SVENSK STANDARD SS-EN 60034-18-31

Fastställd	Utgåva	Sida	Ansvarig kommitté
2013-04-12	2	1 (1+27)	SEK TK 2

Roterande elektriska maskiner – Del 18-31: Funktionsutvärdering av isolersystem för roterande elektriska maskiner – Provning av formlindade lindningar – Termisk utvärdering och klassindelning av isolersystem för roterande maskiner

Rotating electrical machines –
Part 18-31: Functional evaluation of insulation systems –
Test procedures for form-wound windings –
Thermal evaluation and classification of insulation systems used in rotating machines

Som svensk standard gäller europastandarden EN 60034-18-31:2012. Den svenska standarden innehåller den officiella engelska språkversionen av EN 60034-18-31:2012.

Nationellt förord

Europastandarden EN 60034-18-31:2012

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 60034-18-31, Second edition, 2012 - Rotating electrical machines - Part 18-31: Functional evaluation of insulation systems - Test procedures for form-wound windings - Thermal evaluation and classification of insulation systems used in rotating machines**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 60034-18-31, utgåva 1, 1995 och SS-EN 60034-18-31/A1, utgåva 1, 1997, gäller ej fr o m 2015-07-30.

ICS 29.160

Denna standard är fastställd av SEK Svensk Elstandard,
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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60034-18-31

August 2012

ICS 29.160

Supersedes EN 60034-18-31:1994 + A1:1996

English version

Rotating electrical machines - Part 18-31: Functional evaluation of insulation systems - Test procedures for form-wound windings - Thermal evaluation and classification of insulation systems used in rotating machines

(IEC 60034-18-31:2012)

Machines électriques tournantes - Partie 18-31: Evaluation fonctionnelle des systèmes d'isolation - Procédures d'essai pour enroulements préformés - Evaluation thermique et classification des systèmes d'isolation utilisés dans les machines tournantes
(CEI 60034-18-31:2012)

Drehende elektrische Maschinen - Teil 18-31: Funktionelle Bewertung von Isoliersystemen - Prüfverfahren für Wicklungen mit vorgeformten Elementen - Thermische Bewertung und Klassifizierung von Isoliersystemen für drehende Maschinen
(IEC 60034-18-31:2012)

This European Standard was approved by CENELEC on 2012-07-30. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 60034-18-31:2012 E

SEK Svensk Elstandard

Foreword

The text of document 2/1662/FDIS, future edition 2 of IEC 60034-18-31, prepared by IEC/TC 2 "Rotating machinery" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60034-18-31:2012.

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)	2013-04-30
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2015-07-30

This document supersedes EN 60034-18-31:1994 + A1:1996.

EN 60034-18-31:2012 includes the following significant technical changes with respect to EN 60034-18-31:1994 + A1:1996:

- Definition of the test method and sub-cycles required to establish a consistent standardized platform for thermal ageing of insulation systems for form-wound windings.
- Recommendations for establishing a thermal life curve based on confidence intervals.
- Comparison of candidate and reference system performance for specific requirements of thermal class, within feasible limits.

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 60034-18-31:2012 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 60034-1	NOTE Harmonized as EN 60034-1.

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.

Publication	Year	Title	EN/HD	Year
IEC 60034-15	2009	Rotating electrical machines - Part 15: Impulse voltage withstand levels of form-wound stator coils for rotating a.c. machines	EN 60034-15	2009
IEC 60034-18-1	2010	Rotating electrical machines - Part 18-1: Functional evaluation of insulation systems - General guidelines	EN 60034-18-1	2010
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	CLC/TS 60034-18-42	-
IEC 60060-1	-	High-voltage test techniques - Part 1: General definitions and test requirements	EN 60060-1	-
IEC 60085	-	Electrical insulation - Thermal evaluation and designation	EN 60085	-
IEC 60216-1	-	Electrical insulating materials - Thermal endurance properties - Part 1: Ageing procedures and evaluation of test results	EN 60216-1	-
IEC 60216-4-1	-	Electrical insulating materials - Thermal endurance properties - Part 4-1: Ageing ovens - Single-chamber ovens	EN 60216-4-1	-
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 60505	-	Evaluation and qualification of electrical insulation systems	EN 60505	-

CONTENTS

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 electrial machines. IEC 60034-18-1 provides general guidelines for such procedures and qualification principles. The subsequent parts IEC 60034-18-21, 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.

IEC 60034-18-31 describes thermal evaluation and classification of insulation systems for form-wound windings. It provides standard thermal ageing techniques and diagnostic test procedures.

Parts relevant to this document are:

– IEC 60034-18-1: General guidelines

– IEC 60034-18-21: Test procedures for wire-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) electrical insulation systems used in rotating electrical machines fed from voltage converters

ROTATING ELECTRICAL MACHINES –

Part 18-31: Functional evaluation of insulation systems – Test procedures for form-wound windings – Thermal evaluation and classification of insulation systems used in rotating machines

1 Scope

This part of IEC 60034 describes thermal endurance test procedures for classification of insulation systems used in a.c. or d.c. rotating electrical machines with indirect cooling and form-wound windings.

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

The test procedures described in IEC 60034-18-31 are intended to compare the thermal endurance performance of the mainwall insulation between conductor(s) and ground and, where required by the design of the coil or bar, the insulation between the turns.

The test is not intended to simulate the in-service mechanical stresses experienced by the endwinding bracing or support materials. It does not include the evaluation of thermo-mechanical deterioration by expansion and contraction of insulation during temperature cycling.

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 IEC60034-18-31.

The thermal class for the insulation system refers to its maximum allowed (“hot spot”) temperature. The average temperature measured in service should not exceed the allowed temperature rise according to IEC 60034-1.

NOTE 1 Large machines, especially synchronous generators using bars, may require special thermal evaluation test procedures which are not included in this part.

NOTE 2 Recommended parameters for the diagnostic test may be applied according to IEC 60034-18-42 to form-wound coils designed with Type II insulation systems for use in converter applications.

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 60034-15:2009, *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 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 60060-1, *High-voltage test techniques – Part 1: General definitions and test requirements*

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 60216-4-1, *Electrical insulating materials – Thermal endurance properties – Part 4-1: Ageing ovens – Single-chamber ovens*

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

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