



**SLOVENSKI STANDARD**  
**SIST HD 566 S1:1998**

**01-oktober-1998**

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**Thermal evaluation and classification of electrical insulation (IEC 60085:1984)**

Thermal evaluation and classification of electrical insulation

Thermische Bewertung und Klassifikation von elektrischen Isolierung

Evaluation et classification thermiques de l'isolation électrique

**Ta slovenski standard je istoveten z: HD 566 S1:1990**

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**ICS:**

29.080.30      Izolacijski sistemi      Insulation systems

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**en**

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HD 566 S1

July 1990

ENGLISH VERSION

UDC: 621.315.6:620.193.918.2

Descriptors: Electrotechnical equipment, electrical insulation,  
evaluation, thermal endurance testing, classification,  
temperature

THERMAL EVALUATION AND CLASSIFICATION  
OF ELECTRICAL INSULATION

Evaluation et classification  
thermiques de l'isolation  
électrique

Thermische Bewertung und  
Klassifikation von  
elektrischen Isolierungen

BODY OF THE HD

The Harmonization Document consists of:

- IEC 85 (1984) ed 2; IEC/SC 15B (not appended)

This Harmonization Document was approved by CENELEC on 1990-05-01.

The English and French versions of this Harmonization Document are provided by the text of the IEC publication and the German version is the official translation of the IEC text.

According to the CENELEC Internal Regulations the CENELEC member National Committees are bound:

to announce the existence of this Harmonization Document at national level by or before 1990-12-15

to publish their new harmonized national standard by or before 1991-06-15

to withdraw all conflicting national standards by or before 1991-06-15.

Harmonized national standards are listed on the HD information sheet, which is available from the CENELEC National Committees or from the CENELEC Central Secretariat.

The CENELEC National Committees are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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1991-08-29

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE  
NORME DE LA CEI

INTERNATIONAL ELECTROTECHNICAL COMMISSION  
IEC STANDARD

Publication 85

Deuxième édition — Second edition

1984

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Evaluation et classification thermiques de l'isolation électrique

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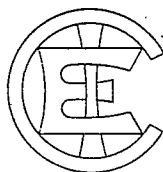
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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THERMAL EVALUATION AND CLASSIFICATION  
OF ELECTRICAL INSULATION

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## FOREWORD

- 1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.
- 3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

## PREFACE

This standard has been prepared by Sub-Committee 15B: Endurance Tests, of IEC Technical Committee No. 15: Insulating Materials, in collaboration with IEC Technical Committee No. 63: Insulation Systems.

This publication constitutes the second edition of IEC Publication 85 and replaces the first edition.

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

SIST HD 566 S1:1998	
Six Months' Rule	Report on Voting
<a href="https://standards.iteh.ai/catalog/standards/sist/4b5a6b17-4e7c-4e21-a9b5-2ae9511b9c78/sist-hd-566-s1-1998">https://standards.iteh.ai/catalog/standards/sist/4b5a6b17-4e7c-4e21-a9b5-2ae9511b9c78/sist-hd-566-s1-1998</a>	<a href="https://standards.iteh.ai/catalog/standards/sist/4b5a6b17-4e7c-4e21-a9b5-2ae9511b9c78/sist-hd-566-s1-1998">https://standards.iteh.ai/catalog/standards/sist/4b5a6b17-4e7c-4e21-a9b5-2ae9511b9c78/sist-hd-566-s1-1998</a>
15B(CO)55	15B(CO)59

Further information can be found in the Report on Voting indicated in the table above.

*Other IEC publications quoted in this publication:*

- Publication Nos. 216-1: Guide for the Determination of Thermal Endurance Properties of Electrical Insulating Materials. Part 1: General Procedures for the Determination of Thermal Endurance Properties, Temperature Indices and Thermal Endurance Profiles.
- 216-2: Part 2: List of Materials and Available Tests.
- 216-3: Part 3: Statistical Methods.
- 216-4: Part 4: Instructions for Calculating the Thermal Endurance Profile.
- 505: Guide for the Evaluation and Identification of Insulation Systems of Electrical Equipment.
- 610: Principal Aspects of Functional Evaluation of Electrical Insulation Systems: Ageing Mechanisms and Diagnostic Procedures.
- 611: Guide for the Preparation of Test Procedures for Evaluating the Thermal Endurance of Electrical Insulation Systems.

