

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

**ISO RECOMMENDATION
R 1136**

**AIR PERMEABILITY METHOD
FOR MEASURING THE MEAN DIAMETER OF WOOL FIBRES**

1st EDITION

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BRIEF HISTORY

The ISO Recommendation R 1136, *Air permeability method for measuring the mean diameter of wool fibres*, was drawn up by Technical Committee ISO/TC 38, *Textiles*, the Secretariat of which is held by the British Standards Institution (BSI).

Work on this question led to the adoption of a Draft ISO Recommendation.

In January 1968, this Draft ISO Recommendation (No. 1245) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Australia	India	Romania
Belgium	Iran	South Africa, Rep. of
Brazil	Israel	Spain
Canada	Italy	Sweden
Cuba	Japan	Switzerland
Czechoslovakia	Korea, Rep. of	Turkey
Denmark	Netherlands	U.A.R.
France	New Zealand	United Kingdom
Germany	Norway	U.S.S.R.
Greece	Poland	
Hungary	Portugal	

No Member Body opposed the approval of the Draft.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in November 1969, to accept it as an ISO RECOMMENDATION.

AIR PERMEABILITY METHOD FOR MEASURING THE MEAN DIAMETER OF WOOL FIBRES

INTRODUCTION

When a current of air is passed through a uniformly arranged mass of fibres packed in a chamber with perforated ends the ratio of air flow to differential pressure is uniquely determined by the total surface area of the fibres, and by various constants. This was predicted from the hydrodynamic equations of Kozeny and others.

For fibres of circular or near-circular cross-section and constant density, such as non-medullated wool, the surface area of a given mass of fibres is proportional to the average fibre diameter. This principle can be utilized to construct apparatus giving an estimate of fibre diameter. Owing to the speed and simplicity of the method it is particularly suitable for quality control in mill testing laboratories.

Since the method is indirect, the apparatus must first be calibrated from wools of known fibre diameter. For this purpose eight reference slivers have been provided (see Annex E).

It has been shown that the estimate of fibre diameter actually given by the permeability method is $d(1 + c^2)$, where d is the average fibre diameter (length biased) measured by the projection microscope and c the fractional coefficient of variation. Since c normally lies within comparatively small limits for unblended slivers it is usual, however, to calibrate the apparatus directly in terms of d .

The method requires that the fibres be reasonably clean and dispersed in a uniform open state, such as card slivers or combed slivers. It is thus unsuitable for raw wool unless first scoured and carded. Some types of wool may need special calibrations as described in Annex D.

1. SCOPE

This ISO Recommendation describes a method of measuring the mean diameter of wool fibres, using an apparatus which passes a current of air through a bundle of fibres.

The method is applicable to clean, unmedullated wool fibres dispersed in a uniform, open state. It is particularly suitable for combed slivers. The method is also applicable to oil-combed slivers without cleaning, if the oil content is constant and the apparatus suitably calibrated.

The method is less accurate for lambswool which is appreciably medullated (see Annex D).

2. DEFINITIONS

- 2.1 *Laboratory sample.* The conditioned sample of fibres, representative of the bulk, from which the test specimens are weighed out. In many cases the laboratory sample will consist of one or more short lengths of sliver.
- 2.2 *Test specimen.* The weighed amount of fibre which is packed into the constant volume chamber.