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Rotating electrical machines – Part 18-33: Functional evaluation of insulation systems – Test procedures for form-wound windings – Multifactor evaluation by endurance under simultaneous thermal and electrical stresses

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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Part 18-33: Functional evaluation of insulation systems – Test procedures for form-wound windings – Multifactor evaluation by endurance under simultaneous thermal and electrical stresses

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- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC/TS 60034-18-33, which is a technical specification, has been prepared by IEC technical committee 2: Rotating machinery.

This new edition was originally issued as a technical report in 1995 but has been revised extensively prior to re-issue as a technical specification. The main changes with respect to the earlier version of this document are as follows.

a) the requirement to investigate the nature of interactions between thermal and electrical stresses has been abandoned;
b) the use of single stress acceleration factors has been removed;
c) the selection of stress levels has been adjusted and the temperatures are now related to the thermal class temperature of the insulation system;
d) the introduction of end-point criteria;
e) a simplified method to display results.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
2/1581/DTS	2/1601/RVC

Full information on the voting for the approval of this technical specification 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.

A list of all parts of the IEC 60034 series, published under the general title *Rotating electrical machines,* can be found on the IEC website.

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.

The committee has decided that the contents of this 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 be

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

This document is being issued as a technical specification (according to the ISO/IEC Directives, Part 1, 3.1.1.1) for provisional application in the field of insulation systems for rotating electrical machines, because there is a need for guidance on how standards in this field should be used to meet an identified need.

This document is not to be regarded as an International Standard. It is proposed for provisional application so that information and experience of its use in practice may be gathered. Comments on the content of this document should be sent to the IEC Central Office.

Part 18-1 of IEC 60034 presents general guidelines for the evaluation and classification of insulation systems used in rotating machines.

Part 18-33 deals exclusively with insulation systems for form-wound windings and concentrates on multifactor functional evaluation under simultaneous thermal and electrical ageing.

ROTATING ELECTRICAL MACHINES –

Part 18-33: Functional evaluation of insulation systems – Test procedures for form-wound windings – Multifactor evaluation by endurance under simultaneous thermal and electrical stresses

1 Scope

This part of IEC 60034-18 describes procedures for evaluation of insulation systems by endurance testing where thermal and electrical stresses are applied simultaneously. The procedures are intended for insulation systems used, or proposed to be used, in a.c. electrical machines using form-wound windings. The test procedures provide a comparison of performance between reference and candidate systems at combinations of voltage and temperature which have been used separately to assess quality in the past and which are chosen to produce failures within a suitable timescale and at stresses within practical limits. The outcome of the test on the candidate insulation system will indicate whether it is better or worse than the reference system with proven service experience but will not enable a lifetime in service to be calculated. The evaluation described in this technical specification does not include stress grading.

The test procedures in this technical specification are not intended to establish the interaction between thermal and electrical stress in the ageing process nor endurance lines. If additional information is required on this interaction or in order to achieve endurance lines, it is necessary to undertake further tests in which electrical ageing is carried out at constant temperature and different voltages (IEC 60034-18-32) and thermal ageing is performed at different temperatures and constant voltage.

2 Normative references

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.

IEC 60034-15, *Rotating electrical machines – Part 15: Impulse voltage withstand levels of form-wound stator coils for rotating a.c. machines*

IEC 60034-18-1:2010, *Rotating electrical machines – Part 18-1: Functional evaluation of insulation systems – General guidelines*

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*

IEC 60505, *Evaluation and qualification of electrical insulation systems*

IEC 62539, *Guide for the statistical analysis of electrical insulation breakdown data*