

This is a preview of "S+ IEC 60721-3-1 Ed...". Click here to purchase the full version from the ANSI store.



Edition 3.0 2018-02

REDLINE VERSION



Classification of environmental conditions – Part 3-1: Classification of groups of environmental parameters and their severities – Storage

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 19.040

ISBN 978-2-8322-5449-3

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD	3
1 Scope and object	5
2 Normative references	5
3 Terms and definitions	5
4 General	7
5 Classification of groups of environmental parameters and their severities	7
5.1 General	8
5.2 Climatic conditions (K)	8
5.3 Special climatic conditions (Z)	12
5.4 Biological conditions (B)	13
5.5 Chemically active substances (C)	14
5.6 Mechanically active substances (S)	15
5.7 Mechanical conditions (M)	15
 Sets of environmental condition class combinations
Annex Summary of conditions covered by the classes
Annex Summary of conditions covered by the sets of class combinations
Annex Explanation of the environmental conditions in tropical areas as specified in classes 1K10 and 1K11
Annex A (informative) Chemically active substances	25
Bibliography	26
Figure Model shock response spectra (first order maximax shock response spectra)
Table 1 – Classification of climatic conditions	10
Table 2 – Classification of special climatic conditions	13
Table 3 – Classification of biological conditions	14
Table 4 – Classification of chemically active substances	15
Table 5 – Classification of mechanically active substances	16
Table 6 – Classification of mechanical conditions	17
Table 7 Sets of environmental class combinations

INTERNATIONAL ELECTROTECHNICAL COMMISSION

CLASSIFICATION OF ENVIRONMENTAL CONDITIONS –

Part 3-1: Classification of groups of environmental parameters and their severities – Storage

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. 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 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 IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

DISCLAIMER

This Redline version is not an official IEC Standard and is intended only to provide the user with an indication of what changes have been made to the previous version. Only the current version of the standard is to be considered the official document.

This Redline version provides you with a quick and easy way to compare all the changes between this standard and its previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

This is a preview of "S+ IEC 60721-3-1 Ed...". [Click here to purchase the full version from the ANSI store.](#)

International Standard IEC 60721-3-1 has been prepared by IEC technical committee 104: Environmental conditions, classification, and methods of test.

This third edition cancels and replaces the second edition, published in 1997, and constitutes a technical revision.

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

- a) Clause 3: reworded and simplified.
- b) Clause 4: reworded and simplified.
- c) Clause 5: Annex C has been incorporated in Clause 5.
- d) 5.2: all existing climate classes have been replaced by completely new classes. The new classes are divided into 3 groups. The reason for the new classes is the latest revision of IEC 60721-2-1 which incorporated new climate types.
- e) 5.3: new classes for solar radiation and snow load.
- f) 5.6: all existing classes for mechanically active substances have been replaced by completely new classes.
- g) 5.7: all existing classes for mechanical conditions have been replaced by completely new classes.
- h) Table 1: new climatic classes with new severities.
- i) Table 2: new classes for solar radiation and snow load.
- j) Table 5 new mechanically active substances classes.
- k) Table 6: new mechanical conditions classes.

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

FDIS	Report on voting
104/772/FDIS	104/782/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.

IMPORTANT – The “colour inside” logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this publication using a colour printer.

CLASSIFICATION OF ENVIRONMENTAL CONDITIONS –

Part 3-1: Classification of groups of environmental parameters and their severities – Storage

1 Scope and object

This part of IEC 60721 classifies the groups of environmental parameters and their severities to which products together with their packaging, if any, are subjected when stored.

The environmental conditions specified in this document are limited to those which ~~may~~ can directly affect the products or their ultimate performance. Only environmental conditions as such are considered. No special description of the effects of these conditions on the products is given.

