

INTERNATIONAL STANDARD

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Paper and board — Determination of water vapour transmission rate of sheet materials — Dynamic sweep and static gas methods

*Papier et carton — Détermination du coefficient de transmission de la
vapeur d'eau des matériaux en feuille — Méthode dynamique par
balayage de gaz et méthode statique*



Reference number
ISO 9932:1990(E)

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 9932 was prepared by Technical Committee ISO/TC 6, *Paper, board and pulps*.

Annexes A and B form an integral part of this International Standard. Annex C is for information only.

Introduction

The rate of water vapour penetration through a barrier is an important property in many applications, for example, in building and in packaging. ISO 2528 describes a dish method for the determination of the transmission rate and this method has wide acceptance. It does, however, have three disadvantages. Results take several days to obtain, it is not suitable for transmission rates less than $1 \text{ g}/(\text{m}^2 \cdot \text{d})$, and it is not recommended for materials thicker than 3 mm.

The methods described in this International Standard can, depending on the material being tested, produce results in a matter of hours and are suitable for materials with transmission rates considerably less than $1 \text{ g}/(\text{m}^2 \cdot \text{d})$. Depending on the specific apparatus, they are also suitable for materials up to 38 mm thick.

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Paper and board — Determination of water vapour transmission rate of sheet materials — Dynamic sweep and static gas methods

1 Scope

This International Standard describes general test methods for determining the water vapour transmission rate of sheet materials by means of a dynamic gas method or a static gas method. Depending on the method and specific apparatus employed, materials up to 38 mm thick and with water vapour transmission rates in the range 0,05 g/(m² · d) to 65 g/(m² · d) can be tested. The basis of the function of the instrumental techniques is briefly described. Advice on calibration is given in annex B.

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 186:1985, *Paper and board — Sampling to determine average quality*.

ISO 187:1977, *Paper and board — Conditioning of samples*.

ISO 2528:1974, *Sheet materials — Determination of water vapour transmission rate — Dish method*.

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 water vapour transmission rate: The mass of water vapour transmitted through unit area in unit time under specified conditions of temperature and humidity. It is expressed in grams per square metre per 24 h [g/(m² · d)].

3.2 dry side: That side of the test cell which is exposed to low humidity.

3.3 wet side: That side of the test cell which is exposed to high humidity.

4 Method A: Dynamic sweep gas method

4.1 Principle

The test piece is mounted between two chambers, one at a known relative humidity and the other swept by a dry gas. The amount of water vapour picked up by the dry gas stream is detected by an electrical sensor and converted to a reading which directly, or after calculation, is a measure of the rate of water vapour transmission through the test piece.

4.2 Apparatus¹⁾

4.2.1 Test cell, designed to clamp a test piece having a defined area, between two chambers, one swept by a dry gas (the dry side) and the other containing an atmosphere of high relative humidity (the wet side) (see figure 1).

1) The EPS digital WVTR meter and the Permatron W-series are examples of suitable instruments available commercially. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by ISO of these instruments.