UDC 676 : 620.1

Ref. No.: ISO / R 536 - 1967 (E)

Revised

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION
R 536

DETERMINATION OF PAPER SUBSTANCE

1st EDITION
January 1967

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BRIEF HISTORY

The ISO Recommendation R 536, *Determination of Paper Substance*, 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 1955 and led, in 1963, to the adoption of a Draft ISO Recommendation.

In December 1964, this Draft ISO Recommendation (No. 612) 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	Romania
Australia	India	Spain
Belgium	Israel	Sweden
Brazil	Japan	Switzerland
Canada	Mexico	Turkey
Chile	Morocco	U.A.R.
Czechoslovakia	Netherlands	United Kingdom
Denmark	New Zealand	U.S.S.R.
Finland	Norway	Yugoslavia
France	Poland	
Germany	Portugal	

Three Member Bodies opposed the approval of the Draft:

Italy
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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ISO Recommendation R 536 January 1967

DETERMINATION OF PAPER SUBSTANCE

1. SCOPE

This ISO Recommendation describes the method of determining the substance of paper.

2. DEFINITION

Substance. Mass of paper, expressed in grammes per square metre, determined under standard test conditions.*

The result is considered " standard " only when these test conditions include conditioning according to ISO Recommendation R 187, *Method for the Conditioning of Paper and Board Test Samples.*

3. PRINCIPLE

The area of the test pieces and their mass are measured and the mass per square metre is calculated, all measurements being made on conditioned test pieces.

However, if it is desired that similar characteristics be determined for other conditions, e.g. " oven dry " or " as taken ", see Notes in the Annex A to this ISO Recommendation. In that case, the results should be qualified by a statement indicating the condition of the test piece.

4. APPARATUS

4.1 Cutting device

The cutting device should normally be capable of repeatedly cutting out test pieces whose area, in at least 95 cases out of 100, falls to the nearest 1% of a known area. This should be checked frequently by the method given in clause 4.3.1 below and, provided that the above accuracy is attained, the mean area obtained in these check tests should be used for calculating substance.

With certain types of paper it will be found, after carrying out this determination of area, that test pieces cannot be cut with the accuracy just defined and, in such cases, the area of every test piece should be determined individually (see clause 4.3).

4.2 Weighing device

The weighing device should be accurate enough, over the range of mass for which it is used, to measure always to the nearest 0.5% of the actual mass. It should be sensitive enough to detect a change of $\pm 0.2\%$ of the mass to be weighed and, if the device is of the direct-reading type it should be graduated so that readings may be taken to this degree of accuracy. For checking of the weighing device, see clause 4.3.2.

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* Definition as in term No. 80 of ISO Recommendation R 135, *Paper Vocabulary — Second Series of Terms.*

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Special sheet-weighing devices, designed to weigh test pieces of a given size and indicating substance in grammes per square metre, may be used, provided that the above conditions are fulfilled and that the area of each test piece in a single weighing is not less than 500 cm² (see section 7 and clause 8.2).

When in use, the weighing device should be shielded from air currents.

4.3 Calibration of apparatus

4.3.1 *Checking of cutting device.* The area cut should be checked frequently by measuring 20 test pieces and calculating their areas (see paragraph 2 of section 7). The cutting accuracy specified in clause 4.1 is attained when the standard deviation of the individual areas is below 0.5% of the mean area, in which case this mean area should be used for calculating substance in subsequent tests. If the standard deviation exceeds this value, the area of every test piece should be determined individually.

4.3.2 *Checking of weighing device.* The weighing device should be checked frequently by applying accurately measured masses with both increasing and decreasing loads.

5. SAMPLING

The selection of units and sheets and the taking of specimens should be carried out in accordance with ISO Recommendation R 186, *Method of Sampling Paper for Testing.* * The number of specimens taken should be at least five and their combined area should be sufficient for at least 20 test pieces.

6. CONDITIONING

The test pieces should be conditioned in accordance with ISO Recommendation R 187.

7. PROCEDURE

At least 20 test pieces in all are taken from at least five conditioned specimens, if possible the same number from each specimen, each test piece having an area of not less than 500 cm².

The area of test piece is determined by calculation from measurements taken to the nearest 0.5 mm.

If the cutting device does not satisfy the accuracy requirements of clause 4.1, the dimensions of each test piece should be measured.

Weigh each test piece.

8. CALCULATION AND EXPRESSION OF RESULTS

The results are expressed in grammes per square metre to three significant figures.

8.1 Using the procedure in section 7, the substance of each test piece is calculated according to the following formula:

$$X = \frac{m}{A} \times 10\,000$$

where

X = substance, in grammes per square metre,
m = mass of the test piece, in grammes,
A = area of the test piece, in square centimetres.

* Being revised.

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