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BSI Standards Publication

Paper, board and pulps — Basic terms and equations for optical properties

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National foreword

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

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TECHNICAL REPORT

ISO/TR 10688

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Paper, board and pulps — Basic terms and equations for optical properties

Papiers, cartons et pâtes — Équations et termes de base pour propriétés optiques

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Contents

Page

Foreword

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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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

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

Introduction

International Standards published by ISO/TC 6 for the determination of optical properties include a lot of definitions and formulae which are used to perform optical measurements and calculations on papers and boards.

It is very valuable for the pulp and paper industry utilizing these International Standards to have access to a single document which gathers together all the various formulae required for the calculation of these optical properties. This Technical Report is based on a SCAN-test document first published in 1994 and revised in 2003.

This Technical Report includes not only formulae but also the values of various constants which appear in these formulae. It is particularly valuable to have the various formulae but also these constants standardized and gathered into a single document when new software programs are being developed either by an instrument manufacturer or in an independent laboratory to ensure that exactly the same expressions are used for such calculations in all the laboratories worldwide when measurements are made in accordance with the ISO/TC 6 standards.

TECHNICAL REPORT **ISO/TR 10688:2015(E)**

Paper, board and pulps — Basic terms and equations for optical properties

1 Scope

This Technical Report provides a summary of the formulae used for determining the optical properties of pulp, paper and board. This Technical Report is to be used in conjunction with the particular International Standards for the determination of the desired optical properties.

This Technical Report provides the information necessary for those involved in development of software for computation of optical properties in accordance with current ISO standards.

2 Terms and definitions

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

2.1 Brightness

2.1.1
ISO brightness, R457
diffuse blue reflectance factor, UV level C
intrinsic diffuse radiance (reflectance) factor measured with a reflectometer having the characteristics described in ISO 2469, equipped with a filter or corresponding function having an effective wavelength of 457 nm and a half bandwidth of 44 nm, and adjusted so that the UV content of the irradiation incident upon the test piece corresponds to that of the CIE illuminant C

Note 1 to entry: The filter function is described more fully by the weighting function factors given in ISO 2470-1, Annex A.

[SOURCE: ISO 2470-1:2009, 3.4, modified]

2.1.2
D65 brightness, R457$_{D65}$
diffuse blue reflectance factor, UV level D65
intrinsic diffuse radiance (reflectance) factor measured with a reflectometer having the characteristics described in ISO 2469, equipped with a filter or corresponding function having an effective wavelength of 457 nm and a half-peak bandwidth of 44 nm, and adjusted so that the UV content of the irradiation incident upon the test piece corresponds to that of the CIE standard illuminant D65

Note 1 to entry: The filter function is described more fully by the weighting function factors given in ISO 2470-2, Annex A and Table A.1.

[SOURCE: ISO 2470-2:2008, 3.4, modified]

2.2
CIE colour matching functions
$\bar{R}(\lambda)$
functions in the CIE 1931 standard colorimetric system describing the tristimulus values X, Y, Z for monochromatic colour stimuli of equal radiance and where the wavelength λ is a variable