INTERNATIONAL STANDARD ISO 2471

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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Paper and board — Determination of opacity (paper backing) — Diffuse reflectance method

First edition — 1973-05-15

UDC 676.017

Ref. No. ISO 2471-1973 (E)

Descriptors : paper, paperboards, tests, optical tests, opacity.

Price based on 2 pages

FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up 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.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 2471 was drawn up by Technical Committee ISO/TC 6, *Paper, board and pulps*, and circulated to the Member Bodies in September 1971.

It has been approved by the Member Bodies of the following countries :

Australia	Hungary	Romania
Austria	India	South Africa, Rep. of
Belgium	Iran	Spain
Bulgaria	Israel	Sweden
Canada	Italy	Switzerland
Czechoslovakia	Netherlands	Thailand
Egypt, Arab Rep. of	New Zealand	Turkey
Finland	Norway	United Kingdom
France	Poland	U.S.A.
Germany	Portugal	

No Member Body expressed disapproval of the document.

Printed in Switzerland

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0 INTRODUCTION

The opacity value depends on the principle used for its evaluation, and a method should be chosen which most closely relates to the interpretation to be placed upon the results. This method is applicable when that property of a paper is involved that governs the extent to which one sheet visually obscures printed matter on underlying sheets of similar paper. It should not be confused with methods based on the reduction in a standard contrast by interposition of the paper — opacity (white backing), formerly known as contrast ratio — nor with the assessment of the amount and condition of light penetrating a sheet (transparency or translucency).

Luminous reflectance factors of the paper are needed for calculating the opacity, that is, measurements of reflectance factor made under specified spectral conditions. The reflectance factor depends on the conditions of measurement and particularly the spectral and geometric characteristics of the instrument used for its determination. This International Standard should therefore be read in conjunction with ISO 2469, *Paper, board and pulps — Measurement of diffuse reflectance factor.*

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method for the measurement of the opacity (paper backing) of paper by diffuse reflectance.

It is restricted to white and near-white papers (and boards). Paper or board that has been treated with a fluorescent dyestuff or exhibits significant fluorescence may be measured, but the agreement between values obtained with different instruments may be unsatisfactory and there may be difficulty in assessing the meaning of results.

2 DEFINITIONS

For the purpose of this International Standard the following definitions apply :

2.1 reflectance factor, R : The ratio, expressed as a percentage, of the radiation reflected by a body to that reflected by a perfect reflecting diffuser under the same conditions.

2.2 luminous reflectance factor, R_o : The reflectance factor that corresponds to the attribute of visual sensation by which a single sheet of the paper with a black backing is judged to reflect incident light.

The reflectometer shall have the characteristics given in ISO 2469.

2.3 intrinsic luminous reflectance factor, R_∞ : The luminous reflectance factor of a layer or pad of material thick enough to be opaque.

2.4 opacity (paper backing) : The ratio, expressed as a percentage, of the luminous reflectance factor of a single sheet of the paper with a black backing to the intrinsic luminous reflectance factor of the same sample.

3 APPARATUS

3.1 Reflectometer, in calibration with the reference instrument described in ISO 2469, and equipped for the measurement of luminous reflectance factor.

3.2 Filter that in conjunction with the optical characteristics of the basic instrument gives an overall response equivalent to the CIE tristimulus value Y (CIE 45-15-060)[1] of the CIE 1931 standard colorimetric system (CIE 45-15-040)[1] of the test piece evaluated for the CIE standard illuminant C (CIE 45-15-145)[1].

3.3 Two working standards calibrated against ISO reference standards of level 3 supplied by the authorized laboratory for the purpose of luminous reflectance factor standardization.

Details of the calibration of the working standards together with cleaning precautions and use are given in ISO 2469. Calibrate the working standards by using ISO reference standards of level 3. In each case recently calibrated reference standards intended for the calibration of the instrument for luminous reflectance factor measurements shall be used at suitable intervals to ensure agreement with the reference instrument.

1) C.I.E. (Commission Internationale de l'Éclairage), *International Lighting Vocabulary,* 3rd Edition, for CIE definitions.