TECHNICAL REPORT

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Plastics — Parameters comparing the spectral irradiance of a laboratory light source for weathering applications to a reference solar spectral irradiance

Plastiques — Paramètres de comparaison de la distribution spectrale d'une source de lumière de laboratoire pour les applications de vieillissement et d'une distribution spectrale solaire de référence

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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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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.

This document 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/TR 18486:2016), which has been technically revised. The main changes compared to the previous edition are as follows:

— Figures 1, 2 and A.1: the keys and their key descriptions have been corrected;

— the document has been editorially revised.

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.

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Introduction

Laboratory radiation sources generate radiation which is intended to simulate a defined "reference sun" as perfect as possible, where the fitting to the spectral irradiance in the materials sensitive range is most important. So far, the fitting is described verbally only (e.g. standards concerning artificial weathering) and the user decides for himself if the spectral irradiance $E(\lambda)$ indicated by the producer of the laboratory radiation source agrees suitable enough with the "reference sun" for his specific application or, occasionally, the classification describes the fitting to a wanted "reference sun" only insufficiently (e.g. for standard weathering tests).

This document deals with a procedure for the determination of objective factors characterizing the grade of fitting in quantity.

One procedure describes the grade of fitting of a laboratory radiation source to the defined reference sun for specific spectral ranges. A second procedure results in characterizing parameters for the respective wavelength ranges, incorporating known action spectra.

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Plastics — Parameters comparing the spectral irradiance of a laboratory light source for weathering applications to a reference solar spectral irradiance

1 Scope

This document specifies a calculation method which allows calculating a parameter which compares the spectral irradiance of a laboratory radiation source for weathering application to a reference solar spectral irradiance.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
spectral irradiance
E_λ
radiant flux per unit area per wavelength interval

Note 1 to entry: It is measured in watts per square metre per nanometre ($W \cdot m^{-2} \cdot nm^{-1}$).

3.2
action spectrum
description of the spectral efficiency of radiation to produce a particular polymer response (specific property change of a specific polymer) plotted as a function of the wavelength of the radiation

Note 1 to entry: Data of an action spectrum are specific to the polymer but independent from the radiation source, also named spectral sensitivity.

4 Symbols

$E(\lambda)_{ref.}$	spectral irradiance of reference sun ($W \cdot m^{-2} \cdot nm^{-1}$)
$E(\lambda)_{source}$	spectral irradiance of laboratory radiation source ($W \cdot m^{-2} \cdot nm^{-1}$)
$E(\lambda)_{scaled}$	scaled spectral irradiance of laboratory radiation source ($W \cdot m^{-2} \cdot nm^{-1}$)
$s(\lambda)$	action spectrum

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