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Miljötålighetsprovning – Del 2-68: Provningsmetoder – L: Damm och sand

*Environmental testing –
Part 2: Tests –
Test L: Dust and sand*

Som svensk standard gäller europastandarden EN 60068-2-68:1996. Den svenska standarden innehåller den officiella engelska språkversionen av EN 60068-2-68:1996.

Nationellt förord

Europastandarden EN 60068-2-68:1996^{*)}

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 60068-2-68, First edition, 1994 - Environmental testing - Part 2: Tests - Test L: Dust and sand**

utarbetad inom International Electrotechnical Commission, IEC.

Standarden ska användas tillsammans med SS-EN 60068-1.

Tidigare fastställd svensk standard SS-EN 60068, utgåva 3, 2000, gäller ej fr o m 2001-11-30.

^{*)} EN 60068-2-68:1996 ikraftsattes 2001-11-30 som SS-EN 60068-2-68 genom offentliggörande, d v s utan utgivning av något svenskt dokument.

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Descriptors: Environmental testing, electrotechnical products, test methods, non-abrasive fine dust, free settling dust, blown dust and sand

English version

Environmental testing
Part 2: Tests - Test L: Dust and sand
(IEC 68-2-68:1994)

Essais d'environnement
Partie 2: Essais
Essai L: Poussière et sable
(CEI 68-2-68:1994)

Umweltprüfungen
Teil 2: Prüfungen
Prüfung L: Staub und Sand
(IEC 68-2-68:1994)

This European Standard was approved by CENELEC on 1996-03-05. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of the International Standard IEC 68-2-68:1994, prepared by SC 50B, Climatic tests, of IEC TC 50, Environmental testing, was submitted to the formal vote and was approved by CENELEC as EN 60068-2-68 on 1996-03-05 without any modification.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 1997-03-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 1997-03-01

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annex ZA is normative and annexes A and B are informative.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 68-2-68:1994 was approved by CENELEC as a European Standard without any modification.

In the official version, for annex B, Bibliography, the following note has to be added for the standard indicated:

IEC 947-1 NOTE: Harmonized as EN 60947-1:1991 (modified).

Annex ZA (normative)

**Normative references to international publications
with their corresponding European publications**

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE: When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May	1991 1993
IEC 721-2-5	1991	Classification of environmental conditions Part 2: Environmental conditions appearing in nature Section 5: Dust, sand, salt mist	HD 478.2.5 S1	1993

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INTRODUCTION

The tests described in this part of IEC 68-2 give information on effects for which the relevant specification may specify assessment criteria. Some of such effects are:

- a) ingress of dust into enclosures;
- b) change of electrical characteristics (for example, faulty contact, change of contact resistance, change of track resistance);
- c) seizure, or disturbance in motion of bearings, axles, shafts and other moving parts;
- d) surface abrasion (erosion);
- e) contamination of optical surfaces; contamination of lubricants;
- f) clogging of ventilating openings, bushings, pipes, filters, apertures necessary for operation etc.

Different tests have been specified to consider diversified aspects which may be used to verify constructional integrity of electrotechnical products or to simulate the conditions of operation in service.

The tests differ by the character of the air flow carrying the particulate matter, and by the type of such matter, resulting in a special methodology for each test.

ENVIRONMENTAL TESTING –

Part 2: Tests – Test L: Dust and sand

1 General

This survey indicates the general structure of the dust/sand tests included in this publication. The structuring and a summary of the characteristics of the different tests are given in figure 1 and table 1. It should be noted that the dust test of IEC 529 has its equivalent in the proposed method La2. See also annex A.

1.1 Scope

This part of IEC 68-2 specifies test methods to determine the effects of dust and sand suspended in air, on electrotechnical products.

The test methods of this standard are not intended for the testing of air filters. Only method Lc2 is suitable for the simulation of the erosion effects of high velocity (more than 100 m/s) particles.

1.2 Description of Test L

The dust and sand test is structured into three groups:

- La: *non-abrasive fine dust*. A test which is primarily oriented towards investigation of the seals of the test specimen. The test specimen is exposed to a very fine dust in the form of talc or an equivalent. The effects of temperature cycling resulting in a pressure difference between the inside and outside of the specimen may be reproduced.
- Lb: *free settling dust*. A test which is oriented towards investigation of the effects when simulating conditions at sheltered locations. The test specimen is exposed to a low-density dust atmosphere created by the intermittent injection of a small quantity of dust which is allowed to fall by gravity onto the specimen.
- Lc: *blown dust and sand*. A test which is oriented towards investigation of the seals and the effect of erosion when simulating outdoor and vehicle conditions. The test specimen is exposed to either a turbulent or a laminar air flow to which is added a quantity of dust, sand or a dust/sand mixture.

Table 1 – Summary of test characteristics

Procedure	Dust/sand type	Particle size	Dust/sand concentration	Notes
Test La				
Method La1	Talc or FE powder	<75 µm	600 g/m ² /h (grams per square metre per hour) deposit on reference surface	Test includes a cycling of the air pressure in the chamber
Method La2	Talc or FE powder	<75 µm	2 kg/m ³ (chamber volume)	Air pressure in the specimen may be reduced
Test Lb	Olivine or quartz or feldspar	<75 µm	6 g/m ² /d (grams per square metre per day) deposit on reference surface	Free settling dust
Test Lc				
Method Lc1	Olivine or quartz or feldspar	<75 µm or <150 µm or <850 µm	1 g/m ³ or 3 g/m ³ or 10 g/m ³	Blown dust and sand Recirculating chamber
Method Lc2	Olivine or quartz or feldspar	<75 µm or <150 µm or <850 µm	1 g/m ³ or 3 g/m ³ or 10 g/m ³	Free blowing dust

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 68-2. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 68-2 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 529: 1989, *Degrees of protection provided by enclosures (IP code)*

IEC 721-2-5: 1991, *Classification of environmental conditions – Part 2: Environmental conditions appearing in nature – Section 5: Dust, sand, salt mist*