



**International  
Standard**

**ISO 4582**

**Plastics — Determination of changes  
in colour and variations in properties  
after exposure to glass-filtered solar  
radiation, natural weathering or  
laboratory radiation sources**

*Plastiques — Détermination des changements de coloration et  
des variations de propriétés après exposition au rayonnement  
solaire derrière une vitre en verre, au vieillissement naturel ou  
aux sources de rayonnement de laboratoire*

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## 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at [www.iso.org/patents](http://www.iso.org/patents). ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html)

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

This fifth edition cancels and replaces the fourth edition (ISO 4582:2017), which has been technically revised.

The main changes are as follows:

- in [4.2.2.1](#) and [4.2.4.2](#), references to CIE tristimulus values and corresponding International Standard ISO/CIE 11664-3 and ASTM E1347 have been deleted;
- in [Table 1](#), ISO 4628-4 for cracking and crazing has been added;
- in [Table 2](#), ISO 4765 for chemical changes has been added;
- in [5.4](#), standard atmosphere 23/50 has been changed to class 2;
- in [6.2.2](#), reference to ISO 4628-1:2016, Table 3 has been added;
- a new [Annex C](#) (Measurements of changes in mechanical properties) has been added.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

A number of different exposure techniques can be used to provide information on the effects of environmental stresses such as simulated solar radiation, heat and water on plastics (see the ISO 877 series and the ISO 4892 series). Each exposure test has its own particular application and relevance. When determining changes in a particular property or attribute of a material subjected to different exposures, the same evaluation methods should be used after all exposures to ensure meaningful results.

Results for plastics subjected to exposure tests are strongly dependent on the type of exposure conditions used, the type of plastic being tested and the property being evaluated. A result obtained for one property might not be the same as that for a different property of the same material, even if the same exposure test is used. This document is not intended to establish a fixed procedure for conducting the exposure test, but is intended to provide a set of specific procedures used to express the results for change in a characteristic property of the material after it has been exposed. It is up to the user to determine which exposure conditions are most relevant to the specific material and the service conditions being used.

Test methods should be selected to determine changes in appearance and properties of the exposed material with its proposed application in mind. The exposure test used should be devised to discriminate among materials based on such changes. This document suggests typical properties that can be used to determine changes in plastics which have been subjected to exposure tests.

**NOTE** Because of large differences in the spectral distribution of the radiation sources used, there can be large differences in results for the same plastics exposed in the various devices described in the ISO 4892 series. Therefore, comparisons between plastics are intended to be made only based on results from exposures in the same type of device and under the same conditions. For optimum comparisons, plastics are expected to be exposed at the same time in the same device.



# Plastics — Determination of changes in colour and variations in properties after exposure to glass-filtered solar radiation, natural weathering or laboratory radiation sources

## 1 Scope

This document specifies methods for determining changes in colour and other appearance properties, and variations in mechanical or other properties, of plastics that have been exposed to glass-filtered solar radiation, to natural weathering or to simulated solar radiation from a laboratory source.

The procedure used to analyse data depends on whether the test used to characterize the materials being exposed is destructive or non-destructive. The exposures are conducted under conditions specified in specific exposure standards (e.g. the ISO 877 series and the ISO 4892 series).

## 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.

ISO 105-A01, *Textiles — Tests for colour fastness — Part A01: General principles of testing*

ISO 105-A02, *Textiles — Tests for colour fastness — Part A02: Grey scale for assessing change in colour*

ISO 105-A03, *Textiles — Tests for colour fastness — Part A03: Grey scale for assessing staining*

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

ISO 2602, *Statistical interpretation of test results — Estimation of the mean — Confidence interval*

ISO 4628-1:2016, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 1: General introduction and designation system*

ISO/CIE 11664-1, *Colorimetry — Part 1: CIE standard colorimetric observers*

ISO/CIE 11664-2, *Colorimetry — Part 2: CIE standard illuminants*

ISO/CIE 11664-4, *Colorimetry — Part 4: CIE 1976 L\*a\*b\* colour space*

CIE 015, *Colorimetry 4<sup>th</sup> ed*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>