~~Transfer during storage is not included in the classification.~~

Environmental conditions directly related to fire or explosions ~~and conditions related to ionizing radiation are excluded~~ are not included. ~~Any other unforeseen incidents are also excluded. The possibility of their occurrence should be taken into account in special cases. Offshore locations are not included.~~

Conditions of stationary use, portable and non-stationary use, use in vehicles and ships, and conditions of transportation are given in other subparts of the IEC 60721-3 series.

The object of this document is to classify environmental parameters and their severities to which a product ~~may~~ can be exposed during storage. ~~Transfer and handling during storage and transport are addressed in IEC 60721-3-2.~~

~~A limited number of classes of environmental conditions is given, covering a broad field of application. The user of this standard should select the lowest classification necessary for covering the conditions of intended storage.~~

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

~~IEC 721-1: 1990, Classification of environmental conditions – Part 1: Environmental parameters and their severities
Amendment 1 (1992)~~

~~IEC 721-2-1: 1982, Classification of environmental conditions – Part 2: Environmental conditions appearing in nature – Temperature and humidity
Amendment 1 (1987)~~

This is a preview of "S+ IEC 60721-3-1 Ed...". Click here to purchase the full version from the ANSI store.

~~IEC 721-3-0: 1984, Classification of environmental conditions—Part 3: Classification of groups of environmental parameters and their severities—Introduction
Amendment 1 (1987)~~

~~IEC 60721-3-2: 1997, Classification of environmental conditions—Part 3: Classification of environmental parameters and their severities—Section 2: Transportation~~

~~IEC 721-3-3: 1994, Classification of environmental conditions—Part 3: Classification of environmental parameters and their severities—Section 3: Stationary use at weatherprotected locations~~

~~IEC 721-3-4: 1995, Classification of environmental conditions—Part 3: Classification of environmental parameters and their severities—Section 4: Stationary use at non-weatherprotected locations~~



INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Classification of environmental conditions –
Part 3-1: Classification of groups of environmental parameters and their
severities – Storage**

**Classification des conditions d'environnement –
Partie 3-1: Classification des groupements des agents d'environnement et de
leurs sévérités – Stockage**



CONTENTS

FOREWORD	3
1 Scope and object	5
2 Normative references	5
3 Terms and definitions	5
4 General	6
5 Classification of groups of environmental parameters and their severities	7
5.1 General	7
5.2 Climatic conditions (K)	7
5.3 Special climatic conditions (Z)	10
5.4 Biological conditions (B)	10
5.5 Chemically active substances (C)	11
5.6 Mechanically active substances (S)	12
5.7 Mechanical conditions (M)	12
Annex A (informative) Chemically active substances	13
Bibliography	14
Table 1 – Classification of climatic conditions	9
Table 2 – Classification of special climatic conditions	10
Table 3 – Classification of biological conditions	11
Table 4 – Classification of chemically active substances	11
Table 5 – Classification of mechanically active substances	12
Table 6 – Classification of mechanical conditions	12

INTERNATIONAL ELECTROTECHNICAL COMMISSION

CLASSIFICATION OF ENVIRONMENTAL CONDITIONS –

Part 3-1: Classification of groups of environmental parameters and their severities – Storage

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. 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 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 IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60721-3-1 has been prepared by IEC technical committee 104: Environmental conditions, classification, and methods of test.

This third edition cancels and replaces the second edition, published in 1997, and constitutes a technical revision.

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

- a) Clause 3: reworded and simplified.
- b) Clause 4: reworded and simplified.
- c) Clause 5: Annex C has been incorporated in Clause 5.

This is a preview of "S+ IEC 60721-3-1 Ed...". [Click here to purchase the full version from the ANSI store.](#)

- d) 5.2: all existing climate classes have been replaced by completely new classes. The new classes are divided into 3 groups. The reason for the new classes is the latest revision of IEC 60721-2-1 which incorporated new climate types.
- e) 5.3: new classes for solar radiation and snow load.
- f) 5.6: all existing classes for mechanically active substances have been replaced by completely new classes.
- g) 5.7: all existing classes for mechanical conditions have been replaced by completely new classes.
- h) Table 1: new climatic classes with new severities.
- i) Table 2: new classes for solar radiation and snow load.
- j) Table 5 new mechanically active substances classes.
- k) Table 6: new mechanical conditions classes.

