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Classification of environmental conditions - Part 2: Environmental conditions appearing in nature - Solar radiation and temperature

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CLASSIFICATION OF ENVIRONMENTAL CONDITIONS
PART 2: ENVIRONMENTAL CONDITIONS APPEARING IN NATURE
SOLAR RADIATION AND TEMPERATURE

Classification des conditions d'environnement
Deuxième partie: Conditions d'environnement présentes dans la nature
Rayonnement solaire et température

Klassifizierung von Umweltbedingungen
Teil 2: Natürliche Einflüsse
Sonnenstrahlung

BODY OF THE HD

The Harmonization Document consists of:

- IEC 721-2-4 (1987) ed 1 + Amdt 1 (1988); IEC/TC 75, not appended

This Harmonization Document was approved by CENELEC on 1989-12-05.

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 1990-03-01

to publish their new harmonized national standard by or before 1990-09-01

to withdraw all conflicting national standards by or before 1990-09-01.

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, Luxemburg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

NORME INTERNATIONALE

INTERNATIONAL STANDARD

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Edition 1:1987 consolidated with amendment 1:1988

Classification des conditions d'environnement –

Partie 2-4: Conditions d'environnement présentes dans la nature – Rayonnement solaire et température

Classification of environmental conditions –

Part 2-4: Environmental conditions appearing in nature – Solar radiation and temperature

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Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

CLASSIFICATION OF ENVIRONMENTAL CONDITIONS –

Part 2-4: Environmental conditions appearing in nature – Solar radiation and temperature

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
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6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60721-2-4 has been prepared by IEC technical committee 104: Environmental conditions, classification and methods of test.[1)]

This consolidated version of IEC 60721-2-4 is based on the first edition (1987) [documents 75(CO)19 and 75(CO)23 and its amendment 1 (1988) [documents 75(CO)38 and 75(CO)45.

It bears the edition number 1.1.

A vertical line in the margin shows where the base publication has been modified by amendment 1.

It should be noted that this standard forms one part of a series intended to deal with the following subjects:

- Classification of environmental parameters and their severities (IEC 60721-1).
- Environmental conditions appearing in nature (IEC 60721-2).
- Classification of groups of environmental parameters and their severities (IEC 60721-3).

1) IEC technical committee 75: "Classification of environmental conditions" has been transformed into technical committee 104.

The following IEC publication are quoted in this standard:

IEC 60721-1:1981, *Classification of environmental conditions – Part 1: Classification of environmental parameters and their severities*

IEC 60721-2-1:1982, *Part 2: Environmental conditions appearing in nature – Temperature and humidity*

The committee has decided that the contents of the base publication and its amendment 1 will remain unchanged until 2007. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

CLASSIFICATION OF ENVIRONMENTAL CONDITIONS –

Part 2-4: Environmental conditions appearing in nature – Solar radiation and temperature

1 Scope

This part of the standard presents a broad division into types of solar radiation areas. It is intended to be used as part of the background material when selecting appropriate severities of solar radiation for product applications.

All types of geographical areas are covered, except areas with altitudes above 5 000 m.

When selecting severities of solar radiation for product applications, the values which are given in IEC 60721-1 should be applied.

2 Object

To define limiting severities of solar radiation to which products are liable to be exposed during transportation, storage and use.

3 General

Solar radiation can affect products primarily by heating of material and their environment or by photochemical degradation of material.

The ultraviolet content of solar radiation causes photochemical degradation of most organic materials. Elasticity and plasticity of certain rubber compounds and plastic materials are affected. Optical glass may become opaque.

Solar radiation bleaches out colours in paints, textiles, paper, etc. This can be of importance, for example for the colour coding of components.

The heating of material is the most important effect of exposure to solar radiation. The presentation of severities of solar radiation is therefore related to the power density radiated towards a surface, or irradiance, expressed in watts per square metre.

An object subjected to solar radiation will attain a temperature depending primarily on the surrounding air temperature, the energy radiated from the sun, and the incidence angle of the radiation on the object. Other factors, for example wind and heat conduction to mountings, can be of importance. In addition, the absorptance α_s of the surface for the solar spectrum is of importance.

An artificial air temperature t_s may be defined, which, under steady-state conditions, results in the same surface temperature of an object as the combination of the actual air temperature t_u and the solar radiation of the irradiance E.