
INTERNATIONAL STANDARD



2470

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Paper and board — Measurement of diffuse blue reflectance factor (ISO brightness)

Papier et carton — Mesurage du facteur de réflectance diffuse dans le bleu (degré de blancheur ISO)

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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 2470 was developed 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	India	South Africa, Rep. of
Austria	Iran	Spain
Belgium	Ireland	Sweden
Bulgaria	Israel	Switzerland
Canada	Italy	Thailand
Czechoslovakia	Netherlands	Turkey
Egypt, Arab Rep. of	New Zealand	United Kingdom
Finland	Norway	U.S.A.
France	Poland	U.S.S.R.
Germany	Portugal	
Hungary	Romania	

No member body expressed disapproval of the document.

This second edition, incorporating an annex which was submitted directly to the ISO Council in accordance with clause 6.12.1 of the Directives for the technical work of ISO, cancels and replaces the first edition (ISO 2470-1973).

Paper and board — Measurement of diffuse blue reflectance factor (ISO brightness)

0 INTRODUCTION

The reflectance factor depends on the conditions of measurement, particularly the spectral and geometric characteristics of the instrument used. This International Standard should 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 measuring the diffuse blue reflectance factor (ISO brightness) of paper and board.

This International Standard is confined in its scope 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.

NOTE — Two reflectometers of different makes may both have spectral characteristics giving an effective wavelength of 457 nm although the spectral power distributions of the radiation incident are different. If this difference occurs in the spectral region that excites fluorescent radiation and if this fluorescent radiation is emitted in the spectral region of the measurements (near 450 nm), then different values of brightness can be obtained. Hence, measurements can only be made satisfactorily on samples exhibiting fluorescence if the spectral power distribution of the irradiation in the long wave ultra-violet region is standardized.

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

2.3 diffuse blue reflectance factor (ISO brightness) : The intrinsic reflectance factor measured at an effective wavelength of 457 nm with a reflectometer having specified characteristics as given in ISO 2469.

3 APPARATUS

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

3.2 Filter that in conjunction with the spectral characteristics of the basic instrument gives an overall effective wavelength of $457 \pm 0,5$ nm and a bandwidth at half-height of 44 nm.

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

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 diffuse blue reflectance factor (ISO brightness) of paper and board measurements shall be used at suitable intervals to ensure agreement with the reference instrument.

4 SAMPLING

The sampling procedure will differ according to the purposes for which the measurement is required. It shall be agreed between the parties concerned.

5 PREPARATION OF TEST PIECES

Avoiding watermarks, dirt and obvious defects of the paper, cut rectangular test pieces about 75 mm $\times$ 150 mm. Assemble not less than ten test pieces top side upwards in a pad using, if necessary, a number greater than ten so that the blue reflectance factor remains unchanged if the number is increased. Protect the pad by placing an additional test piece on both top and bottom; avoid contamination and unnecessary exposure to light or heat.

Mark the top test piece in one corner to identify the sample and the top side.

6 PROCEDURE

Check that the correct filters are in the light beams. Remove the protecting sheets from the test piece pad. Without touching the test area, use the procedure appropriate to the instrument, and the working standard, to measure the intrinsic reflectance factor of the top side of the test piece pad. Read and record the value to the nearest 0,1 % reflectance factor. Move the uppermost test piece to the bottom of the pad and determine the blue reflectance factor for the next and similarly for the following test pieces until a total of not less than ten readings has been made.

Turn the pad upside down and repeat the procedure for the other side.

7 EXPRESSION OF RESULTS

Report the mean intrinsic reflectance factor, separately for both sides, as the diffuse blue reflectance factor

(ISC brightness) of the paper or board in per cent to the nearest 0,5 % reflectance factor.

8 TEST REPORT

The test report shall include the following details :

- a) precise identification of the sample;
- b) a reference to this International Standard;
- c) the results and the form in which they are expressed;
- d) any particular points observed in the course of the test;
- e) any departure from this International Standard or any circumstances or influences that may have affected the results.

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