NSAI Standards

Irish Standard Recommendation
S.R. CEN ISO/TR 18486:2017

Plastics - Parameters comparing the spectral irradiance of a laboratory light source for weathering applications to a reference solar spectral irradiance (ISO/TR 18486:2016)

S.R. CEN ISO/TR 18486:2017

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National Foreword

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TECHNICAL REPORT

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English Version

Plastics - Parameters comparing the spectral irradiance of a laboratory light source for weathering applications to a reference solar spectral irradiance (ISO/TR 18486:2016)

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 (ISO/TR 18486:2016)

This Technical Report was approved by CEN on 3 March 2017. It has been drawn up by the Technical Committee CEN/TC 249.

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European foreword

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TECHNICAL REPORT

ISO/TR 18486

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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

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The committee responsible for this document is ISO/TC 61, *Plastics*, Subcommittee SC 6, *Ageing, chemical and environmental resistance*.

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 has to decide 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 Technical Report 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.

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

1 Scope

This Technical Report 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 Terms and definitions

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

2.1
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 ($W \cdot m^{-2} \cdot nm^{-1}$).

2.2
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.

3 Symbols and abbreviated terms

$E(\lambda)_{ref.}$ 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

4 Significance

Not for all applications of simulated solar radiation (laboratory radiation source) the total sun spectrum is needed. For economic reasons, therefore, it is advisable to simulate only that spectral range being of importance for the respective process or in cases of application where the object's heating has to be observed in close limits, e.g. with biological objects. In this case, both VIS and IR radiation have to be eliminated to a great extent (see Table 1).