SLOVENSKI STANDARD
SIST EN 60034-18-1:1999

01-april-1999

Rotating electrical machines - Part 18: Functional evaluation of insulation systems - Section 1: General guidelines (IEC 60034-18-1:1992 + corrigendum Aug. 1992)

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

Drehende elektrische Maschinen -- Teil 18: Funktionelle Bewertung von Isoliersystemen -- Hauptabschnitt 1: Allgemeine Richtlinien

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

Ta slovenski standard je istoveten z: **EN 60034-18-1:1994**

ICS:

29.080.30	Izolacijski sistemi	Insulation systems
29.160.01	Rotacijski stroji na splošno	Rotating machinery in general

SIST EN 60034-18-1:1999 **en**

EUROPEAN STANDARD

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EUROPÄISCHE NORM

EN 60034-18-1

May 1994

UDC 621.313:621.315.6:620.1:621.317.08

Descriptors: Rotating electrical machine, electrical insulation, operate characteristic, principle

ENGLISH VERSION

Rotating electrical machines
Part 18: Functional evaluation of insulation systems
Section 1: General guidelines
(IEC 34-18-1:1992 + corrigendum 1992)

Machines électriques tournantes
Partie 18: Evaluation fonctionnelle des systèmes d'isolation
Section 1: Principes directeurs généraux
(CEI 34-18-1:1992 + corrigendum 1992)

Drehende elektrische Maschinen
Teil 18: Funktionelle Bewertung von Isoliersystemen für drehende elektrische Maschinen
Teil 1: Allgemeine Richtlinien
(IEC 34-18-1:1992 + Corrigendum 1992)

This European Standard was approved by CENELEC on 1993-12-08. 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, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and 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 CENELEC questionnaire procedure, performed for finding out whether or not the International Standard IEC 34-18-1:1992 and its corrigendum August 1992 could be accepted without textual changes, has shown that no common modifications were necessary for the acceptance as European Standard.

The reference document was submitted to the CENELEC members for formal vote and was approved by CENELEC as EN 60034-18-1 on 8 December 1993.

The following dates were fixed:

- latest date of publication of an identical national standard (dop) 1995-03-15
- latest date of withdrawal of conflicting national standards (dow) 1995-03-15

For products which have complied with the relevant national standard before 1995-03-15, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2000-03-15.

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given only form information.
In this standard, annex A is informative and annex ZA is normative.

ENDORSEMENT NOTICE

The text of the International Standard IEC 34-18-1:1992 and its corrigendum August 1992 was approved by CENELEC as a European Standard without any modification.

In the official version of annex A, Bibliograhpy, the following notes have to be added for the standards indicated:

IEC 243 NOTE: IEC 243:1967 is superseded by IEC 243-1:1988, which is harmonized as HD 559.1 S1:1991, (modified).

IEC 455 NOTE: Harmonized as HD 307 (series).

ANNEX ZA (normative)

OTHER INTERNATIONAL PUBLICATIONS QUOTED IN THIS STANDARD WITH THE REFERENCES OF THE RELEVANT EUROPEAN PUBLICATIONS

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

NOTE : When the international publication has been modified by CENELEC common modifications, indicated by (mod), the relevant EN/HD applies.

IEC Publication	Date	Title	EN/HD	Date
34-1 (mod)	1983	Rotating electrical machines - Part 1: Rating and performance	HD 53.1 S2 A3	1985 1992
60-2	1973	High-voltage test techniques - Part 2: Test procedures	-	-
85	1984	Thermal evaluation and classification of electrical insulation	HD 566 S1	1990
216-1	1987*	Guide for the determination of thermal endurance properties of electrical insulating materials - Part 1: General procedures for the determination of thermal endurance properties, temperature indices and thermal endurance profiles	-	-
216-2	1974*	Part 2: List of materials and available tests	-	-
216-3**	1980	Part 3: Statistical methods	-	-
216-4**	1980	Part 4: Instructions for calculating the thermal endurance profile	-	-

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* IEC 216-1:1990 is harmonized as HD 611.1 S1:1992
IEC 216-2:1990 is harmonized as HD 611.2 S1:1992

** IEC 216-3:1980 + IEC 216-4:1980 are superseded by IEC 216-3-1:1990, which was harmonized as HD 611.3.1 S1:1992

IEC Publication	Date	Title	EN/HD	Date
493-1	1974	Guide for the statistical analysis of ageing test data - Part 1: Methods based on mean values of normally distributed test results	-	-
505	1975	Guide for the evaluation and identification of insulation systems of electrical equipment	-	-
544-1	1977	Guide for determining the effects of ionizing radiation on insulating materials - Part 1: Radiation interaction	-	-
544-2	1979	Part 2: Procedures for irradiation	-	-
544-3	1979	Part 3: Test procedures for permanent effects	-	-
544-4	1985	Part 4: Classification system for service in radiation environments	-	-
610	1978	Principal aspects of functional evaluation of electrical insulation systems: Ageing mechanisms and diagnostic procedures	-	-
611	1978	Guide for the preparation of test procedures for evaluating the thermal endurance of electrical insulation systems	-	-
727-1	1982	Evaluation of electrical endurance of electrical insulation systems - Part 1: General considerations and evaluation procedures based on normal distributions	-	-
792-1	1985	The multi-factor functional testing of electrical insulation systems Part 1: Test procedures	-	-

