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IEC 60068-3-1:1974

Australian Standard™

Environmental testing
Part 3.1: Background information—Section one: Cold and dry heat 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 14 February 2003 and published on 15 April 2003.

The following are represented on Committee EL-026:

Australian Chamber of Commerce and Industry

Australian Electrical and Electronic Manufacturers Association

Electrical Compliance Testing Authorities

Electrical Regulatory Authorities Council

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 to supersede AS 1099.3.1—1980, *Basic environmental testing procedures for electrotechnology* Part 3: *Background information*—Section 1: *Tests A and B—Cold and dry heat tests*.

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 3.1 of that series.

This Standard is identical with, and has been reproduced, from IEC 60068-3-1:1974, *Environmental testing – Part 3: Background information – Section One: Cold and dry heat 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.

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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 Introduction

The performance of components and equipments is influenced and limited by their internal temperatures which depend on the external ambient conditions and on the heat generated within the device itself.

Whenever temperature gradients exist in the system formed by a device and its surroundings, a process of heat transfer will ensue.

The tests cover cold and dry heat testing, with both sudden and gradual change of the temperature, and of non-heat-dissipating and heat-dissipating specimens (the latter with or without artificial cooling).

The use of test chambers with and without forced air circulation is covered as appropriate. A general block diagram of the total procedure is given in Annex K.

1.1 Reference ambient conditions

Unfortunately, the actual ambient conditions in which the device will have to work are normally neither accurately known nor well defined, so that it is not possible to use them as a basis for design, specification or testing.

For these purposes, it is necessary to define conventional reference ambient conditions which may be specified taking into account the following considerations.

1.2 Devices without heat dissipation

If the ambient temperature is uniform and constant and there is no generation of heat within the device, heat will flow from the ambient atmosphere into the device if the former is at a higher temperature, and from the device into the ambient atmosphere if the latter is at a lower temperature. This heat transfer will continue until the device has reached in all its parts the temperature of the surrounding atmosphere. From that moment on, the heat transfer ceases and will not start again unless the ambient temperature changes. In this case, the definition of a reference ambient temperature is simple, the only condition being that it shall be uniformly distributed and constant. For the case when the device does not reach the temperature of the surrounding atmosphere, the definition of a reference temperature is more complicated and the conclusions in 1.3 apply.

1.3 Devices with heat dissipation

If heat were generated within the device and there were no heat transfer to the ambient atmosphere, the temperature of the device would rise beyond any limit. It follows that if an ultimate steady temperature is reached, this implies that heat is flowing continuously from the device into the atmosphere whereby the device is always cooled, no matter what the ambient atmosphere is. Only if the ambient temperature rises, a further rise of temperature within the device may occur.