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Standard

ISO 4892-4

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

Part 4:

Open-flame carbon-arc lamps

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

Partie 4: Lampes à arc au carbone

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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*.

This fourth edition cancels and replaces the third edition (ISO 4892-4:2013), of which it constitutes a minor revision.

The change is as follows:

— reference to CIE 85 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.

Plastics — Methods of exposure to laboratory light sources —

Part 4: Open-flame carbon-arc lamps

1 Scope

This document specifies methods for exposing specimens to open-flame carbon-arc lamps in the presence of moisture to reproduce the weathering effects that occur when materials are exposed in actual end-use environments to global solar radiation, or to window-glass filtered solar radiation.

The specimens are exposed to filtered open-flame carbon-arc light under controlled environmental conditions (temperature, moisture). Various filters are described.

General guidance is given in ISO 4892-1.

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

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3 Terms and definitions

No terms and definitions are listed in this document.

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/>

4 Principle

4.1 Specimens of the materials to be tested are exposed to glass-filtered open-flame carbon-arc light, to heat and to moisture continuously or in repetitive cycles.

4.2 The exposure conditions may be varied by selection of:

- a) the light filter;
- b) the type of exposure to moisture/humidity;
- c) the length of exposure to light and moisture/humidity;
- d) the exposure temperature;

e) the relative lengths of the light and dark periods.

The effect of moisture is usually produced by controlling the humidity of the air or by spraying the test specimens with demineralized/deionized water or by condensation of water vapour on to the surfaces of the specimens.

4.3 The procedure may include measurements of the irradiance and radiant exposure at the surface of the specimens.

4.4 It is recommended that a similar material of known behaviour (a control) be exposed simultaneously with the test specimens to provide a reference standard for comparative purposes.

4.5 Intercomparison of results obtained from specimens exposed in different apparatus should not be made unless an appropriate statistical relationship has been established between the devices for the particular material tested.

5 Apparatus

5.1 Laboratory light source

5.1.1 General

Open-flame carbon-arc light sources typically use three or four pairs of carbon rods, which contain a mixture of rare-earth metal salts and have a surface coating of a metal, such as copper. An electric current is passed between the carbon rods, which burn, giving off ultraviolet, visible and infrared radiation. The pairs of carbon rods are burned in sequence, with one pair burning at any one time. Use the carbon rods recommended by the manufacturer of the apparatus. The radiation reaching the specimens passes through glass filters. Three types of glass filter are used in practice. [Tables 1](#) and [2](#) show the typical relative spectral irradiance for open-flame carbon-arc lamps with daylight and window-glass filters, respectively. When extended-UV filters are used, the relative spectral irradiance shall meet the requirements of [Table 3](#).

5.1.2 Spectral irradiance of open-flame carbon-arc lamps with daylight filters (type 1)

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[Table 1](#) shows typical relative spectral irradiance in the UV wavelength range of an open-flame carbon-arc lamp with daylight filters in order to simulate daylight (see CIE Publication No. 241, CIE-H1).