SLOVENSKI STANDARD
SIST EN 60034-18-1:2011

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Nadomešča:
SIST EN 60034-18-1:1999

Električni rotacijski stroji - 18-1. del: Funkcijsko ocenjevanje izolacijskih sistemov - Splošne smernice (IEC 60034-18-1:2010)

Rotating electrical machines - Part 18-1: Functional evaluation of insulation systems - General guidelines (IEC 60034-18-1:2010)

Drehende elektrische Maschinen - Teil 18-1: Funktionelle Bewertung von Isoliersystemen - Allgemeine Richtlinien (IEC 60034-18-1:2010)

Machines électriques tournantes - Partie 18-1: Evaluation fonctionnelle des systèmes d'isolation - Principes directeurs généraux (CEI 60034-18-1:2010)

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29.080.30	Izolacijski sistemi	Insulation systems
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Rotating electrical machines - Part 18-1: Functional evaluation of insulation systems - General guidelines

(IEC 60034-18-1:2010)

Machines électriques tournantes - Partie 18-1: Evaluation fonctionnelle des systèmes d'isolation - Principes directeurs généraux (CEI 60034-18-1:2010)

Drehende elektrische Maschinen - Teil 18-1: Funktionelle Bewertung von Isoliersystemen - Allgemeine Richtlinien (IEC 60034-18-1:2010)

This European Standard was approved by CENELEC on 2010-05-01. 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, 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

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Foreword

The text of document 2/1583/FDIS, future edition 2 of IEC 60034-18-1, prepared by IEC TC 2, Rotating machinery, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60034-18-1 on 2010-05-01.

This European Standard supersedes EN 60034-18-1:1994 + A1:1996.

This EN 60034-18-1:2010 includes the following significant technical changes with respect to EN 60034-18-1:1994 + A1:1996:

– provides general guidelines for functional evaluation of different types of windings as before but beyond that for electrical evaluation of windings which are electrically stressed by converter-supply;

– is now focused on general guidelines with all technical details of procedures and qualification principles moved to the subsequent parts;

– details additional general aspects of functional evaluation, particularly the statistical procedure for comparison between reference and candidate insulation systems and the evaluation of minor component or manufacturing changes;

– contains a new acceptance test for verifying the expected production quality level of the insulation systems;

– restricts the classification of insulation systems as a result of the functional evaluation to thermal classification. Other kinds of classifications (classes) of insulation systems no longer exist.

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)	2011-02-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2013-05-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60034-18-1:2010 was approved by CENELEC as a European Standard without any modification.

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.

Publication	Year	Title	EN/HD	Year
IEC 60034-1	-	Rotating electrical machines - Part 1: Rating and performance	EN 60034-1	-
IEC 60034-18-21	-	Rotating electrical machines - Part 18: Functional evaluation of insulation systems - Section 21: Test procedures for wire-wound windings - Thermal evaluation and classification	EN 60034-18-21	-
IEC 60034-18-22	-	Rotating electrical machines - Part 18-22: Functional evaluation of insulation systems - Test procedures for wire-wound windings - Classification of changes and insulation component substitutions	EN 60034-18-22	-
IEC 60034-18-31	-	Rotating electrical machines - Part 18: Functional evaluation of insulation systems - Section 31: Test procedures for form-wound windings - Thermal evaluation and classification of insulation systems used in machines up to and including 50 MVA and 15 kV	EN 60034-18-31	-
IEC/TR 60034-18-32	-	Rotating electrical machines - Part 18-32: Functional evaluation of insulation systems - Test procedures for form-wound windings - Electrical evaluation of insulation systems used in machines up to and including 50 MVA and 15 kV	CLC/TR 60034-18-32	-
IEC/TR 60034-18-33	-	Rotating electrical machines - Part 18-33: Functional evaluation of insulation systems - Test procedures for form-wound windings - Multifactor functional evaluation - Endurance under combined thermal and electrical stresses of insulation systems used in machines up to and including 50 MVA and 15 kV	CLC/TR 60034-18-33	-

