

Electrical insulating materials - Thermal endurance properties -- Part 8: Instructions for calculating thermal endurance characteristics using simplified procedures

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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English version

**Electrical insulating materials -
Thermal endurance properties -
Part 8: Instructions for calculating thermal endurance characteristics
using simplified procedures
(IEC 60216-8:2013)**

Matériaux isolants électriques -
Propriétés d'endurance thermique -
Partie 8: Instructions pour le calcul des
caractéristiques d'endurance thermique en
utilisant des procédures simplifiées
(CEI 60216-8:2013)

Elektroisolierstoffe -
Eigenschaften hinsichtlich des
thermischen Langzeitverhaltens -
Teil 8: Anweisungen zur Berechnung von
charakteristischen Werten zum
thermischen Langzeitverhalten unter
Verwendung vereinfachter Verfahren
(IEC 60216-8:2013)

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CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 112/236/FDIS, future edition 1 of IEC 60216-8, prepared by IEC/TC 112 "Evaluation and qualification of electrical insulating materials and systems" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60216-8:2013.

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) 2014-01-19
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2016-04-19

This document supersedes EN 60216-1:2001 (PART).

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 60216-8:2013 was approved by CENELEC as a European Standard without any modification.

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

IEC 60216-6	NOTE	Harmonised as EN 60216-6.
IEC 60212	NOTE	Harmonised as EN 60212.
ISO 2578:1993	NOTE	Harmonised as EN ISO 2578:1998 (not modified).

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 60085	-	Electrical insulation - Thermal evaluation and designation	EN 60085	-
IEC 60216-1	2013	Electrical insulating materials - Thermal endurance properties - Part 1: Ageing procedures and evaluation of test results	EN 60216-1	2013
IEC 60216-2	-	Electrical insulating materials - Thermal endurance properties - Part 2: Determination of thermal endurance properties of electrical insulating materials - Choice of test criteria	EN 60216-2	-
IEC 60216-3	-	Electrical insulating materials - Thermal endurance properties - Part 3: Instructions for calculating thermal endurance characteristics	EN 60216-3	-
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	-
ISO 291	-	Plastics - Standard atmospheres for conditioning and testing	EN ISO 291	-

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INTRODUCTION

The designation 'thermal endurance' is used here to refer to the test of thermal stress in air, excluding any other influence or stress applied to the test specimens. Thermal endurance properties evaluated in different environments and/or with different stresses applied to the test specimens require different test procedures.

In this part of IEC 60216, the study of the thermal ageing of materials is based solely on the change in certain properties resulting from a period of exposure to elevated temperature. The properties studied are always measured after the temperature has returned to ambient.

Properties of materials change at various rates on thermal ageing. To enable comparisons to be made of the thermal ageing of different materials, the criteria for judgment depend on the type of property to be studied and its acceptable limiting value.

ELECTRICAL INSULATING MATERIALS – THERMAL ENDURANCE PROPERTIES –

Part 8: Instructions for calculating thermal endurance characteristics using simplified procedures

1 Scope

This part of IEC 60216 specifies the general ageing conditions and simplified procedures to be used for deriving thermal endurance characteristics, which are shown by temperature index (TI) and/or relative temperature index (RTI) and the halving interval (HIC).

The procedures specify the principles for evaluating the thermal endurance properties of materials exposed to elevated temperature for long periods.

In the application of this standard, it is assumed that a practically linear relationship exists between the logarithm of the time required to cause the predetermined property change and the reciprocal of the corresponding absolute temperature (Arrhenius relationship).

For the valid application of the standard, no transition, in particular no first-order transition should occur in the temperature range under study.

Throughout the rest of this standard the designation "insulating materials" is always taken to mean "insulating materials and simple combinations of such materials".

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 60085, *Electrical insulation – Thermal evaluation and designation*

IEC 60216-1:2013, *Electrical insulating materials – Thermal endurance properties – Part 1: Ageing procedures and evaluation of test results*¹

IEC 60216-2, *Electrical insulating materials - Thermal endurance properties - Part 2: Determination of thermal endurance properties of electrical insulating materials - Choice of test criteria*

IEC 60216-3, *Electrical insulating materials – Thermal endurance properties – Part 3: Instructions for calculating thermal endurance characteristics*

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

¹ A sixth edition is due to be published shortly.

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

ISO 291, *Plastics – Standard atmospheres for conditioning and testing*

3 Terms, definitions, symbols and abbreviations

For the purposes of this document, the following terms, definitions, symbols and abbreviations apply.

3.1 Terms and definitions

3.1.1

temperature index

TI

numerical value of the temperature in degrees Celsius derived from the thermal endurance relationship at a time of 20 000 h (or other specified time)

3.1.2

halving interval

HIC

numerical value of the temperature interval in Kelvin which expresses the halving of the time to end-point taken at the temperature equal to TI

[SOURCE: IEC 60050-212:2010 [1]², definition 212-12-13, modified – omission of reference to "relative temperature index"]

3.1.3

thermal endurance graph

graph in which the logarithm of the time to reach a specified end-point in a thermal endurance test is plotted against the reciprocal thermodynamic test temperature

[SOURCE: IEC 60050-212:2010, definition 212-12-10]

3.1.4

thermal endurance graph paper

graph paper having a logarithmic time scale as the ordinate, graduated in powers of ten (from 10 h to 100 000 h is often a convenient range) and values of the abscissa are proportional to the reciprocal of the thermodynamic (absolute) temperature

Note 1 to entry: The abscissa is usually graduated in a non-linear (Celsius) temperature scale oriented with temperature increasing from left to right.

3.1.5

degrees of freedom

number of data values minus the number of parameter values

3.1.6

end-point

limit for a diagnostic property value based on which the thermal endurance is evaluated.

² Figures in square brackets refer to the Bibliography.