

# Plastics — Methods of exposure to laboratory light sources —

## Part 1: General guidance

The European Standard EN ISO 4892-1:2000 has the status of a  
British Standard

ICS 83.080.01

# National foreword

This British Standard is the official English language version of EN ISO 4892-1:2000. It is identical with ISO 4892-1:1999.

The UK participation in its preparation was entrusted to Technical Committee PRI/21, Testing of plastics, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

## Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

**Compliance with a British Standard does not of itself confer immunity from legal obligations.**

## Summary of pages

This document comprises a front cover, an inside front cover, the EN ISO title pages, the EN ISO foreword page, the ISO title page, pages ii to iv, pages 1 to 15 and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

This British Standard, having been prepared under the direction of the Sector Committee for Materials and Chemicals, was published under the authority of the Standards Committee and comes into effect on 15 October 1999

© BSI 17 September 2001

## Amendments issued since publication

| Amd. No. | Date              | Comments                                |
|----------|-------------------|-----------------------------------------|
| 13148    | 17 September 2001 | Implementation of the European Standard |
|          |                   |                                         |
|          |                   |                                         |
|          |                   |                                         |

ISBN 0 580 32969 0

English version

# Plastics — Methods of exposure to laboratory light sources — Part 1: General guidance

(ISO 4892-1:1999)

Plastiques —  
Méthodes d'exposition à des sources lumineuses  
de laboratoire —  
Partie 1: Guide générale  
(ISO 4892-1:1999)

Kunststoffe —  
Künstliches Bestrahlen oder Betwittern  
in Geräten —  
Teil 1: Allgemeine Anleitung  
(ISO 4892-1:1999)

This European Standard was approved by CEN on 8 September 2000.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

## CEN

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

**Management Centre: rue de Stassart, 36 B-1050 Brussels**

## Foreword

The text of the International Standard from Technical Committee ISO/TC 61, Plastics, of the International Organization for Standardization (ISO) has been taken over as a European Standard by Technical Committee CEN/TC 249, Plastics, the Secretariat of which is held by IBN.

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 March 2001, and conflicting national standards shall be withdrawn at the latest by March 2001.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

NOTE Normative references to International Standards are listed in Annex ZA (normative).

# INTERNATIONAL STANDARD

**ISO**  
**4892-1**

Second edition  
1999-07-01

---

## **Plastics — Methods of exposure to laboratory light sources —**

### **Part 1: General guidance**

*Plastiques — Méthodes d'exposition à des sources lumineuses  
de laboratoire —*

*Partie 1: Guide général*



## Contents

|                                                                                                                                                                                                               | Page |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Foreword                                                                                                                                                                                                      | iii  |
| Introduction                                                                                                                                                                                                  | iii  |
| 1 Scope                                                                                                                                                                                                       | 1    |
| 2 Normative references                                                                                                                                                                                        | 1    |
| 3 Terms and definitions                                                                                                                                                                                       | 1    |
| 4 Principle                                                                                                                                                                                                   | 2    |
| 4.1 Significance                                                                                                                                                                                              | 2    |
| 4.2 Use of accelerated tests with laboratory light sources                                                                                                                                                    | 3    |
| 5 Requirements for laboratory exposure devices                                                                                                                                                                | 3    |
| 5.1 Light source                                                                                                                                                                                              | 3    |
| 5.2 Temperature                                                                                                                                                                                               | 5    |
| 5.3 Humidity and wetting                                                                                                                                                                                      | 6    |
| 5.4 Other apparatus requirements                                                                                                                                                                              | 6    |
| 6 Test specimens                                                                                                                                                                                              | 7    |
| 6.1 Form, shape and preparation                                                                                                                                                                               | 7    |
| 6.2 Number of test specimens                                                                                                                                                                                  | 8    |
| 6.3 Storage and conditioning                                                                                                                                                                                  | 8    |
| 7 Test conditions and procedure                                                                                                                                                                               | 8    |
| 8 Precision and bias                                                                                                                                                                                          | 9    |
| 8.1 Precision                                                                                                                                                                                                 | 9    |
| 8.2 Bias                                                                                                                                                                                                      | 9    |
| 9 Test report                                                                                                                                                                                                 | 9    |
| Annex A (informative) Factors that decrease the degree of correlation between accelerated tests using laboratory light sources and actual-use exposures                                                       | 11   |
| Annex B (normative) Procedures for measuring the irradiance uniformity in the specimen exposure area                                                                                                          | 13   |
| Figure B.1 — Measurement of irradiance in devices using a rotating specimen drum                                                                                                                              | 13   |
| Figure B.2 — Measurement of irradiance uniformity in devices with a flat specimen plane                                                                                                                       | 13   |
| Figure B.3 — Typical plot of measured property for a reference material showing a linear change with radiant exposure and for a material that shows an induction period before any measurable property change | 14   |
| Table 1 — Spectral global irradiance                                                                                                                                                                          | 4    |

## 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 3. 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.

International Standard ISO 4892-1 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 6, *Ageing, chemical and environmental resistance*.

This second edition cancels and replaces the first edition (ISO 4892-1:1994), of which it constitutes a technical revision.

ISO 4892 consists of the following parts, under the general title *Plastics — Methods of exposure to laboratory light sources*:

- *Part 1: General guidance*;
- *Part 2: Xenon-arc sources*;
- *Part 3: Fluorescent UV lamps*;
- *Part 4: Open-flame carbon-arc lamps*.

Annex B forms a normative part of this part of ISO 4892. Annex A is for information only.

## Introduction

Plastics are often used outdoors or in indoor locations where they are exposed to daylight or to daylight behind glass for long periods. It is therefore very important to determine the effects of daylight, heat, moisture and other climatic stresses on the colour and other properties of plastics. Outdoor exposures to daylight and to daylight filtered by window glass are described in ISO 877:1994, *Plastics — Methods of exposure to direct weathering, to weathering using glass-filtered daylight, and to intensified weathering by daylight using Fresnel mirrors*. However, it is often necessary to determine more rapidly the effects of light, heat and moisture on the physical, chemical and optical properties of plastics with accelerated laboratory exposure tests that use specific laboratory light sources. Exposures in these laboratory devices are conducted under more controlled conditions than found in natural environments and are designed to accelerate polymer degradation and product failures.

Relating results from accelerated laboratory exposures to those obtained in actual-use conditions is difficult because of variability in both types of exposure and because laboratory tests often do not reproduce all the exposure stresses experienced by plastics exposed in actual-use conditions. No single laboratory exposure test can be specified as a total simulation of actual-use exposures.

The relative durability of materials in actual-use exposures can be very different depending on the location of the exposure because of differences in UV radiation, time of wetness, temperature, pollutants and other factors. Therefore, even if results from a specific accelerated laboratory test are found to be useful for comparing the relative durability of materials exposed in a particular outdoor location or in particular actual-use conditions, it cannot be assumed that they will be useful for determining the relative durability of materials exposed in a different outdoor location or in different actual-use conditions.

