



# SLOVENSKI STANDARD

## SIST ISO 2965:2014

01-januar-2014

Nadomešča:  
SIST ISO 2965:1998

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**Materiali, uporabljeni kot cigaretni papirji, zunanji in notranji cigaretni papirji, ki ovijajo filter, ter materiali z različno zračno prepustnostjo - Določevanje zračne prepustnosti**

Materials used as cigarette papers, filter plug wrap and filter joining paper, including materials having a discrete or oriented permeable zone and materials with bands of differing permeability - Determination of air permeability

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Matériaux utilisés comme papier à cigarettes, pour le gainage des filtres et comme papier manchette, y compris les matériaux possédant une zone perméable discrète ou orientée et les matériaux à bandes de perméabilité diverses - Détermination de la perméabilité à l'air

**Ta slovenski standard je istoveten z: ISO 2965:2009**

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**ICS:**

|        |                                  |                                                 |
|--------|----------------------------------|-------------------------------------------------|
| 65.160 | Tobak, tobačni izdelki in oprema | Tobacco, tobacco products and related equipment |
|--------|----------------------------------|-------------------------------------------------|

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**en,fr**

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**ISO 2965:2009(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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 2965 was prepared by Technical Committee ISO/TC 126, *Tobacco and tobacco products*, Subcommittee SC 1, *Physical and dimensional tests*.

This third edition cancels and replaces the second edition (ISO 2965:1997) which has been technically revised.

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## Introduction

Measurements of air permeability of materials used as cigarette papers have been made for many years. The methods have required development and change because of the changing nature of the paper products and changes in the magnitude of their air permeability.

This method has been developed with the technical resources of CORESTA (Cooperative Centre for Research Relative to Tobacco).

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# Materials used as cigarette papers, filter plug wrap and filter joining paper, including materials having a discrete or oriented permeable zone and materials with bands of differing permeability — Determination of air permeability

## 1 Scope

This International Standard specifies a method for the determination of air permeability (AP).

It is applicable to materials used as cigarette papers, filter plug wrap and filter joining paper, including materials having an oriented permeable zone or discrete permeable zones where the measured permeability is in excess of  $10 \text{ cm}^3 \cdot (\text{min}^{-1} \cdot \text{cm}^{-2})$  at 1 kPa. In addition, it is applicable to banded cigarette papers, with bands of width  $\geq 4 \text{ mm}$ .

NOTE For an estimate of the air permeability of materials outside the scope of this International Standard, see Note 2 in 5.1.2 and Note 3 in 7.6.1.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

ISO 3402, *Tobacco and tobacco products — Atmosphere for conditioning and testing*

## 3 Terms and definitions

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

### 3.1

#### air permeability

##### AP

flow of air, measured in cubic centimetres per minute, passing through  $1 \text{ cm}^2$  surface of the test piece at a measuring pressure of 1,00 kPa

NOTE The air permeability units are  $\text{cm}^3 \cdot (\text{min}^{-1} \cdot \text{cm}^{-2})$  at 1 kPa.

### 3.2

#### measuring pressure

difference in pressure across the two faces of the test piece during the measurement

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**3.3 leakage**  
air flow unintentionally aspirated from the surrounding atmosphere or escaping into it through the sealing surface of the test piece holder and elsewhere

**3.4 paper with uniformly distributed permeability standard paper**  
paper with natural air permeability only

**3.5 paper with oriented permeable zone**  
paper that has a continuous zone of higher air permeability obtained through perforation

**3.6 paper with discrete permeable zone**  
paper that has higher air permeability obtained through perforation in discrete areas

**3.7 banded paper**  
paper with bands of different air permeability

NOTE Papers of this type normally have bands with permeability significantly lower than that of the base paper.

**3.8 special paper**  
paper with modified air permeability

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NOTE Papers of this type include those defined in paragraphs 3.5, 3.6 and 3.7.

