AS/NZS 1301.540:2016
ISO 5631-3:2015

AS/NZS 1301.540:2016

Australian/New Zealand Standard™

Methods of test for pulp and paper—Determination of colour by diffuse reflectance

Method 540: Indoor illumination conditions (D50/2°)

STANDARDS Australia

STANDARDS NEW ZEALAND PAEREWA AOTEAROA

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 6 December 2016 and by the New Zealand Standards Approval Board on 9 December 2016.
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The following are represented on Committee PK-019:

Appita
Australian Forest Products Association
Monash University
New Zealand Paper Forum
Scion

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Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

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We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of Standards Australia or the New Zealand Standards Executive at the address shown on the back cover.

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Method 540: Indoor illumination conditions (D50/2°)

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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 provide a method for determining the colour of paper and board by diffuse reflectance under indoor illumination conditions (D50/2°).

This Standard is identical with, and has been reproduced from ISO 5631-3:2015, *Paper and board—Determination of colour by diffuse reflectance*—Part *3: Indoor illumination conditions (D50/2)*.

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

(a) In the source text 'this part of ISO 5631' 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	
		1301	Methods of test for pulp and paper
186	Paper and board—Sampling to determine average quality	1301.417s	Method 417s: Sampling to determine average quality
2469	Paper, board and pulps—Measurement of diffuse radiance factor (diffuse reflectance factor)	1301.510	Method 510: Measurement of diffuse radiance factor (diffuse reflectance factor)

The reference ISO 187 has not been adopted as an Australian/New Zealand Standard. Only normative references that have been adopted as Australian or Australian/New Zealand Standards have been listed.

In Australia and New Zealand the following standards are generally used:

AS/NZS	
1301	Methods of test for pulp and paper
1301.414s:2006	Method 414s: Conditioning of paper for testing
1301.415s:2008	Method 415s: Standard atmosphere for testing paper and board and procedure for monitoring the atmosphere

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 colour of an object can be uniquely characterized by means of a triplet of colour coordinates such as the CIE *X,Y, Z* tristimulus values or the CIELAB 1976 *L*, a*, b** coordinates for a specified CIE illuminant and CIE standard observer.

Apart from the optical properties of the sample, the values of such coordinates depend upon the conditions of measurement, particularly the spectral and geometric characteristics of the instrument used. This part of ISO 5631 should therefore be read in conjunction with ISO 2469.

This part of ISO 5631 describes the measurement and description of colour in terms of the CIE illuminant D50 and the CIE 1931 (2°) standard observer. The method is especially applicable to the comparison of papers in graphic arts situations since these particular illuminant/observer conditions are required by ISO 13655 for the graphic arts industry. It is, however, emphasized that this is only a partial approach to the graphic arts conditions, since ISO 13655 also specifies measurement with a 45:0 or 0:45 geometry of a single sheet over a specified black backing and also requires that the illumination in the light booth be adjusted to CIE illuminant D50 conditions.

The other parts of this International Standard describe measurements and calculations carried out in an analogous manner using either the CIE illuminant C and the CIE 1931 (2°) standard observer (ISO 5631-1) or the CIE standard illuminant D65 and the CIE 1964 (10°) standard observer (ISO 5631-2). The choice of illuminant conditions is important when determining the colour coordinates of white papers containing a fluorescent whitening agent. In ISO 5631-2, the UV content of the illumination is much higher, approximating UV levels encountered in outdoor viewing conditions

AUSTRALIAN/NEW ZEALAND STANDARD

Methods of test for pulp and paper—Determination of colour by diffuse reflectance

Method 540:
Indoor illumination conditions (D50/2°)

1 Scope

This part of ISO 5631 specifies a method for measuring the colour of paper and board by the diffuse reflectance method with the elimination of specular gloss.

This part of ISO 5631 is primarily intended for measuring the colour of paper and board to be used in the graphic arts industry, where that industry specifies the measurement of colour under D50/2° conditions in accordance with ISO 13655. This method differs from ISO 13655, in that the UV content of the illumination is adjusted to a different level.

The method can be used to determine the colour of papers or boards that contain fluorescent whitening agents, provided the UV content of the illumination on the test piece has been adjusted to conform to that in the CIE illuminant C, using a fluorescent reference standard that fulfils the requirements for international fluorescent reference standards of level 3 (FRS3) as prescribed by ISO 2469 with an assigned ISO brightness value (C/2°) provided by an authorized laboratory, as described in ISO 2470-1.

This part of ISO 5631 is not applicable to coloured papers or boards that incorporate fluorescent dyes or pigments.

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 2469, *Paper, board and pulps — Measurement of diffuse radiance factor (diffuse reflectance factor)*

ISO 2470-1, *Paper, board and pulps — Measurement of diffuse blue reflectance factor — Part 1: Indoor daylight conditions (ISO brightness)*

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

CIE Publication 15:2004, *Colorimetry*, 3rd ed

3 Terms and definitions

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