
**Okoljski preskusi – 2-10. del: Preskusi – Preskus J in navodilo: razvoj modela
(IEC 60068-2-10:2005)**

Environmental testing - Part 2-10: Tests – Test J and guidance: Mould growth (IEC
60068-2-10:2005)

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EUROPEAN STANDARD

EN 60068-2-10

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2005

ICS 19.040

Supersedes HD 323.2.10 S3:1988

English version

Environmental testing
Part 2-10: Tests –
Test J and guidance: Mould growth
(IEC 60068-2-10:2005)

Essais d'environnement
Partie 2-10: Essais –
Essai J et guide: Moisissures
(CEI 60068-2-10:2005)

Umgebungseinflüsse
Teil 2-10: Prüfverfahren –
Prüfung J und Leitfaden:
Schimmelwachstum
(IEC 60068-2-10:2005)

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This European Standard was approved by CENELEC on 2005-06-01. 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, 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 document 104/365/FDIS, future edition 6 of IEC 60068-2-10, prepared by IEC TC 104, Environmental conditions, classification and methods of test, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60068-2-10 on 2005-06-01.

This European Standard supersedes HD 323.2.10 S3:1988.

The main changes with respect to HD 323.2.10 S3:1988 are:

- two test fungi replaced by two others;
- concentration of the spores defined for each test fungus;
- spores suspension in mineral salt solution additionally introduced;
- pre-conditioning of the specimens by damp heat storage prescribed;
- supersonic aerosolization of the spores suspension as the preferred inoculation method introduced;
- duration of incubation reduced from 84 days to 56 days;
- extent of mould growth grade 2 split into grade 2a and grade 2b;
- detailed information on methods of inoculation given in Annex B;
- Annex E: flow-chart deleted. (standards.iteh.ai)

The following dates were fixed:

[SIST EN 60068-2-10:2005](https://standards.iteh.ai/catalog/standards/sist/097341a3-04cf-48dd-8fff/60068-2-10-2005)

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- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2006-03-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2008-06-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60068-2-10:2005 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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.

NOTE Where 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>
ISO/IEC 17025	1999	General requirements for the competence of testing and calibration laboratories	EN ISO/IEC 17025 1)	2000
ISO 846	1997	Plastics - Evaluation of the action of microorganisms	EN ISO 846	1997
MIL-STD-810F	2000	Method 508.5 Fungus	-	-
WHO, ISBN 92 4 1544503	1993	Laboratory Biosafety Manual	-	-

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1) EN ISO/IEC 17025:2000 is superseded by EN ISO/IEC 17025:2005, which is based on ISO/IEC 17025:2005.

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NORME
INTERNATIONALE
INTERNATIONAL
STANDARD

CEI
IEC

60068-2-10

Sixième édition
Sixth edition
2005-06

BASIC SAFETY PUBLICATION
PUBLICATION FONDAMENTALE DE SÉCURITÉ

Essais d'environnement –

**Partie 2-10:
Essais – Essai J et guide:
Moisissures**

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Environmental testing –
(standards.iteh.ai)

Part 2-10: EN 60068-2-10:2005

**Tests – Test J and guidance:
Mould growth**
https://standards.iteh.ai/catalog/standards/sist/097341a3-04cf-48dd-8fff-6a3974b44b04/sist-en-60068-2-10-2005



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

CODE PRIX
PRICE CODE

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*For price, see current catalogue
Pour prix, voir catalogue en vigueur*

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ENVIRONMENTAL TESTING –

**Part 2-10: Tests – Test J and guidance:
Mould growth**

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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- 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 60068-2-10 has been prepared by IEC technical committee 104: Environmental conditions, classification and methods of test.

This sixth edition cancels and replaces the fifth edition published in 1988. This edition constitutes a technical revision.

