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# International Standard



# 6565

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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## **Tobacco and tobacco products — Draw resistance of cigarettes and filter rods — Definitions, standard conditions and general aspects**

*Tabac et produits du tabac — Résistance au tirage des cigarettes et bâtonnets-filtres — Définitions, conditions normalisées et considérations générales*

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**Descriptors :** tobacco, cigarettes, tests, testing conditions.

## Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 6565 was developed by Technical Committee ISO/TC 126, *Tobacco and tobacco products*, and was circulated to the member bodies in March 1982.

It has been approved by the member bodies of the following countries :

|                     |                       |                |
|---------------------|-----------------------|----------------|
| Austria             | India                 | Switzerland    |
| Belgium             | Iraq                  | Tanzania       |
| Brazil              | Italy                 | Thailand       |
| Cuba                | Malaysia              | Turkey         |
| Czechoslovakia      | Mexico                | United Kingdom |
| Egypt, Arab Rep. of | Portugal              | USSR           |
| France              | South Africa, Rep. of |                |
| Greece              | Sweden                |                |

No member body expressed disapproval of the document.

# Tobacco and tobacco products — Draw resistance of cigarettes and filter rods — Definitions, standard conditions and general aspects

## 0 Introduction

The draw resistance of cigarettes and filter rods is a very widespread and important concept both for product quality specifications and for analytical determinations by mechanical smoking.

Different procedures and apparatus are currently available for the determination. It has so far not been possible to standardize the complete description of the equipment to be used and the detailed procedure. Nevertheless, it has been possible to obtain a broad consensus on the definitions to be adopted and the conditions that allow comparable determinations of this characteristic to be made.

## 1 Scope and field of application

This International Standard defines the draw resistance of cigarettes and filter rods and specifies standard conditions for its determination.

It applies to cigarettes, filter rods and, by extension, to cylindrical tobacco products similar to cigarettes.

## 2 References

ISO 3308, *Tobacco and tobacco products — Routine analytical cigarette smoking machine — Definitions, standard conditions and auxiliary equipment.*

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

## 3 Definitions

**3.1 draw resistance of a cigarette or a filter rod :** The static pressure difference between the two ends of the

specimen when it is traversed by an air flow under steady conditions (see the annex, clause A.1) in which the measured volumetric flow, under standard conditions, at the output end (see the annex, clause A.2) is 17,5 ml/s (see the annex, clause A.3).

NOTE — This definition only applies to cigarettes and filter rods. In the case of the pneumatic circulation of a smoking machine, this difference in static pressure is designated by analogy as "pressure drop" to avoid any confusion.

**3.2 input end :** The end of the specimen intended to be lit in the case of a cigarette.

**3.3 output end :** The opposite end to the input end.

**3.4 standard direction of flow :** The direction from the input end to the output end.

NOTE — In the case of a filter rod, the input end and the output end are defined by the direction of flow.

## 4 Standard conditions for the determination

### 4.1 Standard conditions common to cigarettes and filter rods

**4.1.1** The air entering the specimen shall be at a temperature of  $22 \pm 1$  °C and shall have a relative humidity of  $60 \pm 2$  % (atmosphere A in ISO 3402) (see the annex, clause A.4).

**4.1.2** The standard conditions for measuring the flow are a temperature of 22 °C, a relative humidity of 60 % and an atmospheric pressure of 1 013 mbar (see the annex, clause A.4).

## 4.2 Conditions particular to cigarettes

### 4.2.1 Insertion of the specimen

The output end of the specimen shall be inserted into a cigarette holder to a depth of 9 mm (see the annex, clause A.5); the assembled cigarette and holder shall comply with the requirements of ISO 3308, sub-clause 4.14 (see also the annex, clauses A.5 and A.6).

NOTE — If any part of the ventilation area of a tipped cigarette is covered, this should be mentioned in the test report.

### 4.2.2 Air flow

This shall be in the standard direction of flow (3.4) (see the annex, clause A.7).

### 4.2.3 Position

This shall preferably be horizontal.

