SLOVENSKI STANDARD
oSIST prEN IEC 60721-2-5:2024

01-februar-2024

Klasifikacija okoljskih pogojev - 2. del: Okoljski pogoji v naravi - 5. odsek : Prah, pesek, solna meglica

Classification of environmental conditions - Part 2: Environmental conditions appearing in nature - Section 5: Dust, sand, salt mist

Klassifizierung von Umweltbedingungen - Teil 2: Natürliche Umweltbedingungen - Hauptabschnitt 5: Staub, Sand, Salznebel

Classification des conditions d'environnement - Partie 2: Conditions d'environnement présentes dans la nature - Section 5: Poussière, sable, brouillard salin

Ta slovenski standard je istoveten z: **prEN IEC 60721-2-5:2023**

ICS:

19.040	Preskušanje v zvezi z okoljem	Environmental testing

oSIST prEN IEC 60721-2-5:2024 **en**

104/1025/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 60721-2-5 ED2**	
DATE OF CIRCULATION: **2023-11-17**	CLOSING DATE FOR VOTING: **2024-02-09**
SUPERSEDES DOCUMENTS: **104/979/CD, 104/992A/CC**	

IEC TC 104 : ENVIRONMENTAL CONDITIONS, CLASSIFICATION AND METHODS OF TEST

SECRETARIAT: Sweden	SECRETARY: Mr Henrik Lagerström
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☐ EMC ☒ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY

☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

Attention IEC-CENELEC parallel voting

The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting.

The CENELEC members are invited to vote through the CENELEC online voting system.

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Recipients of this document are invited to submit, with their comments, notification of any relevant "In Some Countries" clauses to be included should this proposal proceed. Recipients are reminded that the CDV stage is the final stage for submitting ISC clauses. (SEE AC/22/2007 OR NEW GUIDANCE DOC).

TITLE:

Classification of environmental conditions - Part 2: Environmental conditions appearing in nature - Section 5: Dust, sand, salt mist

PROPOSED STABILITY DATE: 2028

NOTE FROM TC/SC OFFICERS:

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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CLASSIFICATION OF ENVIRONMENTAL CONDITIONS –

Part 2-5: Environmental conditions appearing in nature – Dust, sand and salt mist

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.

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International Standard IEC 60721-2-5 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 1997, and constitutes a technical revision.

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

a) The Information provided in previous issue has been extensively enhanced and revised.

b) New information on methodologies for deriving dust and sand severities has been included.

c) Annex A has been removed because, despite extensive investigation, the source and accuracy of the severities could not be verified. Equivalent information is now provided within the text.

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

FDIS	Report on voting
xxx	xxx

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 document using a colour printer.

INTRODUCTION

This section of IEC 60721-2 is intended to be used as part of the background information when selecting appropriate severities of parameters relating to dust, sand and salt mist for product application.

This document presents information related to the occurrence and characteristics of dust, sand and salt mist. It describes the influences from these environmental factors to which products are liable to be exposed during storage, transportation and use.

The effects of dust, sand and salt mist can be enhanced by precipitation and wind. Information related to the occurrence and characteristics of precipitation and wind is provided in IEC 60721-2-2 [1].

CLASSIFICATION OF ENVIRONMENTAL CONDITIONS –

Part 2-5: Environmental conditions appearing in nature – Dust, sand and salt mist

1 Scope

This part of IEC 60721 presents information related to the occurrence and characteristics of dust, sand and salt mist. It describes the influences from these environmental factors to which products are liable to be exposed during storage, transportation and use. The effects of dust, sand and salt mist can be enhanced by precipitation and wind.

Information related to the occurrence and characteristics of precipitation and wind is provided in IEC 60721-2-2 [1].

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 Dust and sand

4.1 Classification of dust and sand

'Dust' and 'Sand' are terms for solid non-cohesive particulate matter, usually of mineral origin, found on the surface of the earth or suspended in the atmosphere. The range of particle diameters of dust and sand together extends from about 0.1 µm to 2 000 µm. The 2 000 µm value is generally considered as the lower limit for very fine pebbles. Conversely, particles below 1 µm are usually termed smoke and fumes. Although dust and sand are normally differentiated on the basis of particle diameters, no universally accepted demarcation value exists.

