
**Rubber- or plastics-coated fabrics —
Measurement of gas permeability**

*Supports textiles revêtus de caoutchouc ou de plastique — Mesure de
la perméabilité aux gaz*



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Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Principle	1
5 Test pieces	2
5.1 Shape and dimensions	2
5.2 Measurement of thickness	2
5.3 Number of test pieces	2
5.4 Sealing and masking	2
5.5 Conditioning	3
5.6 Test atmosphere	4
5.7 Gas transmission area	4
6 Pressure sensor method	4
6.1 Apparatus	4
6.2 Test gas	5
6.3 Procedure	6
6.4 Calculation and expression of results	7
6.4.1 Gas transmission rate	7
6.4.2 Gas permeability coefficient	8
7 Gas chromatography method	8
7.1 Apparatus	8
7.2 Test gas	10
7.3 Carrier gas	10
7.4 Calibration curve	10
7.5 Procedure	10
7.6 Calculation and expression of results	11
7.6.1 Gas transmission rate	11
7.6.2 Gas permeability coefficient	11
8 Test report	12
Annex A (informative) Gas chromatography method with equal pressure condition	13

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 4, *Products (other than hoses)*.

This second edition cancels and replaces the first edition (ISO 7229:1997), which has been technically revised.

Introduction

The measurement of the permeability of rubber-or plastics-coated fabrics to gases is important in the evaluation of materials for products such as leisure boats, balloons or hoses, and other gas containers in addition to the materials for seals and diaphragms. The permeability of the material is crucial when a product is exposed to differential pressure conditioned environment in its service field.

Rubber- or plastics-coated fabrics — Measurement of gas permeability

WARNING — Persons using this document should be familiar with normal laboratory practice. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any national regulatory conditions.

1 Scope

This International Standard specifies two methods for measuring gas transmission through rubber- or plastics-coated fabrics, a property known as permeability.

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 2231, *Rubber- or plastics-coated fabrics — Standard atmospheres for conditioning and testing*

ISO 2286-3, *Rubber- or plastics-coated fabrics — Determination of roll characteristics — Part 3: Methods for determination of thickness*

3 Terms and definitions

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

3.1

gas transmission rate

volume of test gas passing through a test piece per unit area, per unit time with unit partial-pressure difference between the two sides of the test piece

3.2

gas permeability coefficient

volume of test gas passing through a test piece of unit thickness, per unit area, per unit time with unit partial-pressure difference between the two sides of the test piece

3.3

gas transmission curve

in the pressure sensor method, curve plotted against time, of the pressure change on the low pressure side of the test cell until gas transmission reaches a steady state after starting the test

Note 1 to entry: See [Figure 3](#).

4 Principle

A test piece is placed between two parts of a hermetically sealed measurement cell. Each part of the cell is vacuumed, then one part is filled with test gas to a certain pressure level. The quantity of gas that permeates through the test piece to the lower pressure side is measured and determined by a pressure sensor or by a gas chromatograph. In the gas chromatography method, measurement condition using equal pressure between two parts of the cell divided by the test piece is given for information in [Annex A](#).

5 Test pieces

5.1 Shape and dimensions

The test piece shall be of uniform shape and have a thickness of more than 0,10 mm and less than 4,00 mm. When using test pieces other than this, the thickness shall be agreed between the interested parties. The test piece shall be large enough to cover the full area of the test cell.

5.2 Measurement of thickness

Measure the thickness of the test piece at five or more points including the centre part of the gas transmission area to the nearest 0,01 mm in accordance with ISO 2286-3 and take the arithmetic mean.

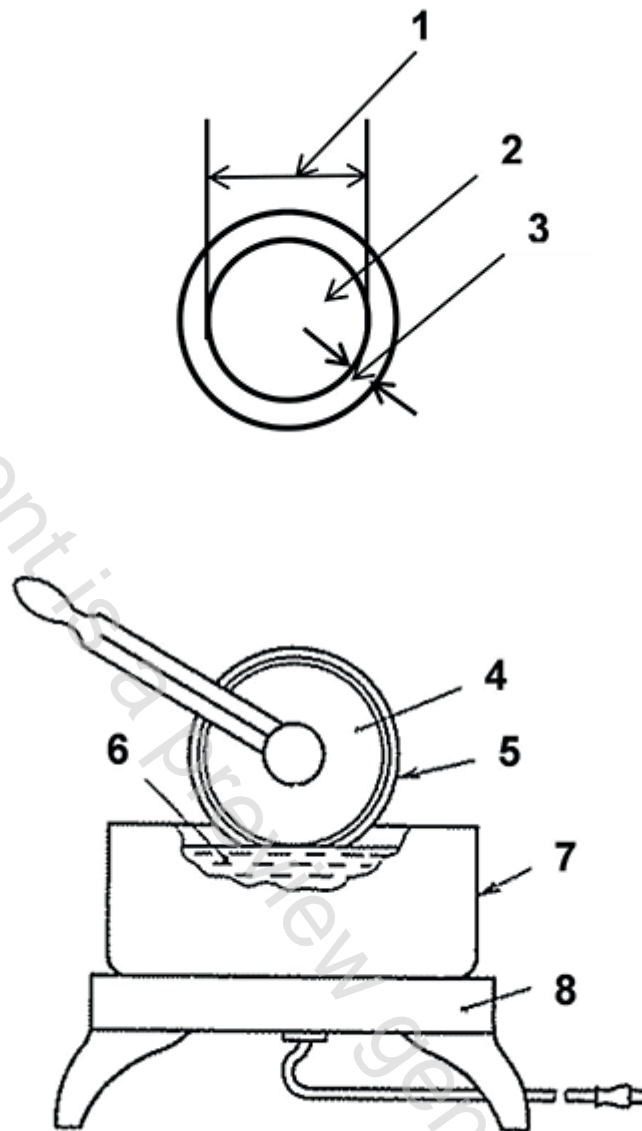
5.3 Number of test pieces

Three or more test pieces shall be used.

5.4 Sealing and masking

A substrate generally passes gas much more easily than coating materials, and even after the test piece is fixed in the cell, the test gas permeated through the coating material may leak out of the cell through the substrate. Cross section cut at the edge around the test piece shall be sealed or masked with wax or a solid type of adhesive which shall not cause any crack nor affect the gas permeability of the test piece during the test.

When a test piece of single-faced coated fabric is used, the surface of the fabric substrate outside the gas permeability measurement area shall be masked besides the edge as shown in [Figure 1](#).

**Key**

- | | | | |
|---|-------------------------------------|---|------------------|
| 1 | 10 mm – 150 mm (see 6.1.1) | 5 | test piece |
| 2 | gas transmission area A (see 5.7) | 6 | wax or adhesives |
| 3 | sealing and masking zone | 7 | vessel |
| 4 | plate to support for test piece | 8 | heater |

Figure 1 — Example of the sealing and masking equipment

5.5 Conditioning

The minimum time between vulcanization and commencement of conditioning of test pieces shall be 16 h.

Unless otherwise required in the material specification, the material shall be conditioned before testing for 16 h to 24 h using method of conditioning “1” specified in ISO 2231. When using a test piece that can