

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Classification of environmental conditions –
Part 3-0: Classification of groups of environmental parameters
and their severities – Introduction**

**Classification des conditions d'environnement –
Partie 3-0: Classification des groupements des agents d'environnement
et de leurs sévérités – Introduction**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

CLASSIFICATION OF ENVIRONMENTAL CONDITIONS –**Part 3-0: Classification of groups of environmental parameters and their severities – Introduction**

FOREWORD

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International Standard IEC 60721-3-0 has been prepared by IEC technical committee 104: Environmental conditions, classification and methods of test.

This second edition cancels and replaces the first edition published in 1984 and Amendment 1:1987. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) This edition has been extensively simplified to only provide necessary information with regard to the process given in the other parts of IEC 60721-3 and information on class severity has been updated.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
104/864/FDIS	104/867/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60721 series, published under the general title *Classification of environmental conditions*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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- withdrawn,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

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INTRODUCTION

This document forms one part of a series dealing with the following subjects:

- 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).

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CLASSIFICATION OF ENVIRONMENTAL CONDITIONS –

Part 3-0: Classification of groups of environmental parameters and their severities – Introduction

1 Scope

This part of IEC 60721 provides guidance on the use of all parts of IEC 60721-3. It contains background information including information on the application and limitation of the classes given in various parts of IEC 60721-3 which can be used in the design, limitation of conditions and protection of equipment.

Reference to IEC 60721-3-0 is important in order to avoid misuse of the classes defined in the other parts of IEC 60721-3.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

4 Content and layout

Separate groups of classes of environmental conditions are given for the following product applications:

- IEC 60721-3-1: Storage;
- IEC 60721-3-2: Transportation and handling;
- IEC 60721-3-3: Stationary use at weatherprotected locations;
- IEC 60721-3-4: Stationary use at non-weatherprotected locations;
- IEC 60721-3-5: Ground vehicle installations;
- IEC 60721-3-6: Ship environment;
- IEC 60721-3-7: Portable and non-stationary use;
- IEC 60721-3-9: Microclimates inside products.

The classes are identified by:

- a digit defining the application (1 for storage, 2 for transportation and handling, 3 for stationary use at weatherprotected locations, etc.);
- a letter for climatic conditions (K), biological conditions (B), chemically active substances (C), mechanically active substances (S), mechanical conditions (M) or special climatic conditions (Z). To be extended if necessary;

- a further digit indicating severity, where a higher digit normally indicates more stringent conditions. A class may be further divided into H (High) or L (Low) to allow for conditions where, for example, the temperature may be severely low but never high.

EXAMPLE Class 2K11

where

2 = transportation and handling;

K = climatic conditions;

11 = severity.

IEC 60721-3 (all parts) contains tables giving all classes, including the severity of each environmental parameter for each class. In addition, every publication may include an informative annex that provides details of conditions which products are assumed to meet and which form a basis for the classes. These annexes are intended to guide the user of the publication in his selection of the class appropriate to his special product application.

5 Guidance on the selection of environmental parameters and severities

5.1 General

A product may be subjected to a range of environmental conditions during its lifetime. These conditions have been separated into classes described in IEC 60721-3 (all parts). The classes given may be used for defining the maximum short-term environmental stresses of a product. However, they do not provide information regarding the long-term or total lifetime environmental stresses a product may experience. This means that no reliability or lifetime assessment is possible based on these classes alone. Refer to IEC 60721-2 (all parts) and applicable technical reports (IEC TR 62130 and IEC TR 62131 (all parts)) for further information on actual environmental conditions.

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A product will be simultaneously exposed to a number of environmental parameters, for example, solar radiation and temperature, temperature and humidity, as well as vibration and temperature change. Combinations of the environmental parameters given may increase the effect on a product. Therefore, combined conditions should be considered in the design and evaluation of a product.

Products should be designed to survive and operate in different environments. Basically, they will be affected by the environmental influences in two ways:

- by the effects of short-term extreme environmental conditions which may directly cause malfunction or destroy the product;
- by the effect of long-term subjection to non-extreme environmental stresses which may slowly degrade the product and finally cause malfunction or destruction of the product.

Short-term extreme environmental conditions may occur at any time in the product's life. A product may be unaffected by an extreme condition when it is new but fails when it is subjected to the same condition after being used for a long period of time due to the effect of ageing. The order in which the environmental conditions are applied may affect the results of an evaluation.

It is important for the product specification, when referring to a certain class in IEC 60721-3, to define whether the product is required to be capable of operating or only to survive without permanent damage when being exposed to the conditions described by the class. The environmental classes may be used as a basis for the selection of design and test severities with respect to the consequence of failure.

5.2 Establishing testing severities

Information contained in IEC 60721-3 (all parts) may be used as a means to help establish expected requirements for use, storage, transportation, handling, etc., and in the development of relevant specifications.

The selected severities used for testing should attempt to produce the effects of the actual environment. See IEC 60068-1:2013, Annex C for information regarding test tailoring.

EXAMPLE 1 A high temperature test on a heat dissipating product is designed to simulate the thermal effect of subjecting the product to conditions of high air temperature, solar radiation and other possible heat sources dependent on the application.

EXAMPLE 2 In a mechanical shock test, the product can be subjected to mechanical shocks of simple pulse shapes (e.g. half-sine), while the actual conditions cannot be described by such simple pulses.

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IEC 60721-3 (all parts), *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities*

IEC TR 62130, *Climatic field data including validation*

IEC TR 62131 (all parts), *Environmental conditions – Vibration and shock of electrotechnical equipment*

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