Publication	Year	Title	EN/HD	Year
IEC/TS 60034-18-34	-	Rotating electrical machines - Part 18-34: Functional evaluation of insulation systems - Test procedures for form-wound windings - Evaluation of thermomechanical endurance of insulation systems	CLC/TS 60034-18-34	-
IEC/TS 60034-18-41	-	Rotating electrical machines - Part 18-41: Qualification and type tests for Type I electrical insulation systems used in rotating electrical machines fed from voltage converters	-	-
IEC/TS 60034-18-42	-	Rotating electrical machines - Part 18-42: Qualification and acceptance tests for partial discharge resistant electrical insulation systems (Type II) used in rotating electrical machines fed from voltage converters	-	-
IEC 60085	-	Electrical insulation - Thermal evaluation and designation	EN 60085	-
IEC 60216	Series	Electrical insulating materials - Properties of thermal endurance	EN 60216	Series
IEC 60493-1	-	Guide for the statistical analysis of ageing test data - Part 1: Methods based on mean values of normally distributed test results	-	-
IEC 60505	2004	Evaluation and qualification of electrical insulation systems	EN 60505	2004
IEC 62539	-	Guide for the statistical analysis of electrical insulation breakdown data	-	-

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Rotating electrical machines –
Part 18-1: Functional evaluation of insulation systems – General guidelines

Machines électriques tournantes –
Partie 18-1: Evaluation fonctionnelle des systèmes d'isolation – Principes directeurs généraux

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ROTATING ELECTRICAL MACHINES –

Part 18-1: Functional evaluation of insulation systems – General guidelines

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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International Standard IEC 60034-18-1 has been prepared by IEC technical committee 2: Rotating machinery.

This second edition cancels and replaces the first edition, published in 1992, and its amendment 1 published in 1996, and constitutes a technical revision.

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

– provides general guidelines for functional evaluation of different types of windings as before but beyond that for electrical evaluation of windings which are electrically stressed by converter-supply;
– is now focused on general guidelines with all technical details of procedures and qualification principles moved to the subsequent parts;

– details additional general aspects of functional evaluation, particularly the statistical procedure for comparison between reference and candidate insulation systems and the evaluation of minor component or manufacturing changes;

– contains a new acceptance test for verifying the expected production quality level of the insulation systems;

– restricts the classification of insulation systems as a result of the functional evaluation to thermal classification. Other kinds of classifications (classes) of insulation systems no longer exist.

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

FDIS	Report on voting
2/1583/FDIS	2/1592/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 list of cross-references of all IEC TC 2 publications can be found in the IEC TC 2 dashboard on the IEC website.

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

IEC 60034-18 comprises several parts, dealing with different types of functional evaluation and special kinds of test procedures for insulation systems of rotating electrial machines. IEC 60034-18-1 provides general guidelines for such procedures and qualification principles, whereas the subsequent parts IEC 60034-18-21, IEC 60034-18-22, IEC 60034-18-31, IEC 60034-18-32, IEC 60034-18-33, IEC 60034-18-34, IEC 60034-18-41 and IEC 60034-18-42 give detailed procedures for the various types of windings. Beyond that, part IEC 60034-18-41 and IEC 60034-18-42 contain special test procedures for electrical evaluation of windings electrically stressed by converter-supply.

The following standards provide the basis and background for the development of the previous standards:

IEC 60505 establishes the basis for estimating the ageing of electrical insulation systems under conditions of either electrical, thermal, mechanical, environmental stresses or combinations of these (multifactor stresses). It specifies the general principles and procedures that should be followed defining functional test and evaluation procedures.

The IEC 60216 series deals with the determination of thermal endurance properties of single insulating materials. On the assumption, that the Arrhenius equations describe the rate of thermal ageing, test procedures and analyzing instructions for getting characteristic parameters like the “Temperature index” (TI), the “Halving interval” (HIC) and the “Relative thermal endurance index” (RTE) are given. For all these parameters selected properties and accepted end-point-criteria are specified. Consequently, a material may be assigned with more than one temperature index, derived from the measurement of different properties and the use of different end-point criteria.

IEC 60085 deals with thermal evaluation of insulation systems used in electrical equipment. In particular, thermal classes of insulation systems are defined and designations are given, such as 130 (B), 155 (F) and 180 (H) for use in rotating machines belonging to IEC 60034-1. In the past, materials for insulation systems were often selected solely on the basis of thermal endurance of individual materials performed according to the IEC 60216 series. However, IEC 60085 recognizes that such selection may be used only for screening materials prior to further functional evaluation of a new insulation system which is not service-proven. Evaluation is performed on the basis of a comparison with a service-proven reference insulation system. Service experience is the preferred basis for assessing the thermal endurance of an insulation system.

IEC 62539 defines statistical methods to analyse times to breakdown and breakdown voltage data obtained from electrical testing of solid insulation materials, for the purposes of characterization of the system and comparison with other insulation systems. The methods of analysis are described for the Weibull-distribution but other distributions are also presented.