

STN	Skúšanie vplyvu prostredia Časť 2-5: Skúšky Skúška S: Simulované slnečné žiarenie na úrovni zemského povrchu a návod na skúšanie slnečným žiarením a na poveternostné starnutie	STN EN IEC 60068-2-5 34 5791
------------	--	--

Environmental testing - Part 2-5: Tests - Test S: Simulated solar radiation at ground level and guidance for solar radiation testing and weathering

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 12/18

Obsahuje: EN IEC 60068-2-5:2018, IEC 60068-2-5:2018

Oznámením tejto normy sa od 11.05.2021 ruší
STN EN 60068-2-5 (34 5791) z augusta 2011

127516

EUROPEAN STANDARD

EN IEC 60068-2-5

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2018

ICS 19.040

Supersedes EN 60068-2-5:2011

English Version

**Environmental testing - Part 2-5: Tests - Test S: Simulated solar radiation at ground level and guidance for solar radiation testing and weathering
(IEC 60068-2-5:2018)**

Essais d'environnement - Partie 2-5: Essais - Essai S:
Rayonnement solaire simulé au niveau du sol et
recommandations pour les essais de rayonnement solaire
et le vieillissement
(IEC 60068-2-5:2018)

Umgebungseinflüsse - Teil 2-5: Prüfverfahren - Prüfung S:
Nachgebildete Sonnenbestrahlung in Bodennähe und
Leitfaden zur Sonnenstrahlung und Bewitterung
(IEC 60068-2-5:2018)

This European Standard was approved by CENELEC on 2018-05-11. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

EN IEC 60068-2-5:2018 (E)**European foreword**

The text of document 104/735/CDV, future edition 3 of IEC 60068-2-5, prepared by IEC/TC 104 "Environmental conditions, classification and methods of test" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60068-2-5:2018.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2019-02-11
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2021-05-11

This document supersedes EN 60068-2-5:2011.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 60068-2-5:2018 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60068-2-78	NOTE	Harmonized as EN 60068-2-78.
ISO 4892-1	NOTE	Harmonized as EN ISO 4892-1.
ISO 4892-2	NOTE	Harmonized as EN ISO 4892-2.
ISO 4892-3	NOTE	Harmonized as EN ISO 4892-3.

Annex ZA
(normative)**Normative references to international publications
with their corresponding European publications**

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60068-1	-	Environmental testing -- Part 1: General and guidance	EN 60068-1	-
IEC 60068-2-1	-	Environmental testing -- Part 2-1: Tests - Test A: Cold	EN 60068-2-1	-
IEC 60068-2-2	-	Environmental testing -- Part 2-2: Tests - Test B: Dry heat	EN 60068-2-2	-



IEC 60068-2-5

Edition 3.0 2018-04

INTERNATIONAL STANDARD

**Environmental testing –
Part 2-5: Tests – Test S: Simulated solar radiation at ground level and guidance
for solar radiation testing and weathering**



**THIS PUBLICATION IS COPYRIGHT PROTECTED****Copyright © 2018 IEC, Geneva, Switzerland**

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing 21 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.



IEC 60068-2-5

Edition 3.0 2018-04

INTERNATIONAL STANDARD

**Environmental testing –
Part 2-5: Tests – Test S: Simulated solar radiation at ground level and guidance
for solar radiation testing and weathering**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 19.040

ISBN 978-2-8322-5514-8

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD	4
INTRODUCTION	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	7
4 General remarks	8
4.1 Overview	8
4.2 Irradiance of solar radiation	8
4.3 Spectral irradiance of solar radiation	8
4.4 Radiation source	9
5 Test method Sa: thermal effect test	9
5.1 Conditioning	9
5.1.1 General	9
5.1.2 Temperature	9
5.1.3 Humidity	9
5.1.4 Ozone and other contamination gases	9
5.1.5 Surface contamination	10
5.1.6 Mounting of test specimen(s)	10
5.1.7 Test facility	10
5.1.8 Test apparatus	10
5.2 Initial measurements	11
5.3 Testing	11
5.3.1 General	11
5.3.2 Procedure Sa 1 – 24 h cycle, 8 h irradiation and 16 h darkness, repeated as required	11
5.3.3 Procedure Sa 2 – 24 h cycle, 20 h irradiation and 4 h darkness, repeated as required	11
5.3.4 Procedure Sa 3 – Continuous irradiation as required	11
5.4 Final measurements	13
6 Test method Sb: Weathering test with or without wetting	13
6.1 Test apparatus	13
6.1.1 Laboratory radiation source	13
6.1.2 Test chamber	14
6.1.3 Temperature	14
6.1.4 Humidity	15
6.1.5 Spray cycle	15
6.1.6 Mounting of test specimen(s)	15
6.1.7 Ozone and other contaminating gases	15
6.1.8 Surface contamination	15
6.2 Initial measurements	15
6.3 Testing	15
6.3.1 General	15
6.3.2 Test duration	16
6.3.3 Test procedure	16
6.3.4 Ancillary environmental conditions	16
6.4 Final measurements	16

