AS 60068.2.14—2003
IEC 60068-2-14:1984
IEC 60068-2-14:1984/Amd 1:1986

Australian Standard™

Environmental testing

Part 2.14: Tests—Test N: Change of temperature

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 10 April 2003 and published on 16 May 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

Electrical Regulatory Authorities Council

Electricity Supply Association of Australia

Testing Interests (Australia)

Keeping Standards up-to-date

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about Standards can be found by visiting the Standards Australia web site at www.standards.com.au and looking up the relevant Standard in the on-line catalogue.

Alternatively, the printed Catalogue provides information current at 1 January each year, and the monthly magazine, *The Australian Standard*, has a full listing of revisions and amendments published each month.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact us via email at mail@standards.com.au, or write to the Chief Executive, Standards Australia International Ltd, GPO Box 5420, Sydney, NSW 2001.

This Standard was issued in draft form for comment as DR 02596.

Australian Standard™

Environmental testing

Part 2.14: Tests—Test N: Change of temperature

First published as AS 60068.2.14—2003.

COPYRIGHT

© Standards Australia International

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher.

Published by Standards Australia International Ltd
GPO Box 5420, Sydney, NSW 2001, Australia

ISBN 0 7337 5266 7

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 2.14 of that series.

This Standard is identical with, and has been reproduced from, IEC 60068-2-14:1984, *Environmental testing—Part 2-14: Tests—Test N: Change of temperature* incorporating Amendment 1:1986.

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).

CONTENTS

Page

Introduction iv
1 Test Na: Rapid change of temperature with prescribed time of transition 1
1.1 Scope 1
1.2 General description of the test 1
1.3 Description of the test apparatus 1
1.3.1 Testing chamber 1
1.3.2 Mounting or supporting of the test specimen 1
1.4 Severities 2
1.5 Initial measurements 2
1.6 Conditioning 2
1.7 Recovery 4
1.8 Final measurements 4
1.9 Information to be given in the relevant specification 4
2 Test Nb: Change of temperature with specified rate of change 4
2.1 Scope 4
2.2 General description of the test 4
2.3 Description of test apparatus 5
2.3.1 Testing chamber 5
2.3.2 Mounting or supporting of the test specimen 5
2.4 Severities 5
2.5 Initial measurements 5
2.6 Conditioning 6
2.7 Recovery 7
2.8 Final measurements 7
2.9 Information to be given in the relevant specification 7
3 Test Nc: Rapid change of temperature, two-fluid-bath method 7
3.1 Scope 7
3.2 General description of the test 8
3.3 Description of test apparatus 8
3.4 Severities 8
3.5 Initial measurements 8
3.6 Conditioning 9
3.7 Recovery 9
3.8 Final measurements 10
3.9 Information to be given in the relevant specification 10

INTRODUCTION

A change of temperature test is intended to determine the effect on the specimen of a change of temperature or a succession of changes of temperature.

It is not intended to show effects which are due only to the high or low temperature. For these effects, the dry heat test or the cold test should be used.

The effect of such tests is determined by:

– values of high and low conditioning temperature between which the change is to be effected;
– the conditioning times for which the test specimen is kept at these temperatures;
– the rate of change between these temperatures;
– the number of cycles of conditioning;
– the amount of heat transfer into or from the specimen.

Guidance on the choice of suitable test parameters for inclusion in the detail specification is given in IEC 60068-2-33: Basic environmental testing procedures – Part 2: Tests – Guidance on change of temperature tests, which should be read in conjunction with this standard.

STANDARDS AUSTRALIA

Australian Standard

Environmental testing
Part 2.14: Tests—Test N: Change of temperature

1 Test Na: Rapid change of temperature with prescribed time of transition

1.1 Scope

This test determines the ability of components, equipment or other articles to withstand rapid changes of ambient temperature. The exposure times adequate to accomplish this will depend upon the nature of the specimen.

1.2 General description of the test

The specimen is exposed to rapid changes of temperature in air, or in a suitable inert gas, by alternate exposure to low temperature and to high temperature.

1.3 Description of the test apparatus

1.3.1 Testing chamber

1.3.1.1 Two separate chambers shall be provided, one for the low temperature and one for the high temperature, the location being such as to allow transfer of the specimen from one chamber to the other within the prescribed time. Either manual or automatic transfer methods may be used.

1.3.1.2 The chambers shall be capable of maintaining the atmosphere at the appropriate temperature for the test in any region where the specimen is placed.

1.3.1.3 The absolute humidity of the atmosphere should not exceed 20 g/m^3.

1.3.1.4 The temperature of the walls of the hot and cold chambers shall not differ by more than 3 % and 8 % respectively from the specified ambient temperature of the test, expressed in kelvins. This requirement applies to all parts of the chamber walls and the specimens shall be unable to “see” any heating or cooling elements which do not comply with this requirement.

1.3.1.5 The volume of the chambers and the air velocity shall be such that after insertion of the test specimens, the temperature of the atmosphere shall be within the specified tolerance after a time of not more than 10 % of the exposure time.

1.3.1.6 The air in the chamber shall be circulated. Air velocity measured close to the test specimen, shall be not less than 2 m/s.

1.3.2 Mounting or supporting of the test specimen

Unless otherwise specified in the relevant specification, the thermal conduction of the mounting or supports shall be low, such that for practical purposes the specimen is thermally isolated. When testing several specimens simultaneously they shall be so placed that free circulation should be provided between specimens, and between specimens and chamber surfaces.

© Standards Australia