



NSAI
Standards

Irish Standard
I.S. EN 60034-2-1:2014

Rotating electrical machines - Part 2-1: Standard methods for determining losses and efficiency from tests (excluding machines for traction vehicles)

I.S. EN 60034-2-1:2014

Incorporating amendments/corrigenda/National Annexes issued since publication:

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This document is based on:

EN 60034-2-1:2014

Published:

2014-09-05

*This document was published
under the authority of the NSAI
and comes into effect on:*

2014-09-26

ICS number:

29.160

NOTE: If blank see CEN/CENELEC cover page

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EUROPEAN STANDARD

EN 60034-2-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2014

ICS 29.160

Supersedes EN 60034-2:1996 (partially), EN 60034-2-1:2007

English Version

**Rotating electrical machines - Part 2-1: Standard methods for
determining losses and efficiency from tests (excluding
machines for traction vehicles)
(IEC 60034-2-1:2014)**

Machines électriques tournantes - Partie 2-1: Méthodes
normalisées pour la détermination des pertes et du
rendement à partir d'essais (à l'exclusion des machines
pour véhicules de traction)
(CEI 60034-2-1:2014)

Drehende elektrische Maschinen - Teil 2-1:
Standardverfahren zur Bestimmung der Verluste und des
Wirkungsgrades aus Prüfungen (ausgenommen Maschinen
für Schienen- und Straßenfahrzeuge)
(IEC 60034-2-1:2014)

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Foreword

The text of document 2/1742/FDIS, future edition 2 of IEC 60034-2-1, prepared by IEC/TC 2 "Rotating machinery" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60034-2-1:2014.

The following dates are fixed:

- latest date by which the document has to be implemented at (dop) 2015-05-01
national level by publication of an identical national
standard or by endorsement
- latest date by which the national standards conflicting with (dow) 2017-08-01
the document have to be withdrawn

This document supersedes EN 60034-2:1996 (partially), EN 60034-2-1:2007.

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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60034-2-2	NOTE	Harmonized as EN 60034-2-2.
IEC/TS 60034-2-3	NOTE	Harmonized as CLC/TS 60034-2-3.
IEC 60044 (Series)	NOTE	Harmonized as EN 60044 (Series).

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 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60027-1	-	Letter symbols to be used in electrical technology -- Part 1: General	EN 60027-1	-
IEC 60034-1	2010	Rotating electrical machines -- Part 1: Rating and performance	EN 60034-1	2010
IEC 60034-4	2008	Rotating electrical machines -- Part 4: Methods for determining synchronous machine quantities from tests	EN 60034-4	2008
IEC 60034-19	-	Rotating electrical machines -- Part 19: Specific test methods for d.c. machines on conventional and rectifier-fed supplies	EN 60034-19	-
IEC 60034-29	-	Rotating electrical machines -- Part 29: Equivalent loading and superposition techniques - Indirect testing to determine temperature rise	EN 60034-29	-
IEC 60051	Series	Direct acting indicating analogue electrical measuring instruments and their accessories	EN 60051	Series
IEC 60051-1	-	Direct acting indicating analogue electrical measuring instruments and their accessories -- Part 1: Definitions and general requirements common to all parts	EN 60051-1	-

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IEC 60034-2-1

Edition 2.0 2014-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Rotating electrical machines –
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(excluding machines for traction vehicles)**

**Machines électriques tournantes –
Partie 2-1: Méthodes normalisées pour la détermination des pertes et du
rendement à partir d'essais (à l'exclusion des machines pour véhicules
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IEC 60034-2-1

Edition 2.0 2014-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Rotating electrical machines –
Part 2-1: Standard methods for determining losses and efficiency from tests
(excluding machines for traction vehicles)**

**Machines électriques tournantes –
Partie 2-1: Méthodes normalisées pour la détermination des pertes et du
rendement à partir d'essais (à l'exclusion des machines pour véhicules
de traction)**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX

XD

ICS 29.160

ISBN 978-2-8322-1606-4

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ROTATING ELECTRICAL MACHINES –

Part 2-1: Standard methods for determining losses and efficiency from tests (excluding machines for traction vehicles)

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

This second edition cancels and replaces the first edition of IEC 60034-2-1, issued in 2007, as well as IEC 60034-2A, issued in 1974. This edition constitutes a technical revision.

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

- a) The test methods are now grouped into preferred methods and methods for field or routine testing. Preferred methods have a low uncertainty and for a specific rating and type of machine only one preferred method is now defined.
- b) The requirements regarding instrumentation have been detailed and refined.
- c) The description of tests required for a specific method is now given in the same sequence as requested for the performance of the test. This will avoid misunderstandings and

improve the accuracy of the procedures. In addition, for each method a flowchart shows the sequence of tests graphically.

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

FDIS	Report on voting
2/1742/FDIS	2/1748/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 in 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.

ROTATING ELECTRICAL MACHINES –

Part 2-1: Standard methods for determining losses and efficiency from tests (excluding machines for traction vehicles)

1 Scope

This part of IEC 60034 is intended to establish methods of determining efficiencies from tests, and also to specify methods of obtaining specific losses.

This standard applies to d.c. machines and to a.c. synchronous and induction machines of all sizes within the scope of IEC 60034-1.

NOTE These methods may be applied to other types of machines such as rotary converters, a.c. commutator motors and single-phase induction motors.

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 60027-1, *Letter symbols to be used in electrical technology – Part 1: General*

IEC 60034-1:2010, *Rotating electrical machines – Part 1: Rating and performance*

IEC 60034-4:2008, *Rotating electrical machines – Part 4: Methods for determining synchronous machine quantities from tests*

IEC 60034-19, *Rotating electrical machines – Part 19: Specific test methods for d.c. machines on conventional and rectifier-fed supplies*

IEC 60034-29, *Rotating electrical machines – Part 29: Equivalent loading and superposition techniques – Indirect testing to determine temperature rise*

IEC 60051(all parts), *Direct acting indicating analogue electrical measuring instruments and their accessories*

IEC 60051-1, *Direct acting indicating analogue electrical measuring instruments and their accessories – Part 1: Definitions and general requirements common to all parts*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60034-1, IEC 60051-1 and the following apply.

3.1

efficiency

ratio of output power to input power expressed in the same units and usually given as a percentage

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