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Plastics - Methods of exposure to laboratory light sources - Part 1: General guidance and requirements (ISO 4892-1:2024)

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Kunststoffe - Künstliches Bestrahlen oder Bewittern in Geräten - Teil 1: Allgemeine Anleitung und Anforderungen (ISO 4892-1:2024)

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European foreword

This document (EN ISO 4892-1:2024) has been prepared by Technical Committee ISO/TC 61 "Plastics" in collaboration with Technical Committee CEN/TC 249 “Plastics” the secretariat of which is held by SIS.

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of an identical text or by endorsement, at the latest by April 2025, and conflicting national standards shall be withdrawn at the latest by April 2025.

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

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International Standard

ISO 4892-1

Plastics — Methods of exposure to laboratory light sources —

Part 1: General guidance and requirements

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

Partie 1: Lignes directrices générales et exigences

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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).

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This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 6, *Ageing, chemical and environmental resistance*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 249, *Plastics*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This fourth edition cancels and replaces the third edition (ISO 4892-1:2016), which has been technically revised.

The main changes are as follows:

— the definition of file specimen (see 3.2) and weathering reference material (see 3.5) have been clarified and Notes to entry have been added;

— definition and Notes to entry of artificial accelerated weathering (see 3.3) and artificial accelerated irradiation (see 3.4) have been clarified;

— new terms, definitions and Notes to entry have been added for black-panel thermometer (see 3.7), black-standard thermometer (see 3.8), white-panel thermometer (see 3.9), and white-standard thermometer (see 3.10);

— reference to ISO/TR 18486 has been added under 4.2.4;

— calibration requirements have been clarified in 5.1.7, 5.2.8, 5.2.9, 5.3.6;

— requirements regarding black-panel thermometer, black-standard thermometer, white-panel thermometer, and white-standard thermometer in 5.2 and Table 2 have been clarified;

— reference to ISO 23741 has been added in 5.3.1;

— new subclause 7.3 “Sampling for intermediate and final evaluation” has been added;

— requirements for the test report have been updated;

— reference to CIE 85 in Annex C has been updated to CIE 241.

A list of all parts in the ISO 4892 series can be found on the ISO website.

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.

Introduction

Plastics are often used outdoors or in indoor locations where they are exposed to solar radiation or to window-glass-filtered solar radiation for long periods. It is therefore very important to determine the effects of solar radiation, heat, moisture and other climatic stresses on the colour and other properties of plastics. Outdoor exposures to solar radiation and to solar radiation filtered by window glass are described in ISO 877 (all parts)[1]. However, it is often necessary to rapidly determine the effects of radiation, heat and moisture on the physical, chemical and optical properties of plastics with artificial accelerated weathering or artificial accelerated irradiation exposures that use specific laboratory light sources. Exposures in these laboratory devices are conducted under more controlled conditions than found in natural environments and are intended to accelerate eventual polymer degradation and product failures.

Relating results from accelerated weathering or artificial accelerated irradiation exposures to those obtained in actual-use conditions is difficult because of variability in both types of exposure and because laboratory tests never reproduce exactly 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 specific accelerated weathering or artificial accelerated irradiation exposures 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.

International Standard **ISO 4892-1:2024(en)**

Plastics — Methods of exposure to laboratory light sources —

Part 1: General guidance and requirements

1 Scope

This document provides general guidance and requirements relevant to the selection and operation of the methods of exposure described in detail in subsequent parts of the ISO 4892 series. It also specifies general performance requirements for devices used for exposing plastics to laboratory light sources. Information regarding performance requirements is for producers of artificial accelerated weathering or artificial accelerated irradiation devices.

This document also provides information on the interpretation of data from artificial accelerated weathering or artificial accelerated irradiation exposures. More specific information about methods for determining the change in the properties of plastics after exposure and reporting these results is not part of this document.

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

ISO 2818, *Plastics — Preparation of test specimens by machining*

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*

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*

ISO 4892-4, *Plastics — Methods of exposure to laboratory light sources — Part 4: Open-flame carbon-arc lamps*

ISO 9370, *Plastics — Instrumental determination of radiant exposure in weathering tests — General guidance and basic test method*

ASTM G113, *Standard terminology relating to natural and artificial weathering tests of nonmetallic materials*