The main changes with respect to the previous edition are listed below:

- Two test fungi replaced by two others
- Concentration of the spores defined for each test fungus
- Spores suspension in mineral salt solution additionally introduced
- Pre-conditioning of the specimens by damp heat storage prescribed

- Supersonic aerosolization of the spores suspension as the preferred inoculation method introduced
- Duration of incubation reduced from 84 days to 56 days
- Extent of mould growth grade 2 split into grade 2a and grade 2b
- Detailed information on methods of inoculation given in Annex B
- Annex E: flow-chart deleted

The text of this standard is based on the following documents:

FDIS	Report on voting
104/365/FDIS	104/373/RVD

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

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

It has the status of a basic safety publication in accordance with IEC Guide 104.

This standard forms Part 2-10 of IEC 60068 which consists of the following major parts, under the general title *Environmental testing*:

Part 1: General and guidance

Part 2: Tests

Part 3: Supporting documentation and guidance

Part 4: Information for specification writers

Part 5: Guide to drafting of test methods

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The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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

ENVIRONMENTAL TESTING –

Part 2-10: Tests – Test J and guidance: Mould growth

1 Scope

This part of IEC 60068 provides a test method for determining the extent to which electrotechnical products support mould growth and how any mould growth may affect the performance and other relevant properties of the product.

Since mould growth conditions include high relative humidity, the test is applicable to electrotechnical products intended for transportation, storage and use under humid conditions over a period of some days at least.

2 Normative references

The following referenced documents are indispensable for the application 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.

ISO/IEC 17025:1999, *General requirements for the competence of testing and calibration laboratories*

ISO 846:1997, *Plastics – Evaluation of the action of microorganisms*

MIL-STD-810 F:2000, *Method 508.5 Fungus*

Laboratory Biosafety Manual 2nd Ed., WHO 1993, ISBN 92 4 1544503

3 General description

This test covers the inoculation of electrotechnical products with a selection of mould spores followed by a period of incubation under conditions which promote spore germination and the growth of mould.

Two variations of the test are given. Variant 1 specifies inoculation of the specimen with the mould spores without nutrients whereas variant 2 specifies the inoculation with the mould spores suspended in a nutritive solution which supports mould growth.

It is advisable to use testing procedures such as specified for plastics in ISO 846 to assess the vulnerability to damage by mould growth of the constructional materials used.

NOTE Laboratories for microbiological testing of technical products should be accredited in accordance with ISO/IEC 17025. See further Annex F.

Surface contamination in the form of dusts, splashes, condensed volatile nutrients or grease may be deposited upon assembled specimens. This can be brought about by storage and use or transport with the product exposed to the atmosphere or handled without protective covering. This surface contamination can cause an increased colonization by fungi and may lead to greater growth and damage. An assessment of the effect of such contamination can be given by the application of test variant 2.

Due to the difficulty of maintaining the necessary conditions in a very large chamber, a large composite equipment will normally be tested as a number of sub-units. This will in any case minimize the cost of the test since several sub-units may be so similar in construction that only one of them need be tested.

4 Health hazards to operators

This test procedure requires the use of viable mould spores and the application of ambient conditions which promote mould growth.

Therefore before any attempt is made to handle mould cultures, or to carry out steps of the test subsequently described, it is important that the annexes of this standard be studied.

Annex A	Danger to personnel
Annex B	Inoculation methods
Annex C	Recommended safety precautions
Annex D	Decontamination procedures

Laboratory Biosafety Manual, 2nd Ed., World Health Organization 1993, ISBN 92 4 1544503 includes general background reading on safety in facilities dealing with fungi.

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5 Description of the test variants

5.1 Test variant 1

After a 28 days incubation period determine

- the extent of mould growth by visual inspection;
- the physical damage caused by mould growth;
- in the case of mould growth the effect on functioning and/or electrical properties if required in the relevant specification.

The incubation period shall be extended to a total of 56 days before checking the function and/or measuring electrical properties if required in the relevant specification.

5.2 Test variant 2

After a simulated contamination with nutrients followed by a 28 days incubation period determine

- the extent of mould growth by visual inspection;
- the physical damage caused by mould growth;
- the effect of the mould growth on functioning and/or electrical properties if required in the relevant specification.