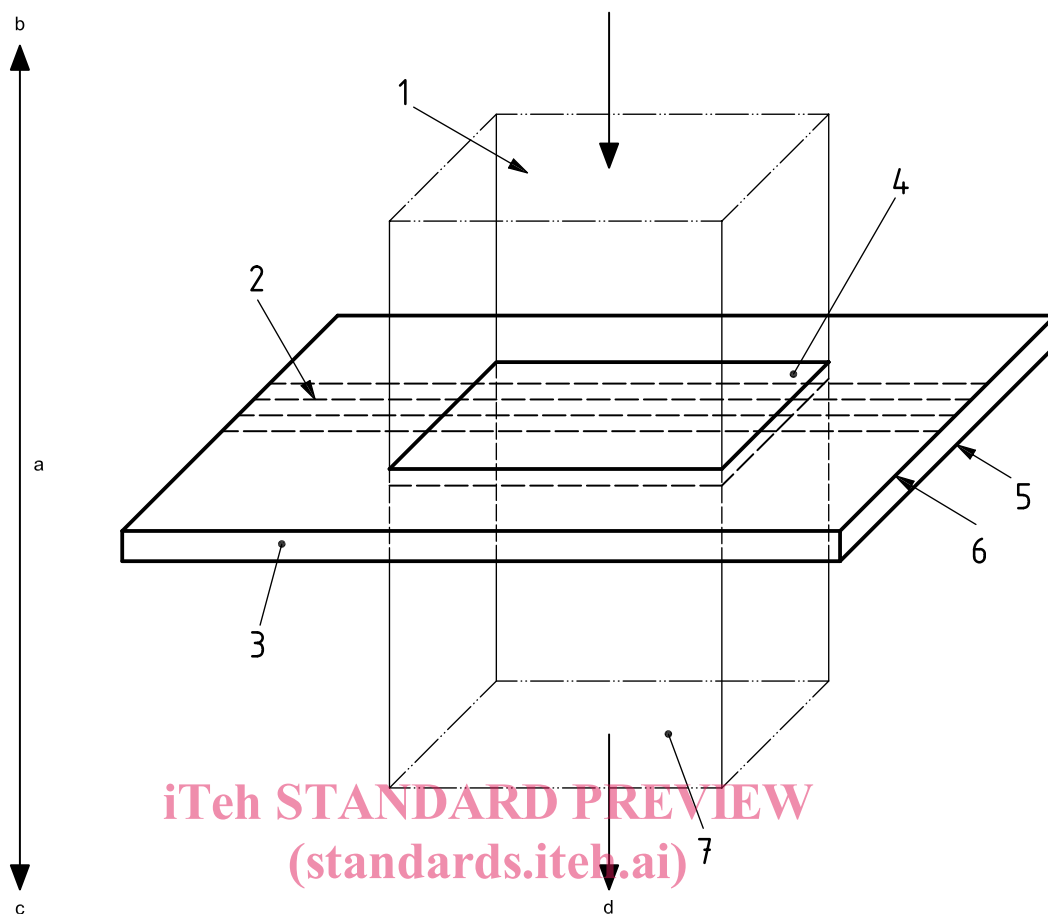
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**4 Principle**

A test piece is held in a suitable device. A pressure difference is applied across the test piece. The resultant flow of air through the test piece is measured.

The principle of measurement is illustrated in Figure 1.



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#### Key

- |   |                                           |   |                        |
|---|-------------------------------------------|---|------------------------|
| 1 | air stream                                | 5 | inner surface          |
| 2 | perforated zone (if present)              | 6 | outer surface          |
| 3 | test piece                                | 7 | air stream             |
| 4 | test surface of area (2 cm <sup>2</sup> ) |   |                        |
| a | Pressure difference.                      | c | Low pressure.          |
| b | High pressure.                            | d | Direction of air flow. |

**Figure 1 — Principle of measurement**

The air flow through the test piece may be produced by applying a positive or negative pressure to one side of the test piece. The direction of air flow through the test piece shall be that which would occur when the sample is used in the finished product, where known, i.e. from the outside face towards the inside face.

