reactors with a rating less than 1 kvar single-phase and 5 kvar three-phase;
- reactors for special purposes such as high-frequency line traps or reactors mounted on rolling stock.

Where IEC standards do not exist for small or special reactors, this part of IEC 60076 may be applicable as a whole or in part.

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 60060-1:1989, *High-Voltage test techniques – Part 1: General definitions and test requirements*

IEC 60076-1:1993, *Power transformers – Part 1: General*
Amendment 1 (1999)

IEC 60076-2:1997, *Power transformers – Part 2: Temperature rise*

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

IEC 60076-4:2002, *Power transformers – Part 4: Guide to lightning impulse and switching impulse testing – Power transformers and reactors*

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

IEC 60076-7:2005, *Power transformers – Part 7: Loading guide for oil-immersed power transformers*

IEC 60076-8:1997, *Power transformers – Part 8: Application guide*

IEC 60076-10:2005, *Power transformers – Part 10: Determination of sound levels*

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

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

IEC 60270, *High-voltage test techniques – Partial discharge measurements*

IEC 60721-2-6, *Classification of environmental conditions – Part 2: Environmental conditions appearing in nature. Earthquake vibration and shock*

IEC 60815, *Guide for the selection of insulators in respect of polluted conditions*

IEC 60905:1987, *Loading guide for dry-type power transformers*

IEC 60943:1998, *Guidance concerning the permissible temperature rise for parts of electrical equipment, in particular for terminals*

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