SLOVENSKI STANDARD
SIST EN 60034-2-2:2010

01-september-2010

Električni rotacijski stroji - 2-2. del: Specifične metode za ugotavljanje posameznih izgub velikih strojev s preskušanjem - Dodatek k IEC 60034-2-1 (IEC 60034-2-2:2010)

Rotating electrical machines - Part 2-2: Specific methods for determining separate losses of large machines from tests - Supplement to IEC 60034-2-1 (IEC 60034-2-2:2010)

Drehende elektrische Maschinen - Teil 2-2: Besondere Verfahren zur Bestimmung der Einzelverluste großer elektrischer Maschinen aus Prüfungen - Ergänzung zu IEC 60034-2-1 (IEC 60034-2-2:2010)

Machines électrique tournantes - Partie 2-2: Méthodes spécifiques pour déterminer les pertes séparées des machines de grande taille - complément à la Partie 2-1 (CEI 60034-2-2:2010)

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Rotating electrical machines - Part 2-2: Specific methods for determining separate losses of large machines from tests - Supplement to IEC 60034-2-1

(IEC 60034-2-2:2010)

Machines électrique tournantes - Partie 2-2: Méthodes spécifiques pour déterminer les pertes séparées des machines de grande taille à partir d'essais - Complément à la CEI 60034-2-1 (CEI 60034-2-2:2010)

Drehende elektrische Maschinen - Teil 2-2: Besondere Verfahren zur Bestimmung der Einzelverluste großer elektrischer Maschinen aus Prüfungen - Ergänzung zu IEC 60034-2-1 (IEC 60034-2-2:2010)

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CENELEC

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

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Foreword

The text of document 2/1585/FDIS, future edition 1 of IEC 60034-2-2, prepared by IEC TC 2, Rotating machinery, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60034-2-2 on 2010-06-01.

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

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2011-03-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2013-06-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60034-2-2:2010 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 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.

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

Publication	Year	Title	EN/HD	Year
IEC 60034-1	-	Rotating electrical machines - Part 1: Rating and performance	EN 60034-1	-
IEC 60034-2-1	-	Rotating electrical machines - Part 2-1: Standard methods for determining losses and efficiency from tests (excluding machines for traction vehicles)	EN 60034-2-1	-

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FOREWORD

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

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

FDIS	Report on voting
2/1585/FDIS	2/1595/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 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.

ROTATING ELECTRICAL MACHINES –

Part 2-2: Specific methods for determining separate losses of large machines from tests – Supplement to IEC 60034-2-1

1 Scope

This part of IEC 60034 applies to large rotating electrical machines and establishes additional methods of determining separate losses and to define an efficiency supplementing IEC 60034-2-1. These methods apply when full-load testing is not practical and result in a greater uncertainty.

NOTE In situ testing according to the calorimetric method for full-load conditions is recognized.

The specific methods described are:

– Calibrated-machine method.
– Retardation method.
– Calorimetric method.

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

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60034-1 and IEC 60034-2-1 apply, as well as the following.

3.1
calibrated machine
machine whose mechanical power input/output is determined, with low uncertainty, using measured electrical output/input values according to a defined test procedure

3.2
calibrated-machine method
method in which the mechanical input/output to/from an electrical machine under test is determined from the measurement of the electrical input/output of a calibrated machine mechanically coupled to the test machine

3.3
retardation method
method in which the separate losses in a machine under test are deduced from the measurements of the deceleration rate of its rotating components when only these losses are present

3.4
calorimetric method
method in which the losses in a machine are deduced from the measurements of the heat generated by them

3.5
thermal equilibrium
the state reached when the temperature rises of the several parts of the machine do not vary by more than a gradient of 2 K per hour

[IEV 411-51-08]

4 Symbols

In addition to the symbols in IEC 60034-2-1, the following apply.

4.1 Quantities

A is an area, m^2,

C is the retardation constant, kg m^2 min^2,

c_p is the specific heat capacity of the cooling medium, J/(kg K),

h is the coefficient of heat transfer, W/(m^2 K),

J is the moment of inertia, kg m^2,

n is the speed, min^{-1},

P_{1E} is the excitation power supplied by a separate source, W,

P_k is the constant loss, W,

P_{el} is the electrical power, excluding excitation, W,

P_e is the excitation power, W,

P_{Fe} is the iron loss, W,

P_{fw} is the friction and windage loss, W,

P_{sc} is the short-circuit loss, W,

P_{mech} is the mechanical power, W,

P_T is the total loss, W,

Q is the volume rate of flow of the cooling medium, m^3/s,

t is the time, s,

v is the exit velocity of cooling medium, m/s,

Δp is the difference between the static pressure in the intake nozzle and ambient pressure, N/m^2,

$\Delta\theta$ is the temperature rise of the cooling medium, or the temperature difference between the machine reference surface and the external ambient temperature, K,

δ is the per unit deviation of rotational speed from rated speed,

ρ is the density of the cooling medium, kg/m^3,

θ is the temperature, °C.

4.2 Subscripts

irs for inside reference surface,

ers for outside reference surface,

E for exciter,

c for the cooling circuit,