7	Information to be given in the relevant specification.....	17
8	Information to be given in the test report.....	17
	Annex A (informative) Standard solar spectral irradiance.....	18
	Annex B (informative) Radiation source.....	20
	B.1 General.....	20
	B.2 Filters.....	20
	B.3 Uniformity of irradiance.....	20
	Annex C (informative) Typical apparatus for weathering.....	21
	Annex D (informative) Instrumentation.....	23
	D.1 General.....	23
	D.2 Measurement of irradiance.....	23
	D.3 Measurement of spectral irradiance.....	23
	D.4 Measurement of temperature.....	23
	D.5 Difference between insulated black panel and uninsulated black panel thermometer.....	23
	Bibliography.....	24
	Figure 1 – Global solar spectral irradiance at sea level.....	8
	Figure 2 – Test procedures Sa 1, Sa 2 and Sa 3.....	13
	Figure C.1 – Example of test apparatus.....	21
	Figure C.2 – Example of test apparatus with flat array.....	22
	Table 1 – Spectral irradiance.....	9
	Table 2 – Minimum and maximum levels of the relative spectral irradiance.....	10
	Table 3 – Relative spectral irradiance of xenon-arc lamp(s) with daylight filters.....	14
	Table 4 – Relative spectral irradiance for xenon-arc lamp(s) with window glass filters.....	14
	Table 5 – Exposure cycles.....	16
	Table A.1 – Comparison of basic atmospheric conditions used for the solar spectrum defined in ASTM G 177 and that defined in CIE 85:1989, Table 4.....	19
	Table A.2 – Irradiance comparison for the ASTM G 177 solar spectrum and the CIE 85:1989, Table 4, solar spectrum.....	19

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ENVIRONMENTAL TESTING –**Part 2-5: Tests – Test S: Simulated solar radiation at ground level and guidance for solar radiation testing and weathering**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60068-2-5 has been prepared by IEC technical committee 104: Environmental conditions, classification and methods of test.

This third edition cancels and replaces the second edition of published in 2010. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) the title of this document has been modified;
- b) the current thermal effect test method, specified as "Test method Sa" has been retained and the weathering test method specified as "Test method Sb" has been added.

The text of this International Standard is based on the following documents:

CDV	Report on voting
104/735/CDV	104/789/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60068 series, published under the general title *Environmental testing*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

This part of IEC 60068 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 irradiance of solar radiation, as observed at the earth's surface, and the intensity of received energy, in combination with controlled temperature conditions. However, the combination of solar radiation with other environments, for example temperature, humidity, water spray (to simulate wetting) and air velocity, should be considered. Two different methods are described, one aiming at the thermal effects, a second aiming at the weathering effects.

ENVIRONMENTAL TESTING –

Part 2-5: Tests – Test S: Simulated solar radiation at ground level and guidance for solar radiation testing and weathering

1 Scope

This part of IEC 60068-2 specifies the methods for testing equipment or components under simulated solar radiation conditions.

This document is applicable to the equipment and components at the surface of the earth.

The purpose of testing is to investigate to what extent the equipment or components are affected by simulated solar radiation in the presence of moisture to reproduce the weathering effects (temperature, humidity and/or wetting) that occur when they are exposed in actual end-use environments to daylight or to daylight filtered through window glass. This document specifies two test methods, test method Sa: thermal effect test, and test method Sb: weathering test.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-1, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-1, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN