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Rotating electrical machines -- Part 15: Impulse voltage withstand levels of form-wound stator coils for rotating a.c. machines (IEC 60034-15:2009 (EQV))

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60034-15

June 2009

ICS 29.160

Supersedes EN 60034-15:1996

English version

Rotating electrical machines - Part 15: Impulse voltage withstand levels of form-wound stator coils for rotating a.c. machines

(IEC 60034-15:2009)

Machines électriques tournantes - Partie 15: Niveaux de tenue au choc électrique des bobines de stator préformées des machines tournantes à courant alternatif (CEI 60034-15:2009)

Drehende elektrische Maschinen - Teil 15: Steh-Stoßspannungspegel von Formspulen im Ständer drehender Wechselstrommaschinen (IEC 60034-15:2009)

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

Central Secretariat: Avenue Marnix 17, B - 1000 Brussels

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Ref. No. EN 60034-15:2009 E

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Foreword

The text of document 2/1534/FDIS, future edition 3 of IEC 60034-15, prepared by IEC TC 2, Rotating machinery, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60034-15 on 2009-05-01.

This European Standard supersedes EN 60034-15:1996.

The principal technical changes are as follows:

– change of title to clarify that it is form-wound coils that are being tested rather than machines;

– removal of the limitation on voltage in the scope;

– additional definitions for consistency with EN 60060-1;

– reduction in tolerances for the risetime of the steep-fronted impulse voltage;

– guidance on test levels for coils to be used in converter driven machines;

– guidance on voltage levels for routine tests;

– additional figures to show testing details and oscillograms of normal and faulty coils.

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)	2010-02-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2012-05-01

Endorsement notice

The text of the International Standard IEC 60034-15:2009 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 60034-1	NOTE	Harmonized as EN 60034-1:2004 (not modified).
IEC 60060-1	NOTE	Harmonized as EN 60060-1:200X[1)] (not modified).
IEC 60071-1	NOTE	Harmonized as EN 60071-1:2006 (not modified).

[1)] At draft stage.

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I.S. EN 60034-15:2009

IEC 60034-15

Edition 3.0 2009-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Rotating electrical machines –
Part 15: Impulse voltage withstand levels of form-wound stator coils for rotating a.c. machines

Machines électriques tournantes –
Partie 15: Niveaux de tenue au choc électrique des bobines de stator préformées des machines tournantes à courant alternatif

IEC 60034-15:2009

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IEC 60034-15

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ROTATING ELECTRICAL MACHINES –

Part 15: Impulse voltage withstand levels of form-wound stator coils for rotating a.c. machines

FOREWORD

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International Standard IEC 60034-15 has been prepared by IEC technical committee 2: Rotating machinery.

This third edition cancels and replaces the second edition published in 1995 and constitutes a technical revision. The principal technical changes are as follows.

- Change of title to clarify that it is form-wound coils that are being tested rather than machines.
- Removal of the limitation on voltage in the Scope.
- Additional definitions for consistency with IEC 60060-1.
- Reduction in tolerances for the risetime of the steep-fronted impulse voltage.
- Guidance on test levels for coils to be used in converter driven machines.
- Guidance on voltage levels for routine tests.
- Additional figures to show testing details and oscillograms of normal and faulty coils.

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

FDIS	Report on voting
2/1534/FDIS	2/1547/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.

NOTE A table of cross-references of all IEC TC 2 publications can be found on the IEC TC 2 dashboard on the IEC website.

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INTRODUCTION

IEC 60071-1 specifies general requirements for the phase to earth insulation of equipment in three phase a.c. systems and states that each apparatus committee is responsible for specifying the insulation levels and test procedures for its equipment, taking into consideration the recommendations of IEC 60071-1. The object of IEC 60034-15 is to specify requirements for rotating electrical machines. Experience has shown that the values given in this standard meet the insulation requirements for the essential stresses in service. An explanation of the principles adopted in preparing these requirements is given in Annex A. This standard is not intended for soft-start machines.

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ROTATING ELECTRICAL MACHINES –

Part 15: Impulse voltage withstand levels of form-wound stator coils for rotating a.c. machines

1 Scope

This part of IEC 60034 relates to a.c. machines incorporating form-wound stator coils. It specifies the test procedures and voltages to be applied to the main and interturn insulation of sample coils.

2 Terms and definitions

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

2.1
sample test
test carried out on coils in new condition which adequately represent the configuration of the finished item to be used in the machine for the purpose of evaluating the manufacturing procedures and processes incorporated in the insulation system

2.2
routine test
test carried out on all coils of the machine

2.3
form-wound stator coil
coil which is preformed to shape, insulated and substantially completed before insertion into the stator

2.4
front time
T_1
time for the impulse voltage to rise from 0 % to 100 % of the peak value and defined as 1,67 times the interval between the instants when the impulse is 30 % and 90 % of the peak value

2.5
time-to-half value
T_2
interval between the origin and the instant when the voltage has decreased to half the peak value

3 Impulse voltage withstand levels

Impulse voltage withstand levels for specific rated voltages shall be calculated in accordance with the formula given in Note 2 of Table 1. Table 1 gives the impulse voltage withstand levels for some common rated voltages rounded to the nearest whole number. The test levels for converter-fed machines depend upon how the rated voltage has been assigned by the manufacturer. It may be appropriate to increase the test levels by a factor to allow for the maximum overshoot which is likely to arise on the voltage at the machine terminals, as described in IEC 60034-18-42. This factor may be as high as 1,7 for a 3-level converter but lower if there are more levels.

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