SVENSK STANDARD SS-EN 60076-3

Fastställd	Utgåva	Sida	Ansvarig kommitté
2014-01-29	2	1 (1+56)	SEK TK 14

Krafttransformatorer –
Del 3: Isolationsnivåer, isolationsprovning och yttre luftavstånd

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

Som svensk standard gäller europastandarden EN 60076-3:2013. Den svenska standarden innehåller den officiella engelska språkversionen av EN 60076-3:2013.

Nationellt förord

Europastandarden EN 60076-3:2013

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 60076-3, Third edition, 2013 - Power transformers - Part 3: Insulation levels, dielectric tests and external clearances in air**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 60076-3, utgåva 1, 2001, gäller ej fr o m 2016-09-04.

ICS 29.180.00

Denna standard är fastställd av SEK Svensk Elstandard,
som också kan lämna upplysningar om **sakinnehållet** i standarden.
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Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a säkerhet, prestanda, dokumentation, utförande och skötsel av elprodukter, elanläggningar och metoder. Genom att utforma sådana standarder blir säkerhetskraven tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

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Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60076-3

November 2013

ICS 29.180

Supersedes EN 60076-3:2001

English version

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

(IEC 60076-3:2013)

Transformateurs de puissance - Partie 3: Niveaux d'isolement, essais diélectriques et distances d'isolement dans l'air (CEI 60076-3:2013)

Leistungstransformatoren - Teil 3: Isolationspegel, Spannungsprüfungen und äußere Abstände in Luft (IEC 60076-3:2013)

CENELEC

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 60076-3:2013 E

SEK Svensk Elstandard

Foreword

The text of document 14/745/FDIS, future edition 3 of IEC 60076-3, prepared by IEC/TC 14 "Power transformers" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60076-3:2013.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2014-06-04
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2016-09-04

This document supersedes EN 60076-3:2001.

EN 60076-3:2013 includes the following significant technical changes with respect to EN 60073-3:2001:

– Three categories of transformer are clearly identified together with the relevant test requirements, these are summarised in Table 1.
– Switching impulse levels are defined for all U_m>72,5kV.
– The procedure for Induced voltage tests with PD has been revised to ensure adequate phase to phase test voltages.
– The AC withstand test has been redefined (LTAC instead of ACSD).
– Induced voltage tests are now based on U_r rather than U_m.
– New requirements for impulse waveshape (k factor) have been introduced.
– Tables of test levels have been merged and aligned with IEC 60071-1:2010.
– Additional test levels have been introduced for U_m > 800kV.
– A new Annex E has been introduced, which sets out the principles used in assigning the tests, test levels and clearances in air.

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

Endorsement notice

The text of the International Standard IEC 60076-3:2013 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 60071-2	NOTE	Harmonized as EN 60071-2.
IEC 60076-4	NOTE	Harmonized as EN 60076-4.
IEC 60214-1	NOTE	Harmonized as EN 60214-1.
IEC 61083-1	NOTE	Harmonized as EN 61083-1.
IEC 61083-2	NOTE	Harmonized as EN 61083-2.
IEC 62271-1	NOTE	Harmonized as EN 62271-1.

Annex ZA
(normative)
Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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.

Publication	Year	Title	EN/HD	Year
IEC 60050-421		International electrotechnical vocabulary (IEV) - Chapter 421: Power transformers and reactors	-	-
IEC 60060-1		High-voltage test techniques – Part 1: General definitions and test requirements	EN 60060-1	
IEC 60060-2		High-voltage test techniques - Part 2: Measuring systems	EN 60060-2	
IEC 60071-1		Insulation co-ordination - Part 1: Definitions, principles and rules	EN 60071-1	
IEC 60076-1		Power transformers - Part 1: General	EN 60076-1	
IEC 60137		Insulated bushings for alternating voltages above 1 000 V	EN 60137	
IEC 60270		High-voltage test techniques - Partial discharge measurements	EN 60270	

CONTENTS

INTRODUCTION

This part of IEC 60076 specifies the insulation requirements and the corresponding insulation tests with reference to specific windings and their terminals. It also recommends external clearances in air (Clause 16).

The insulation levels and dielectric tests which are specified in this standard apply to the internal insulation only. Whilst it is reasonable that the rated withstand voltage values which are specified for the internal insulation of the transformer should also be taken as a reference for its external insulation, this may not be true in all cases. A failure of the non-self-restoring internal insulation is catastrophic and normally leads to the transformer being out of service for a long period, while an external flashover may involve only a short interruption of service without causing lasting damage. Therefore, it may be that, for increased safety, higher test voltages are specified by the purchaser for the internal insulation of the transformer than for the external insulation of other components in the system. When such a distinction is made, the external clearances should be adjusted to fully cover the internal insulation test requirements.

Annex E sets out some of the principles used in assigning the tests, test levels and clearances in air to the transformer according to the highest voltage for equipment U_m.

POWER TRANSFORMERS –

Part 3: Insulation levels, dielectric tests and external clearances in air

1 Scope

This International Standard applies to power transformers as defined by and in the scope of IEC 60076-1. It gives details of the applicable dielectric tests and minimum dielectric test levels. Recommended minimum external clearances in air between live parts and between live parts and earth are given for use when these clearances are not specified by the purchaser.

For categories of power transformers and reactors which have their own IEC standards, this standard is applicable only to the extent in which it is specifically called up by cross reference in the other standards.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-421, *International Electrotechnical Vocabulary (IEV) – Chapter 421: Power transformers and reactors*

IEC 60060-1, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60060-2, *High-voltage test techniques – Part 2: Measuring systems*

IEC 60071-1, *Insulation co-ordination – Part 1: Definitions, principles and rules*

IEC 60076-1, *Power transformers – Part 1: General*

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

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