In this document, a classification based on their different aerodynamic behaviour is adopted. Particles of less than 75 µm diameter can remain suspended in the atmosphere by natural turbulence of the air for very long periods, even years. These are termed 'dust' by most authorities. Conversely, those greater than 150 µm diameter are unable to remain airborne unless continually subjected to strong natural winds, powerful air flows or the turbulence which may be caused, for example, by aircraft, helicopter or convoys of land vehicles. These particles are termed 'sand'. Over the intermediate range of diameters from 75 µm to 150 µm, there is a gradual transition in settling times and the particles are variously referred to as 'dust' or 'sand' in different documents.

For the purposes of laboratory simulation, the default demarcation value for distinguishing sand from dust is typically 149 µm, which is the diameter of the smallest particles retained by a No 100 standard sieve.

4.2 Sand – distribution, hardness and angularity

4.2.1 Distribution

Sand is distributed widely over the Earth's surface. There are vast sandy regions in the Sahara and in Saudi Arabia as well as significant areas in most the world's deserts. All the continents have sandy beaches of various widths and there are large deposits at or near the surface in mainly inland areas formerly covered by water. On account of this widespread occurrence of sand, it should be assumed

that most unprotected products have the potential to be exposed to sandy conditions at some time during their life.

4.2.2 Hardness and angularity

Hardness of the individual particles can determine their ability to scratch objects upon contact. Sand which consists mainly of tiny broken chips of crystalline quartz or other mineral is generally harder than most fused silica glass compositions. Consequently, sand can scratch the surface of most glass optical devices. Table 1 lists a few common substances and hardness levels according to the Mohs scale. Substances with a higher number can scratch any substance with a lower number.

Table 1 -- Hardness scale

Mohs scale	Typical materials
1 - Talc	Graphite, Soapstone
2 - Gypsum	Kaolinite, Alabaster, Mica (muscovite)
3 - Calcite	Limestone, Marble
4 - Fluorite	-
5 - Apatite	Turquoise, Titanite, Hornblende, glass
6 - Orthoclase	Magnetite, Feldspar, Opal, Pyrite
7 - Quartz	Flint, Fused Silica, Olivine, Andalusite, Agate, Tourmaline
8 - Topaz	Emery
9 - Corundum	Sapphire, Silicon Carbide, Tungsten Carbide
10 - Diamond	-

Hardness and angularity are usually the most important characteristics of sand grains. On a world-wide basis, the majority of sands are composed of quartz (SiO_2), which, in its most common form, has a hardness of 7 on the Mohs scale. Other minerals which may be found in sand range from hardness 2 for white gypsum, to hardness 9 for corundum. Table 2 shows the main constituents of natural dusts and sand, and the relative hardness of the particles. Minute quantities of other minerals such as zircon, garnet, mica, magnetite, etc. may also be found. In addition, particulates resulting from industrial processes, as well as microscopic vegetable and microbiological entities, may be present in dust. On a world-wide basis, the majority of sands are composed of quartz.

Table 2 -- Constituents of natural sands

Constituent	Composition	Hardness (Mohs scale)
Quartz	SiO_2	7
Feldspars	K Al Si_3O_8 or Na Al Si_3O_8 or Ca $Al_2Si_2O_8$	6
Limestone	Ca CO_3 and Mg CO_3	2 to 4

Although in time, grains of sand become rounded by mutual abrasion; those having angular shape are found in substantial proportion in most samples of sand. The latter arise from the tendency of some rock-forming minerals, particularly quartz, to fracture along cleavage planes through impact action.

In general, the movement of sand by wind pressure is confined to the air layer within the first metre above the ground. Even within this layer, about half the sand grains (by weight) move within the first 10 mm above the surface and most of the remainder are within the first 100 mm. As a consequence of the low elevation at which the majority of sand grains move, most abrasion damage caused by sand outside high wind periods is at or near ground level.