

Basic environmental testing procedures —

Part 2.1 Tests —

Test J and guidance. Mould growth

(This Part should be read in conjunction with Part 1.1 General and guidance)

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National foreword

This Part of BS 2011 has been prepared under the direction of the General Electrotechnical Standards Policy Committee. It is identical with IEC Publication 68-2-10:1988 “*Basic environmental testing procedures. Part 2: Tests — Test J and guidance: Mould growth*” including corrigendum (1988) published by the International Electrotechnical Commission (IEC). Most Parts of IEC Publication 68 are endorsed by CENELEC Harmonization Document (HD 323) as a general rule, although in some cases an enquiry is made before endorsement.

This revision of this British Standard supersedes BS 2011-2.1J:1985 and BS 2011-2.2J:1977 which are withdrawn.

Terminology and conventions

In 4.1.1 there is a reference to “the following cultures”. These are given in the table that precedes 4.1.4.

In clause 11 g) the word “must” is used. This should be understood to mean “are to”.

In A1.2 there is a reference to “these appendices” which should be understood as “Appendix A to Appendix D” (see 2.2).

Textual error. When adopting the text of the international standard the textual error listed below was discovered. It has been marked in the text with an asterisk and has been reported to the IEC.

In 1.2, line 1 the comma after “assembled” should be deleted. In line 2 the semi-colon after “moulds” should be replaced with a comma.

WARNING. This British Standard calls for the use of procedures that may be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage. For information on health hazards to operators reference should be made to clause 2.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

This British Standard, having been prepared under the direction of the General Electrotechnical Standards Policy Committee, was published under the authority of the Board of BSI and comes into effect on 29 September 1989

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 14 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Amendments issued since publication

Amd. No.	Date of issue	Comments

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1 General

1.1 This test covers the inoculation of assembled specimens 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 direct inoculation of the specimen with the mould spores whereas variant 2 specifies the pre-conditioning of the test specimen with nutrients which support mould growth.

1.2 When assembled, specimens must operate where they will be exposed to airborne mould spores,¹⁾ and where climatic conditions will be conducive to the growth of moulds; this test procedure may be used to assess the extent to which mould will grow and/or the operational deterioration which may be expected from this source.

1.3 It is advisable to use established mycological testing procedures to assess the vulnerability to damage by mould contamination of the constructional materials used, and to use only materials which are immune from serious attack.

1.4 Assembled specimens which do not have to operate under conditions of exposure to mould spores may have to be stored or transported where a temporary exposure is experienced, and in these cases also the test procedure will be found useful.

1.5 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 assembled specimens 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.

1.6 Where assembled specimens will be protected from such exposure, even though operating in a region where mould spores are abundant, ability to withstand the severe procedure of this test is not necessary.

1.7 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.

2 Health hazards to operators

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

2.2 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 appendices of this standard be studied.

Reference: Appendix A — Danger to personnel.
Appendix B — Inoculation methods.
Appendix C — Recommended safety precautions.
Appendix D — Decontamination procedures.

3 Object

To investigate unforeseen causes of deterioration in assembled specimens, whether or not constructed from mould-resistant materials by the application of test variant 1 and/or test variant 2 using the required severity given in the relevant specification.

- a) Test variant 1: by assessing the extent of mould growth after 28 days' incubation and any physical damage caused thereby, and if required by the relevant specification, by checking the effect on functioning of the specimen after incubation extended to a total of 84 days.
- b) Test variant 2: by assessing the extent of mould growth after 28 days' incubation following quasi-contamination with nutrients and any physical damage caused thereby, and by checking the effect on the functioning of the specimen.

The relevant specification shall state the required test variant and severity.

4 Reagents and materials

4.1 Cultures or spores — Supply and condition

4.1.1 The following cultures shall be used for performing the test. The nature of the attack to be expected from each culture is indicated for guidance, but all spores are used together, whatever the nature of the specimen.

¹⁾ See national foreword for details of textual errors.

The research centre supplying these cultures or spores for test purposes shall certify that they are as specified.

4.1.2 Cultures from a recognized mycological research centre shall be supplied in suitable containers with the date of seeding thereon.

4.1.3 Cultures and freeze-dried spores shall be handled and stored in accordance with the recommendations of the supplier. These recommendations shall require the date of seeding to be marked on the containers of cultures prepared by the user from freeze-dried spores.

4.1.4 The cultures shall be used for preparing the test suspension when they have been exposed to room temperature for a period of not less than 14 days and not more than 28 days from the date of seeding marked on the container.

4.1.5 If the cultures are not for immediate use, they shall be stored in a refrigerator at a temperature between 5 °C and 10 °C, for a continuous period of not more than six weeks commencing not earlier than 14 days and not later than 28 days from the date of seeding given on the container.

4.1.6 The closures shall not be removed until the mould suspension is about to be made, and only one suspension shall be made from the opened container. A fresh container shall be used for each batch of suspensions made.

NOTE See Appendix C for recommended safe method of carrying out the subsequent test procedures.

4.2 Preparation of mould suspensions

4.2.1 The suspension shall first be prepared in distilled water, to which has been added 0.05 % of a wetting agent. An agent based on N-methyl taurine or on dioctyl sodium sulphosuccinate has been found to be suitable. The wetting agent shall not contain substances which support or inhibit mould growth.

4.2.2 Ten millilitres of the water containing the wetting agent is added gently to each culture. A platinum or nichrome wire is sterilized by heating to red heat in a flame and allowed to cool. This wire is then used to scrape gently the surface of the culture to liberate spores. The liquid is slightly agitated to disperse the spores without detaching mycelial fragments, and the suspension is then gently decanted into a flask in which all separate suspensions are collected.

4.2.3 The flask is then shaken vigorously to mix the eight spore extracts thoroughly and break up any clumps of spores. The suspension shall be left to stand for at least 30 min and then filtered to remove mycelial fragments, lumps of agar and clumps of spores: good quality, fast flow, cellulose filter papers have been found suitable.

4.2.4 Centrifuge the filtered spore suspension and discard the supernatant liquid. Resuspend the residue in 50 ml of distilled water and centrifuge again. Wash the spores in this manner three times. Dilute the final washed residue in accordance with the following requirements.

4.2.4.1 Test variant 1: Dilute the final residue in 100 ml of distilled water.

4.2.4.2 Test variant 2: When the specimens are to be pre-conditioned as in Clause 8 prior to inoculation by spraying, the final residue shall be diluted in 100 ml of distilled water.

When specimens are to be inoculated by painting or dipping, the suspension may be prepared by using the nutritive solution given in Sub-clause 4.2.3 in place of distilled water.

If a nutritive solution spore suspension is used for inoculation, the pre-conditioning procedure given in Clause 8 is omitted.