AS/NZS 1301.400:2016
ISO 1974:2012

AS/NZS 1301.400:2016

Australian/New Zealand Standard™

Methods of test for pulp and paper

Method 400: Determination of tearing resistance—Elmendorf method

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 15 September 2016 and by the New Zealand Standards Approval Board on 17 August 2016.
This Standard was published on 18 October 2016.

The following are represented on Committee PK-019:

Appita
Australian Forest Products Association
New Zealand Paper Forum
Scion

Keeping Standards up-to-date

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 Standards may also be withdrawn.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.

Detailed information about Joint Australian/New Zealand Standards can be found by visiting the Standards Web Shop at www.saiglobal.com or Standards New Zealand web site at www.standards.govt.nz and looking up the relevant Standard in the on-line catalogue.

For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

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.

This Standard was issued in draft form for comment as DR AS/NZS 1301.400:2015.

Australian/New Zealand Standard™

Methods of test for pulp and paper

Method 400: Determination of tearing resistance—Elmendorf method

Originally in Australia as AS P1.P400m—1962.
Originated in New Zealand as Appita P400s:1955.
Jointly revised and redesignated as AS/NZS 1301.400s:1998.
Jointly revised and redesignated as AS/NZS 1301.400:2016.

Jointly published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001 and by Standards New Zealand, PO Box 1473, Wellington 6011.

ISBN 978 1 76035 575 3

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 1301.400s:1998 *Methods of test for pulp and paper* Part 400s: *Tearing resistance of paper.*

The objective of this Standard is to provide a method for those concerned with determining the tearing resistance of paper.

This Standard is identical with, and has been reproduced from ISO 1974:2012, *Paper—Determination of tearing resistance—Elmendorf method.*

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
		1301.417s	Method 417s: Sampling to determine average quality
536	Paper and board—Determination of grammage	1301.405s	Part 405s: Grammage of non-creped paper and board

The normative reference ISO 187 has not been adopted as an Australian/New Zealand Standard.

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

AS/NZS 1301.414s:2006, *Methods of test for pulp and paper*, Method 414s: *Conditioning of paper for testing*.

AS/NZS 1301.415s:2008, *Methods of test for pulp and paper*, 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

NOTES

AUSTRALIAN/NEW ZEALAND STANDARD

Methods of test for pulp and paper

Method 400:
Determination of tearing resistance—Elmendorf method

1 Scope

This International Standard specifies a method for determining the (out-of-plane) tearing resistance of paper. It can also be used for boards having a low grammage if the tearing resistance is within the range of the instrument.

This International Standard does not apply to corrugated fibreboard, but it may be applied to the components of such boards. It is not suitable for determining the cross-direction tearing resistance of highly directional papers (or boards).

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 187, *Paper, board and pulps — Standard atmosphere for conditioning and testing and procedure for monitoring the atmosphere and conditioning of samples*

ISO 536, *Paper and board — Determination of grammage*

3 Terms and definitions

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

3.1
tearing resistance
mean force per sheet required to continue the tearing started by an initial cut in the test piece

NOTE 1 If the initial cut is in the machine direction, the result is given as the machine-direction tearing resistance; similarly, if the initial cut is in the cross-direction, the result is given as the cross-direction tearing resistance.

NOTE 2 The tearing resistance is expressed in millinewtons (mN).

3.2
tear index
tearing resistance of the paper (or board) divided by its grammage

NOTE The tear index is expressed in millinewton square metres per gram ($mN \cdot m^2/g$).

3.3
test piece
pack of four rectangular sheets of the same size

NOTE The dimensions depend on the design of the apparatus clamp used (see Clause 8).

4 Principle

An initial cut is made in a test piece (of four superimposed sheets), which is then torn out-of-plane through a given distance along one single tear line using a pendulum. The work done in tearing the test piece is measured as the loss in energy of the pendulum.

The mean tearing force of a single sheet is calculated by dividing the work done by the distance torn and the number of sheets in a test piece.