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

FDIS	Report on voting
104/772/FDIS	104/782/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.

CLASSIFICATION OF ENVIRONMENTAL CONDITIONS –

Part 3-1: Classification of groups of environmental parameters and their severities – Storage

1 Scope and object

This part of IEC 60721 classifies the groups of environmental parameters and their severities to which products together with their packaging, if any, are subjected when stored.

The environmental conditions specified in this document are limited to those which can directly affect the products or their ultimate performance. Only environmental conditions as such are considered. No special description of the effects of these conditions on the products is given.

Environmental conditions directly related to fire or explosions are not included.

Conditions of stationary use, portable and non-stationary use, use in vehicles and ships, and conditions of transportation are given in other subparts of the IEC 60721-3 series.

The object of this document is to classify environmental parameters and their severities to which a product can be exposed during storage. Transfer and handling during storage and transport are addressed in IEC 60721-3-2.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

SOMMAIRE

AVANT-PROPOS	17
1 Domaine d'application et objet	19
2 Références normatives	19
3 Termes et définitions	19
4 Généralités	20
5 Classification des groupements des agents d'environnement et de leurs sévérités.....	21
5.1 Généralités	21
5.2 Conditions climatiques (K).....	21
5.3 Conditions climatiques spéciales (Z).....	24
5.4 Conditions biologiques (B).....	24
5.5 Substances chimiquement actives (C)	24
5.6 Substances mécaniquement actives (S)	25
5.7 Conditions mécaniques (M)	26
Annexe A (informative) Substances chimiquement actives.....	27
Bibliographie	28
Tableau 1 – Classification des conditions climatiques	23
Tableau 2 – Classification des conditions climatiques spéciales.....	24
Tableau 3 – Classification des conditions biologiques	24
Tableau 4 – Classification des substances chimiquement actives	25
Tableau 5 – Classification des substances mécaniquement actives	26
Tableau 6 – Classification des conditions mécaniques.....	26

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

CLASSIFICATION DES CONDITIONS D'ENVIRONNEMENT –

Partie 3-1: Classification des groupements des agents d'environnement et de leurs sévérités – Stockage

AVANT-PROPOS

- 1) La Commission Electrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. A cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
- 2) Les décisions ou accords officiels de l'IEC concernant les questions techniques représentent, dans la mesure du possible, un accord international sur les sujets étudiés, étant donné que les Comités nationaux de l'IEC intéressés sont représentés dans chaque comité d'études.
- 3) Les Publications de l'IEC se présentent sous la forme de recommandations internationales et sont agréées comme telles par les Comités nationaux de l'IEC. Tous les efforts raisonnables sont entrepris afin que l'IEC s'assure de l'exactitude du contenu technique de ses publications; l'IEC ne peut pas être tenue responsable de l'éventuelle mauvaise utilisation ou interprétation qui en est faite par un quelconque utilisateur final.
- 4) Dans le but d'encourager l'uniformité internationale, les Comités nationaux de l'IEC s'engagent, dans toute la mesure possible, à appliquer de façon transparente les Publications de l'IEC dans leurs publications nationales et régionales. Toutes divergences entre toutes Publications de l'IEC et toutes publications nationales ou régionales correspondantes doivent être indiquées en termes clairs dans ces dernières.
- 5) L'IEC elle-même ne fournit aucune attestation de conformité. Des organismes de certification indépendants fournissent des services d'évaluation de conformité et, dans certains secteurs, accèdent aux marques de conformité de l'IEC. L'IEC n'est responsable d'aucun des services effectués par les organismes de certification indépendants.
- 6) Tous les utilisateurs doivent s'assurer qu'ils sont en possession de la dernière édition de cette publication.
- 7) Aucune responsabilité ne doit être imputée à l'IEC, à ses administrateurs, employés, auxiliaires ou mandataires, y compris ses experts particuliers et les membres de ses comités d'études et des Comités nationaux de l'IEC, pour tout préjudice causé en cas de dommages corporels et matériels, ou de tout autre dommage de quelque nature que ce soit, directe ou indirecte, ou pour supporter les coûts (y compris les frais de justice) et les dépenses découlant de la publication ou de l'utilisation de cette Publication de l'IEC ou de toute autre Publication de l'IEC, ou au crédit qui lui est accordé.
- 8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
- 9) L'attention est attirée sur le fait que certains des éléments de la présente Publication de l'IEC peuvent faire l'objet de droits de brevet. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets et de ne pas avoir signalé leur existence.