NORME INTERNATIONALE

INTERNATIONAL STANDARD

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Première édition
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1992-02

Evaluation fonctionnelle des systèmes d'isolation des machines électriques tournantes

Partie 1:
Principes directeurs généraux

Functional evaluation of insulation systems for rotating electrical machines

Part 1:
General guidelines

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Commission Electrotechnique Internationale
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Международная Электротехническая Комиссия

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

FUNCTIONAL EVALUATION OF INSULATION SYSTEMS FOR ROTATING ELECTRICAL MACHINES

Part 1: General guidelines

FOREWORD

1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.

2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.

3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

This part of International Standard IEC 34-18 has been prepared by Sub-Committee 2J: Classification of insulation systems for rotating machinery, of IEC Technical Committee No. 2: Rotating machinery.

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

Six Months' Rule	Report on Voting
2J(CO)4	2J(CO)8

Full information on the voting for the approval of this part can be found in the Voting Report indicated in the above table.

Annex A is for information only.

INTRODUCTION

IEC 34-18 comprises several parts:

Part 1: General guidelines
Part 2: Test procedures for wire-wound windings
Part 3: Test procedures for form-wound windings

Parts 2 and 3 are further divided into sub-parts, dealing with different types of functional evaluation.

IEC 505 recognizes and defines all of the factors which might influence the time to end of life of electrical equipment insulation. Those factors of influence causing ageing of the insulation are considered to be thermal, electrical, environmental (ambient), and mechanical.

IEC 85 deals with thermal evaluation of insulating materials and insulation systems used in electrical equipment. In particular, the thermal classes of insulation systems used in rotating machines such as A, E, B, F and H, as well as the temperatures usually associated with these thermal classes, are established in IEC 85. In the past, materials for insulation systems were often selected solely on the basis of thermal endurance of individual materials. However, the second edition of IEC 85 recognizes that such selection can be used only for screening materials prior to further functional evaluation of a new insulation system which is not service-proven. This evaluation is linked with earlier service experience through the use of a service-proven reference insulation system as the basis for comparative evaluation. Service experience is the preferred basis for assessing the thermal endurance of an insulation system.

IEC 611 describes the methodology based on the linear Arrhenius relationship (log life versus reciprocal absolute temperature), to be used as a guide in the preparation of test procedures for specific types of electromechanical products where the thermal ageing factor is considered to be dominant.

IEC 727 deals with evaluation of electrical endurance of insulation systems.

IEC 791 gives instructions for evaluation of data from service experience and from functional tests.

IEC 792 describes general principles for multi-factor functional testing of insulation systems.

In the winding of an electrical machine, different factors of influence may be dominant in different parts (e.g. turn insulation and end winding insulation). Therefore, different criteria may be necessary to assess those parts of the insulation. It may also be appropriate to apply different procedures of functional evaluation to these parts.

The large differences found in the rotating electrical machine windings, in terms of size, voltage and operating conditions, necessitate the use of different procedures of functional evaluation to evaluate various types of windings. These procedures may also be of different complexity, the simplest being based on a single ageing mechanism (e.g. thermal or electrical). In the present state of the art only thermal and electrical endurance testing procedures can be specified in some detail. Principles of mechanical, environmental and multifactor functional testing are briefly described to provide a basis for procedures to be developed later where appropriate.

FUNCTIONAL EVALUATION OF INSULATION SYSTEMS FOR ROTATING ELECTRICAL MACHINES

Part 1: General guidelines

1 Scope

This part of IEC 34-18 describes procedures for functional evaluation of electrical insulation systems used or proposed to be used in rotating electrical machines within the scope of IEC 34-1, and the classification of those insulation systems. This part (Part 1) provides general guidelines for such procedures and classification principles, whereas the subsequent parts give detailed procedures for the various types of windings.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of IEC 34-18. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of IEC 34-18 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 34-1: 1983, *Rotating electrical machines - Part 1: Rating and performance.*

IEC 60-2: 1973, *High-voltage test techniques - Part 2: Test procedures.*

IEC 85: 1984, *Thermal evaluation and classification of electrical insulation.*

IEC 216-1: 1987, *Guide for the determination of thermal endurance properties of electrical insulating materials - Part 1: General guidelines for ageing and evaluation of test results.*

IEC 216-2: 1974, *Guide for the determination of thermal endurance properties of electrical insulating materials - Part 2: List of materials and available tests.*

IEC 216-3: 1980, *Guide for the determination of thermal endurance properties of electrical insulating materials - Part 3: Statistical methods.*

IEC 216-4: 1980, *Guide for the determination of thermal endurance properties of electrical insulating materials - Part 4: Instructions for calculating the thermal endurance profile.*

IEC 493-1: 1974, *Guide for the statistical analysis of ageing test data - Part 1: Methods based on mean values of normally distributed test results.*