NOTE — It may be acceptable to test the cigarettes in a vertical position, provided that this is mentioned in the test report.

## 4.3 Conditions particular to filter rods

### 4.3.1 Encasing

The specimen shall be completely inserted into a suitable cigarette holder so that no air can pass through the filter rod wrapping (see the annex, clause A.8, and the figure).

### 4.3.2 Influence of the direction of air flow on the measured value

If the direction of air flow can influence the value measured, carry out two series of determinations; the second shall be carried out after turning the specimen end for end prior to its re-insertion into the cigarette holder (see the annex, clause A.9). If the results are different, record both values in the test report.

### 4.3.3 Position

The position may be either horizontal or vertical (see the annex, clause A.10); the position adopted shall be stated in the test report.

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## Annex

### Various technical comments supported by useful justification for full understanding of this International Standard

#### A.1 Steady conditions

The conditions are said to be steady if all the parameters defining them remain constant. This means that not only the flow should be so, but also that the parameters defining it should remain constant. Thus, the specimen remains in equilibrium with the standardized atmosphere of the current passing through it.

#### A.2 Flow at the output end of the specimen

During preparatory work, several inquiries and collaborative studies have been carried out. The results have shown that there is an interest in determining the volumetric flow at the output end of the specimen.

It is therefore reasonable to specify the volumetric flow at this point, both from the consumer's point of view and for analytical smoking purposes.

Finally, it is easier to determine the volumetric flow at the output end of the specimen than at the input end, since the flow is split up into several parts, particularly in the case of porous or perforated wrappings.

#### A.3 Adjustment of volumetric flow and calibration of apparatus

The volumetric flow may be adjusted to the value prescribed by various kinds of apparatus. In all cases, calibration of this apparatus should be carried out by means of a soap bubble flowmeter so that calibration fulfils the standard conditions.

#### A.4 Atmospheres

The specification for temperature is important, principally for the following reasons: Flowmeters, for example flowmeters with a float, indicate according to the air temperature. In addition, the hygrometric equilibrium of the specimen also depends on the temperature. Specification of humidity is based mainly on conditions of hygrometric equilibrium of the specimen, since the draw resistance may be affected by variations in the water content of the material (tobacco or filtering material).

The humidity of the air may also affect the measurement of the flow using a spirometer. Consequently, when the humidity and temperature do not correspond exactly to the standard conditions, these conditions shall be precisely determined and the measurements corrected in accordance with the differences found.

#### A.5 Depth of insertion

Specification of the insertion depth of 9 mm means that any ventilation area no further than 9 mm from the output end of the cigarette is not taken into account when determining the draw resistance, by analogy with ISO 3308.

#### A.6 Cigarette holder

ISO 3308 lays down, in sub-clause 4.14, the principal conditions with which the cigarette holder shall comply. It is planned to specify its structure at a later stage.

#### A.7 Pressure drop

The pressure drop of the specimen most often depends on the direction of air flow; this is particularly the case with filter cigarettes which are non-symmetrical because of their constitution.

#### A.8 Draw resistance of filter rods

The draw resistance of filter rods is generally so great that even if so called "non-porous" or non-perforated papers are used, some ventilation is produced through the wrappings.

Moreover, when the filter is used on the cigarette, it is covered by a second wrapping, the tipping paper.

