

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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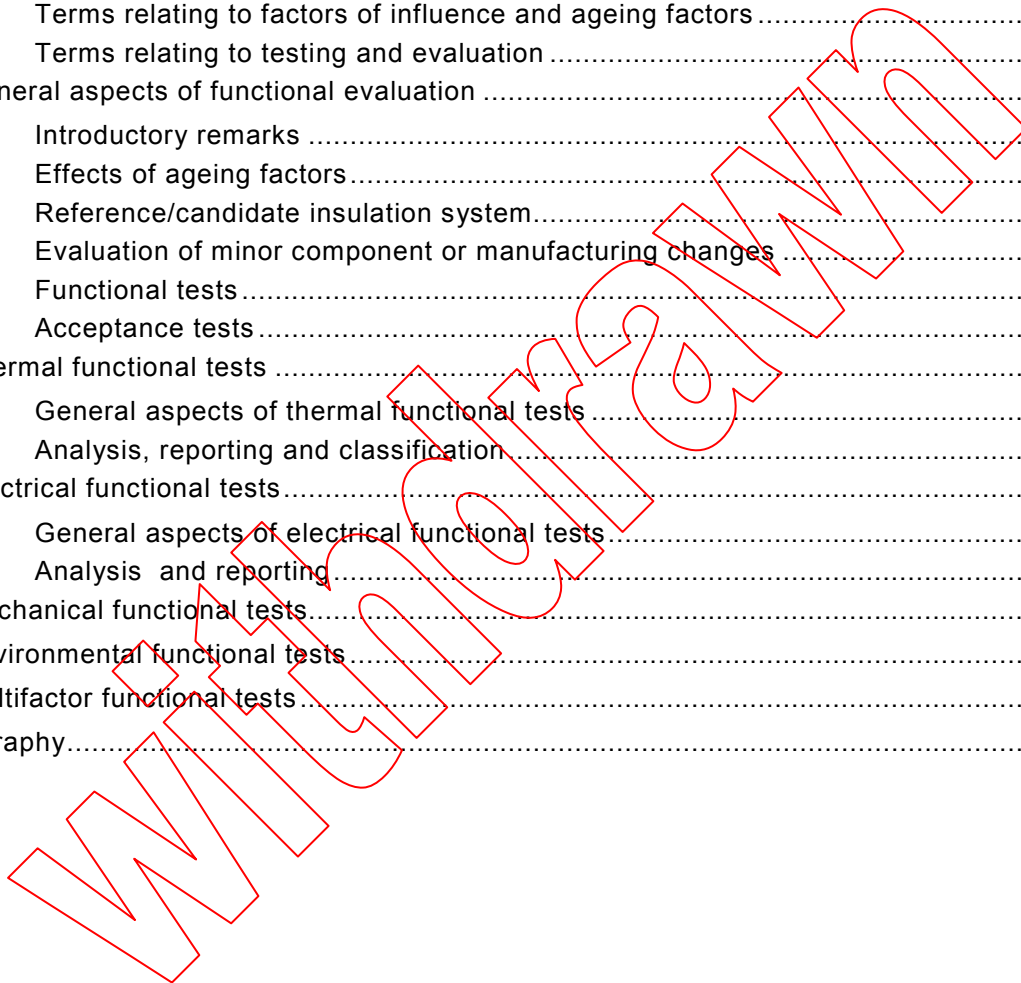


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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ROTATING ELECTRICAL MACHINES –

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

FOREWORD

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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 electrical 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.