

Methods of testing

Plastics —

Part 8: Other properties —

Method 820A: Determination of water vapour transmission rate (dish method)

IMPORTANT NOTE. Before reading this method it is essential to read BS 2782-0 *Introduction* issued separately

ICS 85.080

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee PAI/11, Methods of test for paper, board and pulp, upon which the following bodies were represented:

- The British Apparel and Textile Confederation
- The British Carton Association
- The British Fibreboard Packaging Association
- The British Printing Industry Federation
- The Envelope Makers’ and Manufacturing Stationers’ Association
- Her Majesty’s Stationery Office
- The Institute of Paper Conservation
- Ministry of Defence
- The Paper Federation of Great Britain
- PIRA International
- UMIST

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National foreword

This British Standard has been prepared by Technical Committee PAI/11 and is identical to ISO 2528:1995 *Sheet materials — Determination of water vapour transmission rate — Gravimetric (dish) method*, published by the International Organization for Standardization (ISO). It supersedes BS 2782-8:Method 820A:1992 which is withdrawn.

Cross-references

Publication referred to	Corresponding British Standard
ISO 187:1990	BS EN 20187:1993 <i>Paper, board and pulps. Standard atmosphere for conditioning and testing and procedure for monitoring the atmosphere and conditioning of samples</i> (Identical)
ISO 471:1995	BS 903 <i>Physical testing of rubber</i> Part A35:1995 <i>Temperatures, humidities and times for conditioning and testing of test pieces</i> (Identical)
ISO 2231:1989	BS 3424 <i>Testing coated fabrics</i> Part 2:1992 <i>Method 4 — Pre-conditioning and conditioning of coated fabrics for testing purposes</i> (Identical)
ISO 9932:1990	BS 7406:1991 <i>Methods for determination of water vapour transmission rate of sheet materials (paper and board) by dynamic sweep and static gas methods</i> (Identical)

The Technical Committee has reviewed the provisions of ISO 186:1994, ISO 209-1:1989, ISO 291:1977 and ISO 2233:1994 to which reference is made in the text, and has decided that they are acceptable for use in conjunction with this standard.

ISO 291:1977 is related to BS 2782-0:1992 *Methods of testing plastics* Part 0 *Introduction*.

ISO 186:1986 is shortly due to be published as BS EN ISO 186.

ISO 2233:1994 is shortly due to be published as BS EN ISO 22233.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 10, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Introduction

This international standard describes a method which can in theory be applied to any sheet material. In practice its main use is for flat, usually thin, materials that can be processed to form a vapour-resistant barrier, as used in packaging, such as paper, board, plastics films or laminates of paper with films or metal foils, and for fabrics coated with rubber or plastics.

The water vapour pressure differential is the essential part of this test and in this instance it has not been possible to adopt the conditions recommended in ISO 554. In addition, the limits of temperature and humidity control are more exacting than those required for normal testing.

This test is intended to give reliable values of WVTR by means of simple apparatus. The use of the results of any particular application must, however, be based upon experience.

Transmission rate is not a linear function of temperature nor, generally, of relative humidity difference. A determination carried out under certain conditions is not, therefore, necessarily comparable with one carried out under other conditions. The conditions of test should, therefore, be chosen to be as close as possible to the conditions of use.

1 Scope

This International Standard specifies a method for the determination of the water vapour transmission rate (often erroneously called “permeability”) of sheet materials.

This method is not generally recommended for use if the transmission rate is expected to be less than $1 \text{ g}/(\text{m}^2 \text{ d})$ or for materials thicker than 3 mm. In such cases the method specified in ISO 9932 is preferred.

The method cannot be applied to film materials that are damaged by hot wax or that shrink to an appreciable extent under the test conditions used.

For some purposes it may be necessary to determine the transmission rate of creased material; a procedure for this is given in Annex A.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards. ISO 186:1994, *Paper and board — Sampling to determine average quality*.

ISO 187:1990, *Paper, board and pulps — Standard atmosphere for conditioning and testing and procedure for monitoring the atmosphere and conditioning of samples*.

ISO 209-1:1989, *Wrought aluminium and aluminium alloys — Chemical composition and forms of products — Part 1: Chemical composition*.

ISO 291:1977, *Plastics — Standard atmospheres for conditioning and testing*.

ISO 471:1995, *Rubber — Temperatures, humidities and times for conditioning and testing*.

ISO 2231:1989, *Rubber- or plastics-coated fabrics — Standard atmospheres for conditioning and testing*.

ISO 2233:1994, *Packaging — Complete, filled transport packages — Conditioning for testing*.

ISO 9932:1990, *Paper and board — Determination of water vapour transmission rate of sheet materials — Dynamic sweep and static gas methods*.

3 Definition

For the purposes of this International Standard, the following definition applies.

3.1

water vapour transmission rate (WVTR)

mass of water vapour transmitted through a unit area in a unit time under specified conditions of temperature and humidity

it is expressed in grams per square metre per 24 h $[\text{g}/(\text{m}^2 \text{ d})]$

NOTE 1 The WVTR depends upon the thickness, composition and permeability of the constituent material or materials and upon the conditions of temperature and relative humidity under which the test is carried out (see Annex B).

4 Principle

Dishes containing a desiccant and closed by the material to be tested are placed in a controlled atmosphere (see Annex B).