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IEC 60068-2-38:1974

Australian Standard™

Environmental testing

Part 2.38: Tests—Test Z/AD: Composite temperature/humidity cyclic test

Standards Australia

This Australian Standard was prepared by Committee EL-026, Protective Enclosures and Environmental Testing for Electrical/Electronic Equipment. It was approved on behalf of the Council of Standards Australia on 21 October 2003 and published on 1 December 2003.

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Australian Chamber of Commerce and Industry
Australian Electrical and Electronic Manufacturer's Association
Electrical Compliance Testing Association
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PREFACE

This Standard was prepared by the Standards Australia Committee EL-026, Protective Enclosures and Environmental Testing for Electrical/Electronic Equipment to supersede AS 1099.2Z/AD—1980, *Basic environmental testing procedures for electrotechnology,* Part 2Z/AD: *Tests—Test Z/AD—Composite temperature/humidity cyclic test*.

The objective of this Standard is to provide the electrotechnology industry with a complete set of environmental test procedures published as a series under AS 60068 *Environmental tests*. This Standard is Part 2.38 of that series.

This Standard is identical with, and has been reproduced from, IEC 60068-2-38:1974, *Environmental testing – Part 2-38: Tests—Test Z/AD: Composite temperature/humidity cyclic test*.

As this Standard is reproduced from an International Standard, the following applies:

(a) Its number does not appear on each page of text and its identity is shown only on the cover and title page.

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(d) Any French text on figures should be ignored.

In this Standard, the following print types are used:

– requirements proper: in arial type;

– *test specifications: in italic type;*

– explanatory matter: in smaller arial type.

Any international Standard referenced should be replaced by an equivalent Australian Standard when one is available. The availability of equivalent Australian Standards can be determined either from the Standards Australia catalogue or from the Standards Australia website (www.standards.com.au).

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Australian Standard

Environmental testing
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1 Introduction

Test Z/AD is a cyclic temperature/humidity test which is designed to reveal defects in test specimens caused by "breathing" as distinct from the absorption of moisture.

This test differs from other cyclic damp heat tests in that it derives its increased severity from:

a) A greater number of temperature variations or "pumping" actions in a given time.

b) A greater cyclic temperature range.

c) A higher cyclic rate of change of temperature.

d) The inclusion of a number of excursions to sub-zero temperatures.

The accelerated breathing and the effect of the freezing of trapped water in cracks and fissures are the essential features of this composite test.

It is emphasized however that the freezing effect will occur only if the fissure dimensions are large enough to allow the penetration of a coherent mass of water, as is normally the case in fissures between seals and metal assemblies or between seals and wire terminations.

The degree of condensation will depend mainly upon the thermal time constant of the surface of the test specimens and may be negligible for very small specimens but copious for large specimens.

Similarly, the breathing effect will be more apparent on specimens which contain relatively large air-filled or gas-filled voids but again the severity of the test will depend to some extent on the thermal characteristics of the specimens.

Application of the test

For the reasons given above, it is recommended that this test procedure be limited to component type specimens when the construction of the specimens suggests a "breathing" type of damp heat test combined with icing and where the thermal characteristics are compatible with the rates of change of temperature, etc., of test Z/AD.

For solid type specimens, e.g. plastic encapsulated, where there may be small hairline cracks or porous material, the absorption or diffusion mechanisms will predominate and a steady damp heat such as test C is preferred for investigating these effects.

For larger specimens such as equipment or when it is essential for components to ensure thermal stability during the various phases of the cycle, test Db should be employed, although due to the reduced number of cycles in a given period the degree of acceleration may not be so great. In this case, test Db should normally form part of a sequence such as that defined in clause 7 of IEC 60068-1.

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