AS/NZS 1301.436:2014
ISO 2469:2007

AS/NZS 1301.436:2014

Australian/New Zealand Standard™

Methods of test for pulp and paper

Method 436: Measurement of diffuse radiance factor

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The following are represented on Committee PK-019:

Appita
Australian Forest Products Association
Australian Institute of Packaging
HRL Technology
New Zealand Paperboard Packaging Association

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Australian/New Zealand Standard™

Methods of test for pulp and paper

Method 436: Measurement of diffuse radiance 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, to supersede AS/NZS 1301.436s:2005 *Methods of test for pulp and paper*, Method 436s: *Measurement of diffuse reflectance factor*.

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

The reason for the revision is because the method in AS/NZS 1301.436s:2005 was not applicable to testing of materials exhibiting fluorescence.

This Standard is identical with, and has been reproduced from, ISO 2469:2007, *Paper, board and pulps—Measurement of diffuse radiance factor.*

As this Standard is reproduced from an International Standard, the following applies:

(a) In the source text 'this International Standard' should read 'this Australian/New Zealand Standard'.

(b) A full point substitutes for a comma when referring to a decimal marker.

References to International Standards should be replaced by references to Australian or Australian/New Zealand Standards, as follows:

Reference to International Standard		*Australian/New Zealand Standard*	
ISO		AS/NZS	
186	Paper and board—Sampling to determine average quality	1301	Methods of test for pulp and paper
		1301.417	Method 417: Sampling to determine average quality

Only normative references that have been adopted as Australian or Australian/New Zealand Standard have been listed.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the annex to which they apply. A 'normative' annex is an integral part of a Standard, whereas an 'informative' annex is only for information and guidance.

CONTENTS

INTRODUCTION

The radiance factor depends on the conditions of measurement, particularly the spectral and geometric characteristics of the instrument used. The diffuse radiance factor as defined by this International Standard is determined using instruments having the characteristics given in Annex A and calibrated according to the procedure specified in Annex B.

The radiance factor is the sum of the reflected radiance factor and the luminescent radiance factors, and the radiance factor of a luminescent (fluorescent) object is dependent on the spectral power distribution of the illumination. The content of UV radiation in the illumination must therefore be set to a specified level if adequately accurate measurements are to be carried out on fluorescent objects. The preparation of fluorescent reference standards to enable this adjustment to be made is described in Annex C. The use of these fluorescent reference standards is described in detail in the International Standards describing the measurement of the properties of the materials containing fluorescent whitening agents.

The spectral radiance factor or the weighted radiance factor applicable to one or several specified wavelength bands is often used to characterize the properties of pulp, paper and board. Examples of radiance factors associated with specified wavelength bands are the ISO brightness (diffuse blue radiance factor) and the luminance factor.

The radiance factor or reflectance factor is also used as the basis for calculating optical properties, such as opacity, colour, whiteness and the Kubelka-Munk scattering and absorption coefficients. These various properties are specified in specific International Standards, for all of which this International Standard is the primary normative reference.

AUSTRALIAN/NEW ZEALAND STANDARD

Methods of test for pulp and paper

Method 436:
Measurement of diffuse radiance factor

1 Scope

This International Standard describes the general procedure for measuring the diffuse radiance factor of all types of pulp, paper and board. More particularly, it specifies in detail in Annex A the characteristics of the equipment to be used for such measurements, and in Annex B the procedures to be used for calibrating that equipment.

This International Standard may be used to measure the radiance factors and related properties of materials containing fluorescent whitening agents, provided that the UV radiation content in the illumination has been adjusted to the level specified in the specific International Standard describing the measurement of the property in question.

This International Standard describes in Annex C the preparation of fluorescent reference standards, although the procedures for using these standards are not included, since their use is described in detail in the specific International Standards describing the measurement of the properties of materials containing fluorescent whitening agents.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

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

ASTM E308-06, *Standard Practice for Computing the Colors of Objects by Using the CIE System*

3 Terms and definitions

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

3.1
radiance factor
β
ratio of the radiance of a surface element of a body in the direction delimited by a given cone with its apex at the surface element to that of the perfect reflecting diffuser under the same conditions of illumination

NOTE For luminescent (fluorescent) materials, the total radiance factor, β, is the sum of two portions, the reflected radiance factor, β_S, and the luminescent radiance factor, β_L, so that:

$$\beta = \beta_S + \beta_L$$

For non-fluorescent materials, the reflected radiance factor, β_S, is numerically equal to the reflectance factor, R.