BS ISO 2469:2014

BSI Standards Publication

Paper, board and pulps — Measurement of diffuse radiance factor (diffuse reflectance factor)

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National foreword

This British Standard is the UK implementation of ISO 2469:2014. It supersedes BS ISO 2469:2007 which is withdrawn.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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INTERNATIONAL STANDARD

ISO 2469

Fifth edition
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Paper, board and pulps — Measurement of diffuse radiance factor (diffuse reflectance factor)

Papier, carton et pâtes — Mesurage du facteur de luminance énergétique diffuse (facteur de réflectance diffuse)

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Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
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Contents

Page

Foreword ..... **iv**
Introduction ..... **v**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Principle **4**
5 Apparatus **4**
6 Photometric calibration of the instrument and its working standards **4**
6.1 Calibration of the instrument 4
6.2 Calibration of the working standards for its intended use 5
6.3 Use of working standards 5
6.4 Cleaning the working standards 5
7 Sampling **6**
8 Preparation of the test pieces **6**
9 Procedure **6**
9.1 Verification of calibration 6
9.2 Measurement 6
10 Calculation and expression of results **7**
11 Precision **7**
12 Test report **7**
Annex A (normative) **Instruments for the measurement of radiance factor** **8**
Annex B (normative) **Calibration service — Photometric calibration** **11**
Annex C (normative) **Calibration service — UV-adjustment** **13**
Annex D (informative) **Measurement uncertainty** **15**
Annex E (informative) **Radiance and reflectance** **18**
Bibliography **19**

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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. www.iso.org/directives

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The committee responsible for this document is ISO/TC 6, *Paper, board and pulps*.

This fifth edition cancels and replaces the fourth edition (ISO 2469:2007), which has been technically revised.

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Introduction

The radiance factor depends on the conditions of measurement, particularly the spectral and geometric characteristics of the instrument used. The diffuse radiance factor as defined by this International Standard is determined using instruments having the characteristics given in Annex A and calibrated according to the procedure specified in Annex B.

The diffuse radiance factor is the sum of the reflected radiance factor and the luminescent radiance factor, and the luminescent radiance factor of a luminescent (fluorescent) object is dependent on the spectral power distribution of the illumination. If adequately accurate measurements are to be carried out on fluorescent objects, the UV-content of the instrument illumination must therefore be adjusted to produce the same amount of fluorescence for a fluorescent reference standard as the selected CIE illuminant. The preparation of fluorescent reference standards to enable this adjustment to be made is described in Annex C. The use of these fluorescent reference standards is described in detail in the International Standards describing the measurement of the properties of the materials containing fluorescent whitening agents.

The spectral diffuse radiance factor or the weighted diffuse radiance factor applicable to one or several specified wavelength bands is often used to characterize the properties of pulp, paper and board. Examples of diffuse radiance factors associated with specified wavelength bands are the ISO brightness (diffuse blue radiance factor) and the luminance factor.

The diffuse radiance factor or diffuse reflectance factor is also used as the basis for calculating optical properties, such as opacity, colour, whiteness and the Kubelka-Munk scattering and absorption coefficients. These various properties are described in detail in specific International Standards, and for all of these, ISO 2469 is the primary normative reference.

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INTERNATIONAL STANDARD ISO 2469:2014(E)

Paper, board and pulps — Measurement of diffuse radiance factor (diffuse reflectance factor)

1 Scope

This International Standard describes the general procedure for measuring the diffuse radiance factor of all types of pulp, paper and board. More particularly, it specifies in detail in Annex A the characteristics of the equipment to be used for such measurements, and in Annex B the procedures to be used for calibrating that equipment.

This International Standard may be used to measure the diffuse radiance factors and related properties of materials containing fluorescent whitening agents, provided that the UV-content of the instrument illumination has been adjusted to give the same level of fluorescence as a fluorescent reference standard for a selected CIE illuminant, in accordance with the specific International Standard describing the measurement of the property in question.

This International Standard describes in Annex C the preparation of fluorescent reference standards, although the procedures for using these standards are not included, since their use is described in detail in the specific International Standards describing the measurement of the properties of materials containing fluorescent whitening agents.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4094, *Paper, board and pulps — International calibration of testing apparatus — Nomination and acceptance of standardizing and authorized laboratories*

ASTM E308-06, *Standard Practice for Computing the Colors of Objects by Using the CIE System*

3 Terms and definitions

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

NOTE It is intended that these terms and definitions and their symbols be included in ISO/TR 10688, in order to have a single and common reference document for International Standards for measurement of optical properties of paper, board and pulps.

3.1
radiance factor
β
ratio of the radiance of a surface element of a body in the direction delimited by a given cone with its apex at the surface element to that of the perfect reflecting diffuser under the same conditions of illumination

Note 1 to entry: For luminescent (fluorescent) materials, the total radiance factor, β, is the sum of two portions, the reflected radiance factor, β_S, and the luminescent radiance factor, β_L, so that

$$\beta = \beta_S + \beta_L$$

For non-fluorescent materials, the reflected radiance factor, β_S, is numerically equal to the reflectance factor, R.

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