

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION R 534

DETERMINATION OF THE THICKNESS OF SINGLE SHEETS OF PAPER

1st EDITION

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BRIEF HISTORY

The ISO Recommendation R 534, *Determination of the Thickness of Single Sheets of Paper*, was drawn up by Technical Committee ISO/TC 6, *Paper, Board and Pulps*, the Secretariat of which is held by the Association Française de Normalisation (AFNOR).

Work on this question by the Technical Committee began in 1960 and led, in 1964, to the adoption of a Draft ISO Recommendation.

In April 1965, this Draft ISO Recommendation (No.790) 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:

Argentina	Greece	Spain
Belgium	India	Sweden
Brazil	Israel	Switzerland
Chile	Italy	Turkey
Czechoslovakia	Netherlands	U.A.R.
Denmark	Norway	United Kindgom
Finland	Poland	U.S.S.R.
France	Portugal	Yugoslavia
Germany	Romania	

Four Member Bodies opposed the approval of the Draft:

Australia
New Zealand
Republic of South Africa
U.S.A.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in January 1967, to accept it as an ISO RECOMMENDATION.

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DETERMINATION OF THE THICKNESS OF SINGLE SHEETS OF PAPER*

1. SCOPE

This ISO Recommendation describes a method of measuring the thickness of single sheets of paper* up to a substance of 250 g/m².

Unless otherwise stated, the thickness of paper should be determined or checked in accordance with the present method.

2. PRINCIPLE

The method is based on the use of a precision dial micrometer to measure the thickness of a single sheet when a static load is applied.

Results are given in terms of the thickness of a single sheet.

3. EQUIPMENT

3.1 Precision dial micrometer

This instrument is provided with two parallel plane faces between which the paper can be placed for measurement. One of the faces should be capable of movement in a direction perpendicular to the other, which is fixed. The movable face or pressure foot should be circular. The fixed face or anvil should also be circular and of such size that the whole area of the pressure foot is in contact with the anvil in the zero position.

To ensure that the pressure between the faces is uniform within the limits given, the use of a dead weight rather than a spring is preferred.

The instrument should be checked in accordance with the procedure detailed in the Appendix Z and should conform to the following:

Characteristics	Metric system	Inch system
Diameter of pressure foot	16 ± 0.5 mm	0.63 ± 0.02 in
Area of pressure foot	200 mm ² (nominal value)	0.31 in ² (nominal value)
Pressure exerted by pressure foot	1.00 ± 0.10 kgf/cm ²	14.2 ± 1.5 lbf/in ²
Repeatability of measurement (standard deviation)	≤ 0.002 5 mm or 0.5% **	≤ 0.000 1 in or 0.5% **
Indication error	± 0.002 5 mm or 0.5% **	± 0.000 1 in or 0.5% **
Error of parallelism of pressure foot and anvil	≤ 0.005 0 mm or 1% **	≤ 0.000 2 in or 1% **

3.2 Auxiliary apparatus

A set of feeler gauges of thickness known to the nearest 0.001 mm or 0.000 04 in.

3.3 Calibration of the instrument

The instrument should be calibrated at reasonable intervals. The Appendix Z gives details of the procedure to be followed. For instruments in frequent use, it is suggested that the calibration be checked daily for repeatability and accuracy, and monthly for parallelism and foot pressure.

* The determination of the bulking thickness and bulk of paper is dealt with in ISO Recommendation R 438, *Method for the Determination of the Bulking Thickness and Bulk of Paper*.

** Whichever is the greater.

4. SAMPLING AND CONDITIONING

Not less than twenty test pieces each having a size of 6 cm × 6 cm or larger should be cut from specimens taken at random from those drawn according to ISO Recommendation R 186* and conditioned in accordance with ISO Recommendation R 187*. Not more than one test piece should be cut from any one specimen.

5. TEST PROCEDURE

The tests should be made in the ISO standard reference atmosphere (see ISO Recommendation R 187, section 4). The test piece should be placed between the jaws of the micrometer. The pressure foot should then be lowered slowly** and very carefully onto the test piece so that all punching effect is avoided; also no stress should be imposed on the instrument or the test piece by the hand, when a reading is being taken and the instrument should not be subjected to any vibration. The reading should be taken when the pointer has ceased to move***.

Make one measurement on each of the test pieces taken. This measurement is made 2 cm, or more from any side of the test piece.

6. EXPRESSION OF RESULTS

Calculate the mean of the twenty (or more) readings; the value obtained is the average thickness of a single sheet.

7. TEST REPORT

The test report should state:

- (a) the average thickness to the nearest micron,
- (b) the number of test pieces used for the test,
- (c) the number of readings taken,
- (d) the standard deviation,****
- (e) any circumstances or influences that may have affected the results.

* ISO Recommendation R 186, *Method of Sampling Paper for Testing*;

ISO Recommendation R 187, *Method for the Conditioning of Paper and Board Test Samples*.

** Speed of about 1 to 3 mm/s.

*** This will usually be in about 2 to 5 seconds.

**** The precision of the mean (confidence limits), at the 95% probability level, should be quoted for information.