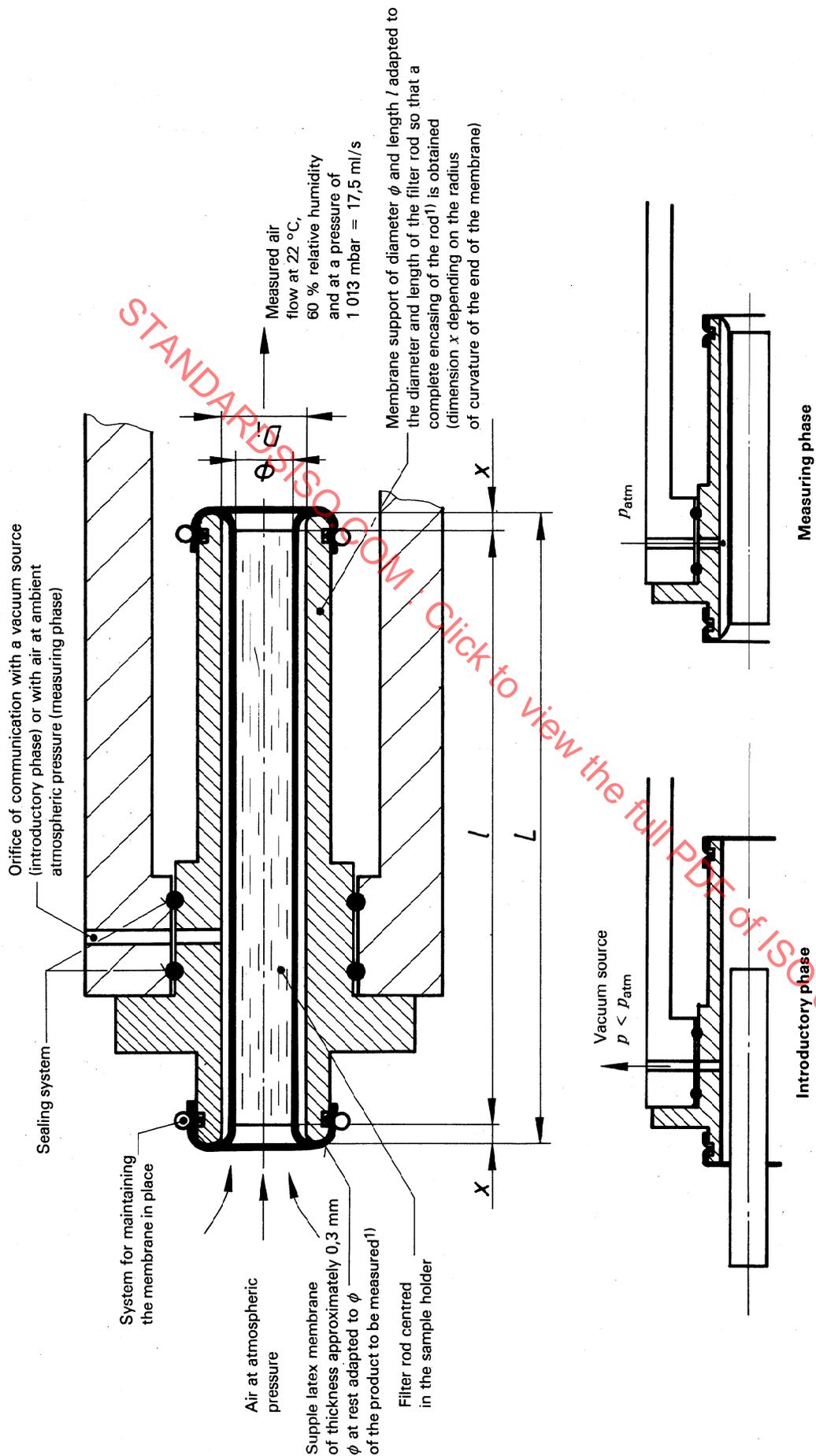
For these two reasons, the measurement of draw resistance of a filter rod shall be carried out after the wrapping has been made completely impermeable to air by encasing.

#### A.9 Direction of flow of air through a filter rod

Filter rods have, in general, a symmetrical structure so that there is normally no difference whatever direction of flow is adopted.

#### A.10 Position of the filter rod during measurement

As the filter rod is completely encased during measurement, it may be convenient, for manipulation, to place it vertically when working with certain equipment.



1) Example for a filter rod of  $l = 120$  mm and  $\phi = 7,90$  mm

$\phi$  int. at rest of the membrane = 7,5 mm

Length of support  $L = l + 2x = 124$  mm

$\phi$  int. of the support  $D_i = 10,5$  mm

Figure — Filter rod holder permitting the complete encasing of the rods at the moment of measuring the draw resistance