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Paper — Determination of light scattering and absorption coefficients (using Kubelka-Munk theory)

Papier — Détermination des coefficients de diffusion et d'absorption de la lumière (utilisation de la théorie de Kubelka-Munk)



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Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Principle	3
5 Apparatus	3
6 Sampling and conditioning	4
7 Preparation of test pieces	4
8 Procedure	4
9 Calculation of results	5
10 Precision	5
11 Test report	6
Annex A (informative) Spectral characteristics of reflectometers for measuring luminance factor	7
Bibliography	9

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 9416 was prepared by Technical Committee ISO/TC 6, *Paper, board and pulps*.

This second edition cancels and replaces the first edition (ISO 9416:1998), of which it constitutes a technical revision.

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Introduction

The opacity of a paper is dependent on its grammage, but it is also intrinsically dependent on the light-absorption and light-scattering coefficients of the material. These coefficients are calculated from the values of the reflectance factor over a black backing, the intrinsic reflectance factor and the grammage of the sheet.

The calculation of these coefficients requires luminance factor data obtained by measurement under specified conditions. Apart from the optical properties of the sample, the luminance factor depends on the conditions of measurement and particularly on the spectral and geometric characteristics of the instrument used for its determination. This International Standard should therefore be read in conjunction with ISO 2469 and ISO 2471.

NOTE This method is based on a theory developed by Kubelka and Munk. This theory describes scattering and absorption processes with certain approximations and simplifications and can therefore yield questionable results in extreme cases. However, the Kubelka-Munk theory offers a simple method for determining these coefficients with the instrument used for the determination of optical properties of paper and pulps. Moreover, the method based on this theory has been successfully used in practical applications.