AS 60068.2.9—2003
IEC 60068-2-9:1975
IEC 60068-2-9:1975/Amd 1:1984
IEC 60068-2-9:1975/Corr 1:1989

Australian Standard™

Environmental testing

Part 2.9: Tests—Guidance for solar radiation testing

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 20 March 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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This Standard was issued in draft form for comment as DR 02483.

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First published as AS 60068.2.9—2003.

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

ISBN 0 7337 5085 0

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 2.9 of that series.

This Standard is identical with, and has been reproduced, from IEC 60068-2-9:1975, *Environmental testing – Part 2: Tests – Guidance for solar radiation testing* incorporating Amendment 1:1984 and Corrigendum 1:1989.

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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Warning note

Intending users of solar radiation tests are directed to the health hazards associated with tests of this nature and should therefore read clause 9 of this publication and take particular note of its contents.

1 Introduction

This publication describes methods of simulation designed to examine the effect of solar radiation on equipment and components at the surface of the earth. The main characteristics of the environment to be simulated are the spectral energy distribution of the sun, as observed at the earth's surface, and the intensity of received energy, in combination with controlled temperature conditions. However, it may be necessary to consider combination of solar radiation – including sky radiation – with other environments, e.g. temperature, humidity, air velocity, etc.

2 Irradiance and spectral distribution of test source

The effect of radiation on the specimen(s) will depend on the level of irradiance and its spectral distribution.

2.1 Irradiance

The irradiance by the sun on a plane perpendicular to the incident radiation outside the earth's atmosphere at the mean earth-sun distance is known as the solar constant E_0 [12].*

The irradiance at the surface of the earth is influenced by the solar constant and the attenuation and scattering of radiation in the atmosphere. CIE Publication No. 20 gives a value of 1120 W/m^2 for the global (total) radiation at the surface of the earth from sun and sky, with the sun at zenith; value based on a solar constant E_0 = 1,35 kW/m^2 [22].

2.2 Spectral distribution

The standard spectral distribution of the global radiation specified for this test, in accordance with the recommendations of the CIE [22], is given in table I of Test Sa of IEC 60068-2-5. Where only the thermal effects of solar radiation are of interest, then the use of tungsten filament lamps may be permitted. However, it must be clearly understood that the spectral distribution of tungsten filament lamps differs markedly from that of natural solar radiation (see figure 2) and the irradiance shall be adjusted in accordance with 2.3 below.

2.3 Irradiance to be used with other spectral distribution

If the source of radiation used for the test does not meet the standard spectral distribution given in table I of Test Sa, e.g. where tungsten filament lamps are used (permissible if the test is solely to assess thermal effects), the irradiance shall be adjusted so that the heating

* All the numbers in square brackets [ ] refer to the Bibliography.