

AS/NZS 1301.464s:2005

ISO 2469:1994

ISO 2469:1994/Cor.1:1998

Australian/New Zealand Standard™

**Methods of test for pulp and paper**

**Method 464s: Equipment for  
measurement of diffuse reflectance  
factor**

AS/NZS 1301.464s:2005



## **AS/NZS 1301.464s:2005**

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee PK-019, Methods of Test for Pulp and Paper. It was approved on behalf of the Council of Standards Australia on 12 May 2005 and on behalf of the Council of Standards New Zealand on 20 May 2005.

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The following are represented on Committee PK-019:

Australian Plantation Products and Paper Industry Council (A3P)  
Appita  
CSIRO Forestry and Forest Products  
National Association of Forest Industries  
New Zealand Forest Research Institute

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# Australian/New Zealand Standard™

## Methods of test for pulp and paper

### Method 464s: Equipment for measurement of diffuse reflectance factor

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## PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee PK-019, Methods of Test for Pulp and Paper.

The objective of this Standard is to specify the equipment for measuring the diffuse reflectance factor of pulp, paper and board and the procedures for calibrating that equipment.

This Standard is identical with and has been reproduced from ISO 2469:1994, *Paper, board and pulps—Measurement of diffuse reflectance factor* and its Technical Corrigendum 1 (1998). The Corrigendum, which is attached at the end of the source text, applies to the footnote on page 4. The title has been changed to reflect more precisely the content of the Standard (the procedure for performing measurements can be found in AS/NZS 1301.462s:2005).

The term ‘normative’ has been used in this Standard to define the application of the annex to which it applies. A ‘normative’ annex is an integral part of a Standard.

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- (a) Its number does not appear on each page of text and its identity is shown only on the cover and title page.
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- (c) A full point should be substituted for a comma when referring to a decimal marker.

The references to International Standards should be replaced by references to the following Australian/New Zealand Standards.

<i>Reference to International Standard</i>		<i>Australian/New Zealand Standard</i>	
ISO		AS	
186	Paper and board—Sampling to determine average quality	1301 1301.417s	Methods of test for pulp and paper Method 417s: Sampling paper, board and pulp for testing
		AS/NZS	
2470	Paper and board—Measurement of diffuse blue reflectance factor (ISO brightness)	1301.462s	Method 462s: Measurement of diffuse blue reflectance factor (ISO brightness) of pulp, paper and paperboard
		AS	
2471	Paper and board—Determination of opacity (paper backing)—Diffuse reflectance method	1301.454s	Method 454s: Determination of opacity (paper backing)—Diffuse reflectance method
		AS/NZS	
3688	Pulps—Preparation of laboratory sheets for the measurement of diffuse blue reflectance factor (ISO brightness)	1301.466s	Method 466s: Preparation of laboratory sheets for the measurement of diffuse blue reflectance factor (ISO brightness)
IEC		AS	
50(845)	International electrotechnical vocabulary—Chapter 845: Lighting	1852 1852.845	International electrotechnical vocabulary Chapter 845: Lighting

## INTRODUCTION

The reflectance factor depends on the conditions of measurement, particularly the spectral and geometric characteristics of the instrument used. The diffuse reflectance factor is determined using instruments having the characteristics given in annex A.

Measurements of reflectance factor need to be made to a high degree of accuracy. The only practical means of achieving this is by calibration using ISO reference standards of level 3 (see 3.6). It is, therefore, essential that a number of laboratories be appointed as standardizing laboratories for the issue of ISO reference standards of level 2 and that a number of laboratories be appointed as authorized laboratories for the issue of ISO reference standards of level 3. These laboratories shall, by the interchange of ISO reference standards of level 2 and level 3 respectively, check their results and agree upon the value to be assigned to these reference standards with respect to the ISO reference standard of level 1. This method is entirely dependent on these arrangements being established and maintained within and between countries.

Since the publication of the first edition of ISO 2469 (ISO 2469:1973), experience has indicated that greater interlaboratory precision can be achieved if this calibration system is more rigorously defined. Such amendments are included in this third edition of ISO 2469.

NOTES

## AUSTRALIAN/NEW ZEALAND STANDARD

### Methods of test for pulp and paper

#### Method 464s:

#### Equipment for measurement of diffuse reflectance factor

### 1 Scope

This International Standard specifies the equipment for measuring the diffuse reflectance factor of pulp, paper and board and the procedures for calibrating that equipment.

Measurements of diffuse reflectance factor are used for the evaluation of optical properties such as diffuse blue reflectance factor (ISO brightness), the scattering coefficient of pulp, opacity, whiteness, luminous reflectance factor, the chromaticity coordinates of paper and the intrinsic reflectance factor of non-fibrous materials. Numerical values optically characterizing the materials are calculated specifically for each property determined.

### 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 186:1994, *Paper and board — Sampling to determine average quality*.

ISO 2470:1977, *Paper and board — Measurement of diffuse blue reflectance factor (ISO brightness)*.

ISO 2471:1977, *Paper and board — Determination of opacity (paper backing) — Diffuse reflectance method*.

ISO 3688:1977, *Pulps — Measurement of diffuse blue reflectance factor (ISO brightness)*.

ISO 4094:1991, *Paper, board and pulps — International calibration of testing apparatus — Nomination and acceptance of standardizing and authorized laboratories*.

IEC 50(845):1987, *International electrotechnical vocabulary — Chapter 845: Lighting*.

ASTM E 308:1990, *Standard Test Method for Computing the Colors of Objects by Using the CIE System*.

### 3 Definitions

For the purposes of this International Standard, the following definitions apply.

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

**3.2 diffuse reflectance factor,  $R$ :** The ratio, expressed as a percentage, of the radiation reflected by a body to that reflected by the perfect reflecting diffuser under the same conditions of diffuse illumination and normal viewing described in this International Standard in an instrument calibrated in accordance with the provisions of this standard.

**3.3 intrinsic reflectance factor,  $R_{\infty}$ :** The reflectance factor of a layer or pad of material thick enough to be opaque, i.e. such that increasing the thickness of the pad by doubling the number of sheets results in no change in the measured reflectance factor.

**3.4 ISO reference standard of level 1; IR 1:** The perfect reflecting diffuser [see IEC 50(845):1987, term No. 845-04-54]. Ideal spectrally uniform isotropic