## THERMAL EVALUATION AND CLASSIFICATION OF ELECTRICAL INSULATION

### 1. Scope

This publication describes the recognized system of thermal classes for the insulation of electrotechnical products. It considers the thermal evaluation of insulating materials and of insulation systems, their interrelationship and the influence of service conditions. It defines the responsibility for assigning thermal identification and classification.

### 2. General

#### 2.1 Thermal classes

The endurance of the insulation of electrotechnical products is affected by many factors such as temperature, electrical and mechanical stresses, vibration, deleterious atmospheres and chemicals, moisture, dirt and radiation.

As the temperature in electrotechnical products is very often the dominating ageing factor on insulating materials and insulation systems, certain basic thermal classes are useful and have been recognized throughout the world. These thermal classes and the temperatures assigned to them are as follows:

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Thermal class	Temperature
Y	90 °C
A	105 °C
E	120 °C
B	130 °C
F	155 °C
H	180 °C
200	200 °C
220	220 °C
250	250 °C

Temperatures over 250 °C should increase by 25 °C intervals and classes designated accordingly.

*Note.* — The old Class C which was used in IEC Publication 85 (1957) for all temperatures above 180 °C is replaced by the above thermal classes.

The use of the letters is not mandatory. However, the above relationship between letters and temperatures should be adhered to. If the contents of Sub-clause 2.1.5 are applied to particular equipment, alternative systems of identification may be used.

When a thermal class describes an electrotechnical product it normally represents the maximum temperature appropriate to that product under rated load and other conditions. Thus, the insulation subjected to this maximum temperature will need to have a thermal capability at least equal to the temperature associated with the thermal class of the product (but see Sub-clause 2.1.2).



Up to now the term "class" has been used to refer to insulating materials, insulation systems and products. IEC Publication 216: Guide for the Determination of Thermal Endurance Properties of Electrical Insulating Materials, has introduced the term "temperature index" for insulating materials, while IEC Publication 505: Guide for the Evaluation and Identification of Insulation Systems of Electrical Equipment, has introduced the term "identification" for insulation systems. The identification of systems is relevant only to the particular product for which the system is designed. The term "classification" may be reserved for electrotechnical products.

### 2.1.1 *Operating conditions*

Experience has proved that, under usual operating conditions, satisfactory economic life is obtained for electrotechnical products such as rotating machines, transformers, etc., designed and built in accordance with standards based on the temperatures in Sub-clause 2.1 making due allowance for factors peculiar to the product in question.

### 2.1.2 *Insulating materials in insulation systems*

The description of an electrotechnical product as being of a particular thermal class does not mean, and must not be taken to imply that each insulating material used in its construction is of the same thermal capability.

The temperature limit for an insulation system may not be directly related to the thermal capability of the individual materials included in it. In the system, the thermal performance of insulating materials may be improved by the protective character of the materials used with them. On the other hand, problems of incompatibility between materials may decrease the appropriate temperature limit of the system below that for the individual materials. Such problems should be investigated by functional tests.

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### 2.1.3 *Temperature and temperature rise*

The temperatures quoted in this standard are the actual temperatures of the insulation and not the temperature rises of the electrotechnical product.

Standards for electrical equipment usually specify temperature rise rather than actual temperature. In establishing such standards, factors such as features of construction, thermal conductivity and thickness of insulation, accessibility of insulated parts, methods of ventilation, load characteristics etc., should be taken into account when considering the methods of measurement and the temperature rise to be permitted.

### 2.1.4 *Other factors of influence*

Apart from thermal factors, the ability of insulation to continue to fulfil its function is influenced by such conditions as mechanical stresses imposed upon it and its supporting structure, and by such factors as vibration and differential thermal expansion which may become of increasing importance as the size of the product increases. Moisture in the atmosphere and the presence of dirt, chemicals, or other contaminants may have injurious effects. All such factors should be taken into account when designing particular products and further guidance on this aspect may be found in IEC Publication 505.