SLOVENSKI STANDARD
SIST EN 60216-4-2:2002

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Electrical insulating materials - Thermal endurance properties - Part 4-2: Ageing ovens - Precision ovens for use up to 300 °C (IEC 60216-4-2:2000)

Electrical insulating materials - Thermal endurance properties -- Part 4-2: Ageing ovens - Precision ovens for use up to 300 °C

Elektroisolierstoffe - Thermische Langzeiteigenschaften -- Teil 4-2: Alterungswärmeschränke - Präzisionswärmeschränke für Temperaturen bis 300 °C

Matériaux isolants électriques - Propriétés d'endurance thermique -- Partie 4-2: Etuves de vieillissement - Etuves de précision pour des utilisations pouvant atteindre 300 °C

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This European Standard was approved by CENELEC on 2000-11-01. 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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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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 15E/135/FDIS, future edition 1 of IEC 60216-4-2, prepared by SC 15E, Methods of test, of IEC TC 15, Insulating materials, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60216-4-2 on 2000-11-01.

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) 2001-08-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2003-11-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annex ZA is normative and annexes A and B are informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60216-4-2:2000 was approved by CENELEC as a European Standard without any modification.

CONTENTS

INTRODUCTION

IEC 60216, which deals with the determination of thermal endurance properties of electrical insulating materials is composed of several parts:

Part 1: General guidelines for ageing procedures and evaluation of test results;

Part 2: Choice of test criteria;

Part 3: Instructions for calculating thermal endurance characteristics – Section 1: Calculations using mean values of normally distributed complete data;

Part 3: Instructions for calculating thermal endurance characteristics – Section 2: Calculations for incomplete data: proof test results up to and including the median time to end-point (equal test groups);

Part 4: Ageing ovens – Section 1: Single-chamber ovens;

Part 4-3: Ageing ovens – Multi-chamber ovens (in preparation);

Part 5: Guidelines for the application of thermal endurance characteristics.

NOTE This series may be extended. For revisions and new parts, see the current catalogue of IEC publications for an up-to-date list.

ELECTRICAL INSULATING MATERIALS – THERMAL ENDURANCE PROPERTIES –

Part 4-2: Ageing ovens – Precision ovens for use up to 300 °C

1 Scope

This part of IEC 60216 covers minimum performance requirements for ventilated and electrically heated precision ovens for thermal endurance evaluation of electrical insulating materials and other appropriate applications. It covers ovens designed to operate over all or part of the temperature range from 20 K above room temperature up to 300 °C.

Two possible methods of achieving the required performance are described:

a) where the required performance is achieved by precise control of temperature in a simple single chamber oven, i.e. upgraded versions of ovens conforming to IEC 60216-4-1, and, otherwise,

b) where the required performance is achieved by utilizing a second chamber (iso-box), mounted within the chamber of a single-chamber oven, the purpose of which is to reduce the magnitude of any temperature changes to an acceptable level whilst maintaining the required levels of air change and circulation.

NOTE 1 Experience has shown that employment of an iso-box is an economical and practical means of meeting the requirements for a precision oven.

NOTE 2 It is recommended that a precision oven rather than a standard oven is used when the expected halving interval is less than 10 K (20 kh to 10 kh) in order to increase the precision of the measured temperature index and halving interval to a reasonable level.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60216. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 60216 are encouraged to investigate the possibility of applying the most recent edition of the normative documents indicated below. For undated references, the latest editions of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60216-1:1990, *Guide for the determination of thermal endurance properties of electrical insulating materials – Part 1: General guidelines for ageing procedures and evaluation of test results*

IEC 60216-4-1:1990, *Guide for the determination of thermal endurance properties of electrical insulating materials – Part 4: Ageing ovens – Section 1: Single-chamber ovens*

3 Definitions

For the purpose of this part of IEC 60216, the following definitions apply.

3.1
rate of ventilation
number of air changes per hour in the exposure chamber at room temperature

3.2
exposure volume
that part of the space in the oven chamber (or within the iso-box, when used) where the temperature difference and temperature fluctuation do not exceed the specified limits

3.3
temperature fluctuation
maximum change in temperature at one point in the exposure volume over a period of 3 h

3.4
temperature difference
maximum difference of temperature between any two points in the exposure volume at any one time

3.5
global average temperature
average temperature, calculated from the results of determinations made over a period of approximately 3 h using nine sensors spaced throughout the exposure volume

NOTE The global average temperature is considered to be the initial effective global exposure temperature if the sensors are mounted in the same space that contains the specimens. The term "global exposure temperature" is frequently abbreviated to "exposure temperature".

3.6
global exposure temperature
temperature selected for ageing test specimens to obtain data for the determination of the effects of temperature on those specimens

3.7
standard oven
oven with an electrically heated and ventilated chamber and with the ability to maintain the exposure temperature in its exposure volume within the limits given in IEC 60216-4-1

3.8
precision oven
oven which meets the requirements of this standard

NOTE The limits for temperature difference and temperature fluctuation in the exposure volume given in this standard are tighter than those given in IEC 60216-4-1.

3.9
oven chamber
interior volume of the single-chamber oven providing the space for exposing test specimens or accommodating an iso-box

3.10
iso-box
metal box with a close-fitting door, mounted in the oven chamber and used in preference as the exposure chamber

3.11
ventilation
continuous passage of pre-heated air through the exposure chamber

3.12
temperature deviation
calculated difference in the exposure temperature from the intended value due to the combination of the temperature difference, temperature fluctuation and the error in the measurement of temperature

3.13
halving interval
difference between two exposure temperatures which causes the halving of the heat ageing period required to arrive at a certain agreed level of property change of the material under test (see IEC 60216-1)

4 Constructional requirements

4.1 General

The oven system shall be soundly constructed of suitable materials designed for continuous operation over the whole of the allowable temperature range.

All electrical and other ancillary fittings shall be readily accessible for maintenance purposes.

4.2 Mechanical requirements

4.2.1 Oven

The materials of construction of the oven chamber and the interior fittings shall be so chosen as to not influence the properties of the specimens.

NOTE 1 Aluminium alloys and stainless steel have been found suitable in many cases.

Attention should be given to ensure that the door to the oven chamber is provided with an efficient seal and that any gasket materials used do not influence the properties of the specimens.

The exposure chamber shall be provided with a supply of preheated ventilating air which shall be directed in such a manner as to produce turbulence throughout the chamber.

NOTE 2 Wherever possible, the supply should be continuously filtered, metered and monitored.

NOTE 3 Inlet and outlet vent fittings with dampers designed to allow adjustment of the rate of ventilation have been found to be satisfactory.

4.2.2 Iso-box

The construction shall be such that the requirements for temperature fluctuation and temperature difference are met throughout more than 50 % of the space inside the iso-box when it is mounted in any chosen oven. The rate of ventilation shall conform with the requirements.

NOTE Boxes made from aluminium alloy sheet have been found to be satisfactory.