La Norme internationale IEC 60721-3-1 a été établie par le comité d'études 104 de l'IEC: Conditions, classification et essais d'environnement.

Cette troisième édition annule et remplace la deuxième édition, parue en 1997. Elle constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- a) Article 3: reformulé et simplifié.
- b) Article 4: reformulé et simplifié.
- c) Article 5: l'Annexe C a été intégrée dans l'Article 5.

This is a preview of "S+ IEC 60721-3-1 Ed...". [Click here to purchase the full version from the ANSI store.](#)

- d) 5.2: toutes les catégories climatiques existantes ont été remplacées par des catégories complètement nouvelles. Les nouvelles catégories ont été divisées en 3 groupes. Ces catégories nouvelles ont été créées en raison de l'intégration de nouveaux types de climats dans la dernière révision de l'IEC 60721-2-1,
- e) 5.3: nouvelles catégories pour le rayonnement solaire et la charge de neige.
- f) 5.6: toutes les catégories existantes de substances mécaniquement actives ont été remplacées par des catégories complètement nouvelles.
- g) 5.7: toutes les catégories de conditions mécaniques existantes ont été remplacées par des catégories complètement nouvelles.
- h) Tableau 1: nouvelles catégories climatiques avec de nouvelles sévérités.
- i) Tableau 2: nouvelles catégories pour le rayonnement solaire et la charge de neige.
- j) Tableau 5: nouvelles catégories de substances mécaniquement actives.
- k) Tableau 6: nouvelles catégories de conditions mécaniques.

Le texte de cette Norme internationale est issu des documents suivants:

FDIS	Rapport de vote
104/772/FDIS	104/782/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette norme.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

Une liste de toutes les parties de la série IEC 60721, publiées sous le titre général *Classification des conditions d'environnement*, peut être consultée sur le site web de l'IEC.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "<http://webstore.iec.ch>" dans les données relatives au document recherché. A cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

CLASSIFICATION DES CONDITIONS D'ENVIRONNEMENT –

Partie 3-1: Classification des groupements des agents d'environnement et de leurs sévérités – Stockage

1 Domaine d'application et objet

La présente partie de l'IEC 60721 classe les groupements d'agents d'environnement et leurs sévérités auxquels des produits, éventuellement emballés, sont soumis lorsqu'ils sont stockés.

Les conditions d'environnement spécifiées dans le présent document se limitent à celles qui sont susceptibles d'influencer directement les produits ou leur comportement ultérieur. Seules de telles conditions sont prises en considération, aucune description particulière de leurs effets sur les produits n'étant donnée.

Les conditions d'environnement directement liées aux risques d'incendie ou d'explosion ne sont pas incluses.

Les conditions pour une utilisation à poste fixe ou en déplacement, à bord de véhicules ou de navires, et les conditions de transport sont données dans d'autres sous-parties de la série IEC 60721-3.

La présente norme a pour objet de classer les agents d'environnement et leurs sévérités auxquels un produit peut être exposé pendant qu'il est stocké. Le transfert et la manipulation durant le stockage et le transport sont traités dans l'IEC 60721-3-2.

2 Références normatives

Les documents suivants cités dans le texte constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60721-1, *Classification des conditions d'environnement – Partie 1: Agents d'environnement et leurs sévérités*