

STN	Skúšanie vplyvu prostredia Časť 2-18: Skúšky Skúška R a návod: Voda	STN EN 60068-2-18 34 5791
------------	--	---

Environmental testing - Part 2-18: Tests Test R and guidance: Water

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. 11/17

Obsahuje: EN 60068-2-18:2017, IEC 60068-2-18:2017

Oznámením tejto normy sa od 14.04.2020 ruší
STN EN 60068-2-18 (34 5791) z novembra 2002

125753

Úrad pre normalizáciu, metrológiu a skúšobníctvo Slovenskej republiky, 2017
Podľa zákona č. 264/1999 Z. z. o technických požiadavkách na výrobky a o posudzovaní zhody a o zmene a doplnení niektorých zákonov v znení neskorších predpisov sa slovenská technická norma a časti slovenskej technickej normy môžu rozmnožovať alebo rozširovať len so súhlasom slovenského národného normalizačného orgánu.

EUROPEAN STANDARD

EN 60068-2-18

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2017

ICS 19.040

Supersedes EN 60068-2-18:2001

English Version

Environmental testing -
Part 2-18: Tests - Test R and guidance: Water
(IEC 60068-2-18:2017)

Essais d'environnement -
Partie 2-18: Essais - Essai R et guide: Eau
(IEC 60068-2-18:2017)

Umgebungsprüfungen -
Teil 2-18: Prüfungen, Prüfung R und Leitfaden: Wasser
(IEC 60068-2-18:2017)

This European Standard was approved by CENELEC on 2017-04-14. 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: Avenue Marnix 17, B-1000 Brussels

EN 60068-2-18:2017**European foreword**

The text of document 104/719/FDIS, future edition 3 of IEC 60068-2-18, 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 60068-2-18:2017.

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) 2018-01-14
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2020-04-14

This document supersedes EN 60068-2-18:2001.

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 60068-2-18:2017 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 60529 NOTE Harmonized as EN 60529.



INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Environmental testing –
Part 2-18: Tests – Test R and guidance: Water**

**Essais d'environnement –
Partie 2-18: Essais – Essai R et guide: Eau**





THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2017 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.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

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

Tel.: +41 22 919 02 11
 Fax: +41 22 919 03 00
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 - www.iec.ch/searchpub

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 20 000 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

65 000 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: csc@iec.ch.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Catalogue IEC - webstore.iec.ch/catalogue

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Recherche de publications IEC - www.iec.ch/searchpub

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

65 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.



INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Environmental testing –
Part 2-18: Tests – Test R and guidance: Water**

**Essais d'environnement –
Partie 2-18: Essais – Essai R et guide: Eau**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 19.040

ISBN 978-2-8322-4019-9

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD	5
INTRODUCTION	7
1 Scope	8
2 Normative references	8
3 Terms and definitions	8
4 Survey of water tests	9
4.1 General	9
4.2 Description of tests R: water	9
5 Test Ra: falling drops	10
5.1 Object	10
5.2 Method Ra 1: artificial rain	10
5.2.1 General description of the test	10
5.2.2 Severities	11
5.2.3 Preconditioning	11
5.2.4 Initial measurements	11
5.2.5 Testing	11
5.2.6 Recovery	12
5.2.7 Final measurements	12
5.2.8 Information to be given in the relevant specification	12
5.3 Method Ra 2: drip box	13
5.3.1 General description of the test	13
5.3.2 Severities	13
5.3.3 Preconditioning	14
5.3.4 Initial measurements	14
5.3.5 Testing	14
5.3.6 Recovery	14
5.3.7 Final measurements	14
5.3.8 Information to be given in the relevant specification	14
6 Test Rb: impacting water	15
6.1 Object	15
6.2 Method Rb 1: oscillating tube and spray nozzle	15
6.2.1 General description of the test	15
6.2.2 Method Rb 1.1: oscillating tube	15
6.2.3 Method Rb 1.2: spray nozzle	19
6.3 Method Rb 2: water jet	21
6.3.1 General description of the test	21
6.3.2 Severities	21
6.3.3 Preconditioning	22
6.3.4 Initial measurements	22
6.3.5 Testing	22
6.3.6 Recovery	22
6.3.7 Final measurements	23
6.3.8 Information to be given in the relevant specification	23
6.4 Method Rb 3: fan jet	23
6.4.1 General description of the test	23
6.4.2 Severities	24

