

|            |                                                                                    |                                                  |
|------------|------------------------------------------------------------------------------------|--------------------------------------------------|
| <b>STN</b> | <b>Plasty</b><br><b>Umelé starnutie vrátane kyslej depozície (ISO 29664: 2010)</b> | <b>STN</b><br><b>EN ISO 29664</b><br><br>64 0773 |
|------------|------------------------------------------------------------------------------------|--------------------------------------------------|

Plastics - Artificial weathering including acidic deposition (ISO 29664:2010)

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. 06/17

Obsahuje: EN ISO 29664:2017, ISO 29664:2010

## 125009

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  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN ISO 29664**

February 2017

ICS 83.080.01

English Version

**Plastics - Artificial weathering including acidic deposition  
(ISO 29664:2010)**

Plastiques - Vieillissement artificiel y compris les  
dépôts acides (ISO 29664:2010)

Kunststoffe - Künstliche Bewitterung einschließlich  
saurer Beanspruchung (ISO 29664:2010)

This European Standard was approved by CEN on 17 January 2017.

CEN 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 CEN 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 CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

| <b>Contents</b>               | <b>Page</b> |
|-------------------------------|-------------|
| <b>European foreword.....</b> | <b>3</b>    |

## European foreword

The text of ISO 29664:2010 has been prepared by Technical Committee ISO/TC 61 “Plastics” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 29664:2017 by Technical Committee CEN/TC 249 “Plastics” the secretariat of which is held by NBN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2017, and conflicting national standards shall be withdrawn at the latest by August 2017.

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

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## Endorsement notice

The text of ISO 29664:2010 has been approved by CEN as EN ISO 29664:2017 without any modification.

---

---

## **Plastics — Artificial weathering including acidic deposition**

*Plastiques — Vieillissement artificiel y compris les dépôts acides*



**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2010

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 ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

Page

|                                                                        |           |
|------------------------------------------------------------------------|-----------|
| <b>Foreword .....</b>                                                  | <b>iv</b> |
| <b>Introduction.....</b>                                               | <b>v</b>  |
| <b>1 Scope .....</b>                                                   | <b>1</b>  |
| <b>2 Normative references .....</b>                                    | <b>1</b>  |
| <b>3 Principle.....</b>                                                | <b>1</b>  |
| <b>4 Apparatus .....</b>                                               | <b>2</b>  |
| <b>5 Test specimens.....</b>                                           | <b>4</b>  |
| <b>6 Test conditions .....</b>                                         | <b>4</b>  |
| <b>6.1 Method A .....</b>                                              | <b>4</b>  |
| <b>6.2 Method B .....</b>                                              | <b>8</b>  |
| <b>6.3 Allowed deviations in temperature and humidity .....</b>        | <b>9</b>  |
| <b>6.4 Measurement of radiant exposure .....</b>                       | <b>9</b>  |
| <b>6.5 Determination of changes in properties after exposure .....</b> | <b>9</b>  |
| <b>7 Precision.....</b>                                                | <b>9</b>  |
| <b>8 Test report.....</b>                                              | <b>9</b>  |
| <b>Annex A (informative) Background information .....</b>              | <b>11</b> |
| <b>Annex B (informative) Precision data for coatings.....</b>          | <b>15</b> |
| <b>Bibliography.....</b>                                               | <b>16</b> |

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 29664 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 6, *Ageing, chemical and environmental resistance*.

## Introduction

This International Standard specifies methods to reproduce the weathering effects that occur when plastics are exposed to heavily polluted outdoor environments. Acidic precipitation can have a significant effect on the photochemical ageing of many polymers. In some cases, this is due to attack on the stabilizers<sup>[5][6]</sup> or fillers like  $\text{CaCO}_3$ <sup>[7][8]</sup> applied in technical polymers. The mechanisms differ from those of harmful gases, which essentially constitute the initial products of acidic precipitation.

Arising from changing industrial air pollution and additionally diffused by the stochastic wind and cloud distribution, acidic precipitation occurs sporadically. Thus, especially regarding acidic precipitation, outdoor weathering effects vary enormously within different years. Therefore, it is practically impossible to obtain reliable outdoor exposure results from just one season. These fluctuations can be avoided through the use of a laboratory test, where all weathering parameters, including the acidic deposition, can be controlled.

In artificial weathering tests for plastics, the action of acidic atmospheric precipitation, which is part of the real world, has generally not been considered.



# Plastics — Artificial weathering including acidic deposition

## 1 Scope

This International Standard describes artificial weathering tests intended to evaluate plastics for use in heavily polluted outdoor environments. Results from this International Standard cannot be used to predict the service life of these plastics.

This International Standard describes two different exposure methods. Use of the methods depends on the form of the plastic product being evaluated.

Method A is intended for products where surface degradation is very important and uses a strong acid spray (pH 1,5) that is applied for a short time.

Method B uses a weaker acid spray (pH 3,5) that is applied over a long period of time so that it can penetrate deeply into the product and is intended for products such as geotextiles and related products.

This International Standard does not cover the influence of special chemicals like agrochemicals.

## 2 Normative references

The following referenced documents are indispensable for the application 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.

ISO 291, *Plastics — Standard atmospheres for conditioning and testing*

ISO 4582, *Plastics — Determination of changes in colour and variations in properties after exposure to daylight under glass, natural weathering or laboratory light sources*

ISO 4892-1, *Plastics — Methods of exposure to laboratory light sources — Part 1: General guidance*

ISO 4892-2, *Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps*

ISO 4892-3, *Plastics — Methods of exposure to laboratory light sources — Part 3: Fluorescent UV lamps*

**koniec náhľadu – text ďalej pokračuje v platenej verzii STN**