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(RCJ/JSA)

**Classification of environmental
conditions—Part 1: Environmental
parameters and their severities**

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Contents

	Page
Introduction.....	1
1 Scope.....	1
2 Normative references	1
3 Definitions	2
4 Environmental factors and parameters	3
4.1 General.....	3
4.2 List of single environmental factors and parameters and their severities	3
4.3 Combined environmental factors	3
4.4 Sequences of environmental factors	4

Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Reliability Center for Electronic Components of Japan (RCJ)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS C 60721-1 : 1995** is replaced with this Standard.

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JIS C 60721 consists of the following 3 parts under the general title “*Classification of environmental conditions*”:

JIS C 60721-1 *Part 1: Environmental parameters and their severities*

JIS C 60721-2 *Part 2: Environmental conditions appearing in nature*

JIS C 60721-3 *Part 3: Classification of groups of environmental parameters and their severities*

Classification of environmental conditions—Part 1: Environmental parameters and their severities

Introduction

This Japanese Industrial Standard has been prepared based on Edition 2.2 of **IEC 60721-1** published in 2002 without modifying the technical contents.

The portions underlined with dots are the matters not stated in the original International Standard.

1 Scope

This Standard lists environmental parameters and a limited number of their severities within the range of conditions met by electrotechnical products when being transported, stored, installed and used.

This Standard specifies environmental parameters and values of their severities not reference to their application. Sufficient guidance on application is available in **JIS C 60721-2** (series) and **JIS C 60721-3** (series).

Technical Committees preparing environmental condition specifications for products should apply **JIS C 60721-3** (series) but if, in exceptional cases, severity values of **JIS C 60721-3** (series) are not appropriate, the list in this part should be considered for the selection of values.

NOTE : The International Standard corresponding to this Standard is as follows.
IEC 60721-1:2002 Classification of environmental conditions—Part 1: Environmental parameters and their severities (IDT)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. If the indication of the year of publication is given to these referred standards, only the edition of indicated year constitutes the provision of this Standard but the revision and amendment made thereafter do not apply. For undated standards, the latest edition of the standards (including any amendments) applies.

JIS B 0153:2001 *Glossary of terms used in mechanical vibration and shock*

NOTE : Corresponding International Standard: ISO 2041:1990 *Vibration and shock—Vocabulary* (MOD)

JIS C 60068-2-27:1995 *Basic environmental testing procedures Part 2: Tests, Test Ea and guidance: Shock*

NOTE : Corresponding International Standard: IEC 60068-2-27:1987 *Environmental testing—Part 2: Tests—Test Ea and Guidance: Shock* (IDT)

JIS C 60721-2 (series) *Classification of environmental conditions Part 2: Environmental conditions appearing in nature*

JIS C 60721-2-2 : 1996 *Classification of environmental conditions Part 2: Environmental conditions appearing in nature. Precipitation and wind*

NOTE : Corresponding International Standard: IEC 60721-2-2 : 1988 *Classification of environmental conditions—Part 2: Environmental conditions appearing in nature—Precipitation and wind* (IDT)

JIS C 60721-3 (series) *Classification of environmental conditions Part 3: Classification of groups of environmental parameters and their severities*

JIS C 61000-4-11 *Electromagnetic compatibility (EMC)—Part 4-11: Testing and measuring techniques—Voltage dips, short interruptions and voltage variations immunity tests*

IEC/TS 61000-2-5 : 1995 *Electromagnetic compatibility (EMC)—Part 2: Environment—Section 5: Classification of electromagnetic environments. Basic EMC publication*

3 Definitions

For the purposes of this Standard, the definitions given in **JIS C 60721** (series) and the following definitions apply:

3.1 environmental condition

physical, chemical or biological condition, external to a product, to which it is subjected at a certain time

NOTE : Environmental conditions are generally composed of environmental conditions appearing in nature and environmental conditions generated by the product itself or by external sources.

3.2 environmental factor

a physical, chemical or biological influence which, either singly or in combination with other influences, produces an environmental condition (e.g. heat, vibration)

3.3 environmental parameter

one or more physical, chemical or biological properties characterizing an environmental factor (e.g. temperature, acceleration)

3.4 severity of environmental parameter

a value of each quantity, characterizing the environmental parameter

For example, the severity of sinusoidal vibration is defined by values of the acceleration (in m/s^2) and frequency (in Hz).

3.5 application, product application

a condition or a situation met by a product

For example, office working rooms, steelworks, ground transport. Applications do not refer to a class of products (e.g. computers).

3.6 group of environmental parameters and their severities

a set of environmental conditions characteristic for a specific use or purpose

4 Environmental factors and parameters

4.1 General

The actual environmental conditions to which a product is exposed are normally complex and composed of a number of environmental factors and corresponding parameters. When defining the environmental conditions for a certain product application, it is therefore necessary to:

- list the environmental factors involved;
- select appropriate severities for each parameter.

The environmental influences on a product in a certain application is a result of:

- conditions of the surrounding medium, normally air or water (in certain cases, soil);
- conditions of the structure to which the product is connected;
- influences from external sources or activities.

When selecting environmental factors and parameters for a certain product application it is therefore necessary to check these conditions and influences for single, combined and sequential environmental factors as they occur.

4.2 List of single environmental factors and parameters and their severities

The list of environmental factors and parameters given in table 1 shall be used:

- as a check list to ensure that relevant factors and parameters have been considered;
- to achieve uniformity in the description of the environment.

The severities given in connection with each parameter in table 1 shall be used for standardization purposes. These are restricted to the severities of the environmental conditions to which a product may be exposed.

It is not intended to cover the severities of the resulting stresses on the product. For example, the severities are intended to cover the temperatures of surrounding media (e.g. air, water, soil, water vapour, ice, oil, etc.) and the temperatures of the structure to which the product is connected, but are not intended to cover the temperatures of hot points on the product itself.

The severities are primarily related to limit environmental conditions, and do not include conditions for reference measurements, calibration, etc.

4.3 Combined environmental factors

A product is exposed simultaneously to a number of environmental factors and corresponding parameters. The effect of a combination of environmental factors is especially important when exposure to a combined environmental affects the product differently from exposure to a sequence of environmental factors.

When selecting environmental factors for a certain product application it is therefore recommended to check the environmental factors, the combination of which may need to be taken into account.

4.4 Sequences of environmental factors

Certain effects of exposing a product to environmental conditions are a direct result of exposing it to two or more factors or parameters in a direct sequence. Two important examples are:

- thermal shock,
which may be the result of exposing the product to high temperature conditions immediately after it has been exposed to low temperature conditions or vice versa, or by subjecting the product to water (rain, water jets, sea waves, immersion) directly after being exposed to high temperature conditions;
- formation of ice,
which may be the result of exposing the product to conditions of temperatures below freezing point immediately before or after it has been exposed to humidity, rain or water from sources other than rain.

It is recommended that these possibilities be taken into account when defining the environmental conditions to which a certain product will be exposed.