

Australian/New Zealand Standard™

Methods of test for pulp and paper

Method 447: Determination of air permeance (medium range)—Sheffield method



AS/NZS 1301.447:2016

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 19 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 Standards may also be withdrawn.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.

Australian/New Zealand Standard™

Methods of test for pulp and paper

Method 447: Determination of air permeance (medium range)—Sheffield method

Originated in Australia as AS 1301.P447s—1984.
Originated in New Zealand as NZS/AS 1301.P447s:1984.
Previous edition AS/NZS 1301.447s:1998.
Jointly revised and redesignated as AS/NZS 1301.447:2016.

COPYRIGHT

© ISO 2016 – All rights reserved

© Standards Australia Limited/Standards New Zealand

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968 (Australia) or the Copyright Act 1994 (New Zealand).

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.

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 1301.447s:1998, *Methods of test for pulp and paper*, Method 447s: *Sheffield air permeance of paper and board* (reconfirmed 2013).

The objective of this Standard is to provide a method for determining the air permeance of paper and board by means of the Sheffield air permeance instrument.

This Standard is identical with, and has been reproduced from ISO 5636-4:2013, *Paper and board—Determination of air permeance (medium range)*, Part 4: *Sheffield method*.

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

- (a) In the source text ‘this part of ISO 5636’ 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:

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

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*, Methods 414s: *Conditioning of paper for testing*.

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

1	Scope	1
2	Normative references	1
3	Terms and definitions	1
4	Principle	1
5	Apparatus	2
6	Sampling	3
7	Conditioning	3
8	Preparation of test pieces	3
9	Calibration	4
	9.1 Variable-area flow-measuring device.....	4
	9.2 Electronic flow-measuring device.....	4
10	Procedure	4
11	Expression of results	4
	11.1 Calculation of air permeance.....	4
	11.2 Reporting the results.....	5
	11.3 Standard deviation and coefficient of variation.....	5
12	Test report	5
	Annex A (normative) Calibration of flowmeters	6
	Annex B (informative) Conversion of Sheffield units (SU) to SI units	10
	Annex C (informative) Precision data	11
	Bibliography	13

NOTES

AUSTRALIAN/NEW ZEALAND STANDARD

Methods of test for pulp and paper

Method 447:

Determination of air permeance (medium range)—Sheffield method

1 Scope

This part of ISO 5636 specifies the Sheffield method for determining the air permeance of paper and board using the Sheffield apparatus.

It is applicable to papers and boards which have air permeances between 0,02 $\mu\text{m}/(\text{Pa}\cdot\text{s})$ and 25 $\mu\text{m}/(\text{Pa}\cdot\text{s})$ when tested with the Sheffield apparatus.

It is unsuitable for rough-surfaced materials, which cannot be securely clamped to avoid leakage.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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*

3 Terms and definitions

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

3.1**air permeance**

mean air flow rate through unit area under unit pressure difference in unit time, under specified conditions

Note 1 to entry: Air permeance is expressed in micrometres per pascal second [$1 \text{ ml}/(\text{m}^2\cdot\text{Pa}\cdot\text{s}) = 1 \mu\text{m}/(\text{Pa}\cdot\text{s})$].

Note 2 to entry: This property is called air permeance, and not air permeability, because it is reported as a sheet property and is not standardized with respect to thickness to give a material property per unit thickness.

Note 3 to entry: The Sheffield unit is not defined, since it has been shown that the scale units (Sheffield units) on different types of Sheffield instruments can correspond to different air flows, and there is no precise physical definition. This part of ISO 5636 requires that the flowmeters be calibrated to give a flow rate in millilitres per minute.

4 Principle

A test piece is clamped between two rubber orifice plates of known dimensions. The absolute air pressure on one side of the test piece is equivalent to atmospheric pressure and the difference in pressure between the two sides of the piece is maintained at a small, substantially constant, value. The air flow rate through the test area is determined and the air permeance is calculated.