

AS 60068.3.1—2003  
IEC 60068-3-1:1974

AS 60068.3.1

Australian Standard™

**Environmental testing**  
**Part 3.1: Background information—**  
**Section one: Cold and**  
**dry heat tests**

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)

---

#### **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 Standards may also be withdrawn.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](http://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](mailto:mail@standards.com.au), or write to the Chief Executive, Standards Australia International Ltd, GPO Box 5420, Sydney, NSW 2001.

---

AS 60068.3.1—2003

Australian Standard™

**Environmental testing  
Part 3.1: Background information—  
Section one: Cold and  
dry heat tests**

Originated as AS 1099.3.1—1980.  
Revised and redesignated as AS 60068.3.1—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 5087 7

## 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.
- (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](http://www.standards.com.au)).

## CONTENTS

	<i>Page</i>
1 Introduction .....	1
1.1 Reference ambient conditions.....	1
1.2 Devices without heat dissipation .....	1
1.3 Devices with heat dissipation.....	1
1.4 Ambient temperature .....	2
1.5 Surface temperatures .....	2
2 Reasons for the differing test procedures.....	2
2.1 Mechanisms of heat transfer.....	2
2.1.1 Convection.....	2
2.1.2 Thermal radiation.....	3
2.1.3 Thermal conduction .....	4
2.1.4 Forced air circulation .....	4
3 Test chambers .....	5
3.1 General .....	5
3.2 Methods of achieving the required conditions in the test chamber.....	6
3.2.1 Design of chambers for simulating the effect of free air condition.....	6
3.2.2 Design of chambers with forced air circulation .....	6
3.2.3 Emissivity coefficient of walls.....	7
3.2.4 Thermal characteristics of mounting devices.....	7
4 Measurements .....	7
4.1 Temperature.....	7
4.2 Air velocity.....	7
4.3 Emissivity coefficient .....	7
Annex A Effects of size of chamber on surface temperature of a specimen when no forced air circulation is used .....	8
Annex B Effect of airflow on chamber conditions and on surface temperatures of test specimens .....	10
Annex C Effect of specimen emissivity coefficient on temperature rise .....	14
Annex D Effect of wire termination dimensions and material on surface temperature of a component.....	15
Annex E Heat transfer calculations and nomograms.....	16
Annex F Thermal conductivities of common materials .....	23
Annex G Measurement of temperature .....	24
Annex H Measurement of air velocity .....	26
Annex J Measurement of emissivity coefficient.....	27
Annex K General block diagram, cold and dry heat tests .....	35

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

- 
- Looking for additional Standards? Visit Intertek Inform Infostore
  - Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation
-