Australian Standard™

Environmental testing

Part 2.53: Tests—Guidance to tests Z/AFc and Z/BFc: Combined temperature (cold and dry heat) and vibration (sinusoidal) tests

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 17 April 2003 and published on 19 June 2003.

The following are represented on Committee EL-026:

Australian Chamber of Commerce and Industry

Australian Electrical and Electronic Manufacturer's Association

Electrical Compliance Testing Association

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Electricity Supply Association of Australia

Testing Interests (Australia)

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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.

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 testing*. This Standard is Part 2.53 of that series.

This Standard is identical with, and has been reproduced from, IEC 60068-2-53:1984, *Environmental testing – Part 2-53: Tests—Guidance to Tests Z/AFc and Z/BFc: Combined temperature (cold and dry heat) and vibration (sinusoidal) tests*.

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.

(b) In the source text 'this international standard' should read 'this Australian Standard'.

(c) A full point should be substituted for a comma when referring to a decimal marker.

(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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1 Object

To give guidance on the application of the combined tests Z/AFc (IEC 60068-2-50) and Z/BFc (IEC 60068-2-51) to the testing of components, equipment and other electrotechnical products, hereinafter referred to as "specimens".

2 General

The combined temperature (cold and dry heat) and vibration (sinusoidal) tests are based on the relevant single tests in IEC 60068-2-1, IEC 60068-2-1A, IEC 60068-2-2, IEC 60068-2-2A and IEC 60068-2-6.

Guidance on these single tests is given for the cold and dry heat tests in IEC 60068-3-1 and for the vibration (sinusoidal) test in annex A of IEC 60068-3-6.

General guidance on environmental testing is given in annex B of IEC 60068-1. This standard should be used in conjunction with the standard(s) for the relevant single test and its guidance and with IEC 60068-1.

The temperature specified for the test, according to the prescriptions of the relevant Test A (cold) or B (dry heat), is taken as the ambient temperature, as defined in IEC 60068-1, of the air surrounding the specimen.

3 Reasons behind the design of the test

For the testing of heat-dissipating specimens, the effects of "free air conditions" are simulated according to Tests A and B. These conditions are those found within an infinite space where the movement of the air is affected only by the heat dissipating specimen itself. Tests A and B state a preference, when testing heat dissipating specimens, for the use of a chamber without forced air circulation. However, testing without forced air circulation in a combined temperature (cold and dry heat) and vibration (sinusoidal) testing facility is not normally advisable for the following reasons:

a) forced air circulation may be needed to remove excessive heat from the vibration generator;

b) with some specimens, for example those which are large or massive, the free circulation of air below the specimen can be reduced or impeded by the vibration generator.

In the design of the combined temperature (cold and dry heat) and vibration (sinusoidal) test, it is therefore accepted that forced air circulation is normally used. To be able to use the same definition of test temperature as for Tests A and B, the following procedure has been specified for heat-dissipating specimens:

1) determine the temperature of the hottest point of the specimen when subjected to the ambient temperature specified for the test in "free air conditions";