6.4.3	Preconditioning.....	24
6.4.4	Initial measurements	24
6.4.5	Testing	24
6.4.6	Recovery	24
6.4.7	Final measurements	24
6.4.8	Information to be given in the relevant specification.....	25
7	Test Rc: immersion.....	25
7.1	Object.....	25
7.2	Method Rc 1: water tank	25
7.2.1	General description	25
7.2.2	Severities	25
7.2.3	Preconditioning.....	26
7.2.4	Initial measurements	26
7.2.5	Testing	26
7.2.6	Recovery	26
7.2.7	Final measurements	26
7.2.8	Information to be given in the relevant specification.....	26
7.3	Method Rc 2: pressurized water chamber	27
7.3.1	General description of the test.....	27
7.3.2	Severities	27
7.3.3	Preconditioning.....	27
7.3.4	Initial measurements	27
7.3.5	Testing	27
7.3.6	Recovery	28
7.3.7	Final measurements	28
7.3.8	Information to be given in the relevant specification.....	28
Annex A (informative) Water characteristics to be considered when writing the relevant specification		29
A.1	General.....	29
A.2	Purity.....	29
A.2.1	General	29
A.2.2	Effect on test specimen	29
A.2.3	Effect on test apparatus.....	29
A.2.4	Ingress of water into the specimen	30
A.3	Water quality for tests R	30
A.3.1	Test Ra: falling drops.....	30
A.3.2	Test Rb: impacting water	30
A.3.3	Test Rc: immersion.....	30
Annex B (informative) General guidance		31
B.1	General.....	31
B.2	Factors affecting the test severity	31
Annex C (informative) Guidance for test Ra		32
C.1	General.....	32
C.2	Example of test apparatus	32
C.2.1	Method Ra 1: artificial rain.....	32
C.2.2	Method Ra 2: drip box	33
C.3	Verification of test apparatus	34
C.3.1	Intensity.....	34
C.3.2	Drop size	34

C.3.3	Resistivity and pH value	34
Annex D (informative)	Guidance for test Rb	36
D.1	General.....	36
D.2	Example of test apparatus	36
D.2.1	Method Rb 1: oscillating tube and spray nozzle	36
D.2.2	Method Rb 2: water jet.....	37
D.2.3	Method Rb 3: fan jet nozzle	38
Annex E (informative)	Guidance for test Rc.....	45
E.1	General.....	45
E.2	Example of test apparatus	45
E.2.1	Method Rc 1: water tank	45
E.2.2	Method Rc 2: pressurized water chamber	45
E.3	Verification of test apparatus	45
Bibliography.....		46
Figure 1 – Structuring of test methods and equivalence with the IP Code of IEC 60529		10
Figure 2 – Test Ra, definitions of angles and axes		12
Figure C.1 – Test Ra 1, test apparatus and measurement setup for drop sizes and intensity for artificial rain method		33
Figure C.2 – Test Ra 2, recommended test apparatus for the drip box method.....		35
Figure D.1 – Test Rb 1.1, recommended test apparatus for the oscillating tube method.....		37
Figure D.2 – Distribution of mean value of precipitation intensity in the oscillating tube area		39
Figure D.3 – Test Rb 1.2, recommended test apparatus for the spray nozzle method.....		40
Figure D.4 – Standard test nozzle for the water jet method (hose nozzle)		40
Figure D.5 – Standard test nozzle for the fan jet method.....		41
Figure D.6 – Fan jet nozzle resulting dimensions of spraying hole for checking purpose		41
Figure D.7 – Example of different quality achievements of the surface finish of the fan jet nozzle		42
Figure D.8 – Set-up for measuring the impact force of the water jet for determining the protection against high-pressure and high-temperature water jets.....		43
Figure D.9 – Impact force distribution		43
Figure D.10 – Test setup for determining the protection against high-pressure and high-temperature water jet for small enclosures		44
Table 1 – Oscillating tube – Relationship of number of nozzles and total water flow to tube radius.....		17
Table A.1 – Typical characteristics of water with approximate values.....		30

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ENVIRONMENTAL TESTING –

Part 2-18: Tests – Test R and guidance: Water

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 60068-2-18 has been prepared by IEC technical committee 104: Environmental conditions, classification and methods of test.

This third edition cancels and replaces the second edition published in 2000. This edition constitutes a technical revision.

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

- a) addition of the new test method Rb 3.

The text of this standard is based on the following documents:

FDIS	Report on voting
104/719/FDIS	104/722/RVD

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

This publication 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 publication will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

A number of water tests are described in other IEC publications. Some of them are well established, for example, the test for classification of the second characteristic numeral of the IP Code, of IEC 60529.

This document incorporates the majority of the most widely used tests, as well as making available further methods and increasing the number of severities.

ENVIRONMENTAL TESTING –

Part 2-18: Tests – Test R and guidance: Water

1 Scope

This part of IEC 60068 provides methods of test applicable to products which, during transportation, storage or in service, can be subjected to falling water drops, impacting water, immersion or high pressure water impact. The primary purpose of water tests is to verify the ability of enclosures, covers and seals to maintain components and equipment in good working order after and, when necessary, under a standardized drop field or immersion in water.

These tests are not corrosion tests and cannot be considered and used as such.

Established water tests in other standards are not intended to simulate natural rainfall and their quoted intensities are too high to be adopted for that purpose. Therefore, in addition to the high-intensity severities, test R includes an artificial rain test based upon natural conditions but not taking into account high wind speeds generally associated with natural rain.

Guidance is given on the applicability of the tests and the severities to be selected.

2 Normative references

There are no normative references in this document.

koniec náhľadu – text ďalej pokračuje v platenej verzii STN