

STANDARDS AUSTRALIA

RECONFIRMATION

OF

AS 2001.2.34—1990

Methods of test for textiles

Method 2.34: Physical tests—Determination of permeability of fabrics to air

RECONFIRMATION NOTICE

Technical Committee TX-020 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

Certain documents referenced in the publication may have been amended since the original date of publication. Users are advised to ensure that they are using the latest versions of such documents as appropriate, unless advised otherwise in this Reconfirmation Notice.

Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 6 July 2016.

The following are represented on Technical Committee TX-020:

Ag Research
Australian Wool Processors Council
AWTA Textile Testing
Council of Textile and Fashion Industries of Australia
Drycleaning Institute of Australia
National Association of Testing Authorities Australia
RMIT University
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NOTES

Methods of test for textiles

Method 2.34: Physical tests— Determination of permeability of fabrics to air

PREFACE

This Standard was prepared by the Standards Australia Committee on Testing of Textiles under the direction of the Textile Standards Board.

This Standard is based on the work of a technical committee of the International Organization for Standardization (ISO/TC 38, Textiles), BS 5636—1978, *Method of test for the determination of the permeability of fabrics to air* and ASTM D 737—1975, *Test method for air permeability of textile fabrics*, and has been adapted to suit Australian requirements.

FOREWORD

This Standard allows alternative orifice sizes and pressure drops to be utilized, depending on the test equipment available and its ability to register a result within its capacity.

Comparison of results using different pressure drops is not valid. Interlaboratory trials conducted in Australia* indicate that the coefficient of variation of individual results on a sample is lower for larger orifice sizes. Comparison of results at different orifice sizes may be valid provided the same pressure drop has been used.

Air permeability is an important factor in the performance of fabrics for special purposes, such as industrial filters, tentage, sailcloth, parachutes, raincoat materials, shirtings, primary covers for continental quilts and pillows, acoustical absorbents and coated fabrics. In filtration, for example, air permeability is directly related to efficiency (the pressure difference between the surfaces of a filter in use). Air permeability can also be used to provide an indication of the 'breathability' of weather and rainproof fabrics, or of coated fabrics in general.

Constructional factors and finishing techniques can have an appreciable effect upon air permeability by causing a change in the length of air flow paths through a fabric.

METHOD

1 SCOPE. This Standard sets out a method for measuring the resistance of a fabric to the passage of air through it. It is applicable to most textile fabrics that are permeable to air.

2 REFERENCED DOCUMENTS. The following documents are referred to in this Standard:

AS	
1199	Sampling procedures and tables for inspection by attributes
2001	Methods of test for textiles
2001.1	Method 1: Conditioning procedures

* CSIRO Technical Report No G68 (1990). Copies available on application to CSIRO, Division of Wool Technology, Geelong.

PRINCIPLE. The rate of air flow through a known area of fabric is adjusted to secure a prescribed pressure differential between the two fabric surfaces in the test area and, from this rate of flow, the air permeability of the fabric is determined.

DEFINITIONS. For the purpose of this Standard, the definition below applies.

1 **Rate of air flow**—the rate of air flow per unit area through a fabric at a differential pressure between the two fabric surfaces.

APPARATUS.

1 **Apparatus**. An air permeability apparatus which contains the following is required:

- Means for clamping the test specimen securely without distortion.
- Guard ring, or similar device, to prevent all leakage of air from the edges of the test area. Alternatively, suitable clamps may be used.
- Pressure gauge or manometer connected to the test head to indicate a pressure drop across the specimen in the range 0 mm to 30 mmH₂O or 0 Pa to 300 Pa, with an accuracy of $\pm 2\%$.
- Means for drawing a steady flow of air at controlled temperature and humidity through the specimen holder, and for adjusting the rate to produce a specified pressure drop in the range 0 mm to 30 mmH₂O or 0 Pa to 300 Pa.
- Depending on machine type, means of measuring the rate of air flow, or the pressure difference, with an accuracy of $\pm 2\%$. Flowmeters, where used, shall be capable of being operated independently of one another.

2 **Controlled atmosphere**. Means of providing and maintaining a standard test atmosphere in accordance with AS 2001.1.

SAMPLE AND TEST SPECIMENS.

1 **Handling**. Care should be taken to ensure that the operator's hands are dry. Excessive handling of the sample and test specimens should be avoided.

2 **Sampling**. A lot sample shall be selected in accordance with the relevant material specification.

2.1 **Lot sample**. A lot sample shall be selected in accordance with the relevant material specification.

Where there is no material specification, the sample shall be selected using a sampling plan determined in accordance with AS 1199.

NOTE: To provide a sampling plan with a meaningful producer's risk and consumer's risk, an adequate specification needs to take into account the variability between rolls of fabric, and between specimens from a sample taken from a roll of fabric.

2.2 **Sample**. A sample shall be taken from the outside of each roll of fabric in the lot sample, after first discarding all fabric that contains creases fold marks, delamination and disturbed weave.

3 **Conditioning**. The fabric sample shall be conditioned in accordance with AS 2001.1. Where appropriate, test specimens shall be prepared from the sample, and subsequent testing conducted without removal from the standard atmosphere.

4 **Tests**.

4.1 **Number of tests**.

NOTE: The number of tests to be carried out depends on the precision required, and on the variability of the air permeability in the fabric sample.

Experience has shown that —

- for an orifice of 5 cm² in area, the coefficient of variation (V) is about 10% to 15% (except for nonwovens) and
- for an orifice of 38.5 cm² in area, the coefficient of variation (V) is about 3% to 6% (except for nonwovens).

It is common practice to accept a precision of measurement of air permeability where the limit of error (e) is 5% of the mean value at the 95% confidence level.

For a woven sample, the number of test specimens required is as follows:

- Where the coefficient of variation, $V \leq 5\%$ 6
- Where the coefficient of variation, $V \leq 10\%$ 18

For a nonwoven sample it is recommended that 20 test specimens be tested and the coefficient of variation be calculated along with the limit of error of the mean. (See Appendix A for equations, and Figures A1 and A2 for graphs of relationships between number of specimens and coefficient of variation.)