If the air flow is produced by a positive pressure, the apparatus used should incorporate a filter which protects the test sample from contamination by oil, water and particles.

**NOTE 1** With certain materials, the flow through the test piece can exhibit a non-linear relationship with the applied pressure drop. Thus the air flow through the test piece is determined at two pressure differences to establish whether the flow/pressure relationship across the paper is linear or non-linear. If it is non-linear, a second measurement of air flow is recorded at 0,25 kPa to fully characterize the material.

**NOTE 2** Depending upon whether the volumetric air flow rate is measured up-stream or down-stream of the test piece, a difference of approximately 1 % of the flow rate can exist either side of the theoretical value at the centre of the test piece.

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## 5 Apparatus

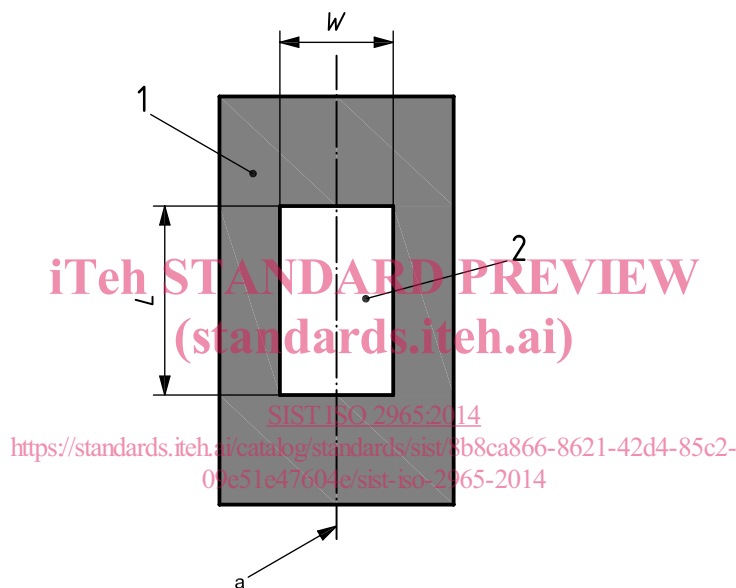
5.1 **Test piece holder**, for clamping the test piece, free from leaks.

5.1.1 For papers with uniformly distributed permeability and those with oriented or discrete permeable zones: the test piece holder has a rectangular surface area of  $2,00 \text{ cm}^2 \pm 0,02 \text{ cm}^2$  with corner radii no greater than 0,1 cm. The long side,  $L$ , shall have a length of  $2,000 \text{ cm} \pm 0,005 \text{ cm}$  (see Figure 2).

5.1.2 For bands of differing permeability: the test piece holder has a rectangular surface area of  $0,30 \text{ cm}^2 \pm 0,01 \text{ cm}^2$ . The short side shall have a length of  $2,00 \text{ mm} \pm 0,05 \text{ mm}$  [see 7.5.6 and Figure 3 d)].

NOTE 1 The positioning of the test piece holder on the test piece differs for different types of papers (see 7.5 and Figures 2 and 3).

NOTE 2 An estimate of the air permeability of other speciality papers, outside the scope of this International Standard, may be required. In this case, specialized test piece holders with different surface areas might be necessary.



## Key

- 1 test piece
- 2 measurement surface area of test piece holder
- $L$  is the long side of the test surface (see 5.1.1)
- $W$  is the width of the test surface
- <sup>a</sup> Centreline of test piece.

Figure 2 — Positioning of test pieces for materials with uniformly distributed permeability

5.2 **Pneumatic controller**, to produce an air flow at a given but adjustable pressure difference between the two mating faces of the test piece holder.

5.3 **Pressure gauge**, suitable for measuring pressure differences to at least 0,001 kPa, having a relative error of no more than 2 % of the measured value within the measuring range.

5.4 **Flow meter**, suitable for measuring the air flow with a relative error no greater than 5 % of the measured value within the measuring range.

5.5 **Conditioning enclosure**, capable of maintaining the conditions given in ISO 187 (but see 7.3).