



**NSAI**  
Standards

Irish Standard  
I.S. EN 60034-18-21:2013

Rotating electrical machines -- Part 18  
-21: Functional evaluation of insulation  
systems - Test procedures for wire-  
wound windings - Thermal evaluation  
and classification (IEC 60034-18  
-21:2012 (EQV))

## I.S. EN 60034-18-21:2013

*Incorporating amendments/corrigenda issued since publication:*

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ICS 29.160

Supersedes EN 60034-18-21:1994 + A1:1996 + A2:1996

English version

**Rotating electrical machines -  
Part 18-21: Functional evaluation of insulation systems -  
Test procedures for wire-wound windings -  
Thermal evaluation and classification  
(IEC 60034-18-21:2012)**

Machines électriques tournantes -  
Partie 18-21: Evaluation fonctionnelle  
des systèmes d'isolation -  
Procédures d'essai pour enroulements  
à fils - Evaluation thermique  
et classification  
(CEI 60034-18-21:2012)

Drehende elektrische Maschinen -  
Teil 18-21: Funktionelle Bewertung  
von Isoliersystemen -  
Prüfverfahren für Runddrahtwicklungen -  
Thermische Bewertung und  
Klassifizierung  
(IEC 60034-18-21:2012)

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## **Foreword**

The text of document 2/1672/FDIS, future edition 2 of IEC 60034-18-21, prepared by IEC/TC 2 "Rotating machinery" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60034-18-21:2013.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2013-09-29
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2015-10-24

This document supersedes EN 60034-18-21:1994 + A1:1996 + A2:1996.

EN 60034-18-21:2013 includes the following significant technical changes with respect to EN 60034-18-21:1994 + A1:1996 + A2:1996:

The main technical changes with regard to the previous edition can be seen in the introduction of some basic statistical methods in the evaluation of comparative data. Moreover, the standard states a simpler use of different test procedures.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

## **Endorsement notice**

The text of the International Standard IEC 60034-18-21:2012 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 documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60034-1	-	Rotating electrical machines - Part 1: Rating and performance	EN 60034-1	-
IEC 60034-18-1	2010	Rotating electrical machines - Part 18-1: Functional evaluation of insulation systems - General guidelines	EN 60034-18-1	2010
IEC 60085	-	Electrical insulation - Thermal evaluation and designation	EN 60085	-
IEC 60216-1	-	Electrical insulating materials - Properties of thermal endurance - Part 1: Ageing procedures and evaluation of test results	EN 60216-1	-
IEC 60216-5	-	Electrical insulating materials - Thermal endurance properties - Part 5: Determination of relative thermal endurance index (RTE) of an insulating material	EN 60216-5	-
IEC 60455	Series	Resin based reactive compounds used for electrical insulation	EN 60455	Series
IEC 60464	Series	Varnishes used for electrical insulation	EN 60464	Series
IEC 60505	-	Evaluation and qualification of electrical insulation systems	EN 60505	-

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**ROTATING ELECTRICAL MACHINES –**

**Part 18-21: Functional evaluation of insulation systems –  
Test procedures for wire-wound windings –  
Thermal evaluation and classification**

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 60034-18-21 has been prepared by IEC technical committee 2: Rotating machinery.

This second edition cancels and replaces the first edition published in 1992, and its amendments 1 (1994) and 2 (1996), and constitutes a technical revision.

The main technical changes with regard to the previous edition can be seen in the introduction of some basic statistical methods in the evaluation of comparative data. Moreover, the standard states a simpler use of different test procedures.

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

FDIS	Report on voting
2/1672/FDIS	2/1682/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.

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

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

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## 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. Part IEC 60034-18-1 provides general guidelines for such procedures and qualification principles. The subsequent parts IEC 60034-18-21, IEC 60034-18-22, IEC 60034-18-31, 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.

This part IEC 60034-18-21 deals with the thermal evaluation and classification of insulation systems for wire-wound (usually random wound) windings.

Parts relevant to this document are:

- IEC 60034-18-1: General guidelines
- IEC 60034-18-31: Test procedures for form-wound windings
- IEC 60034-18-41: Qualification and type tests for Type I electrical insulation systems used in rotating electrical machines fed from voltage converters
- IEC 60034-18-42: Qualification and acceptance tests for partial discharge resistant electrical insulation systems (Type II) used in rotating electrical machines fed from voltage converters

# ROTATING ELECTRICAL MACHINES –

## Part 18-21: Functional evaluation of insulation systems – Test procedures for wire-wound windings – Thermal evaluation and classification

### 1 Scope

This part of IEC 60034 gives test procedures for the thermal evaluation and classification of insulation systems used or proposed for use in wire-wound alternating current (a.c.) or direct current (d.c.) rotating electrical machines.

The test performance of a candidate insulation system is compared to the test performance of a reference insulation system with proven service experience.

IEC 60034-18-1 describes general testing principles applicable to thermal endurance testing of insulation systems used in rotating electrical machines. The principles of IEC 60034-18-1 are followed unless otherwise stated in IEC 60034-18-21.

### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60034-1, *Rotating electrical machines – Part 1: Rating and performance*

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

IEC 60085, *Electrical insulation – Thermal evaluation and designation*

IEC 60216-1, *Electrical insulating materials – Properties of thermal endurance – Part 1: Ageing procedures and evaluation of test results*

IEC 60216-5, *Electrical insulating materials – Thermal endurance properties – Part 5: Determination of relative thermal endurance index (RTE) of an insulating material*

IEC 60455 (all parts), *Resin based reactive compounds used for electrical insulation*

IEC 60464 (all parts), *Varnishes used for electrical insulation*

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

### 3 General considerations

#### 3.1 Reference insulation system

A reference insulation system shall be tested using the same test procedure as for the candidate system. See 4.3 of IEC 60034-18-1.

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