INTERNATIONAL STANDARD 5637

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

Paper and board — Determination of water absorption and increase in thickness after immersion in water

Papier et carton — Détermination de l'absorption d'eau et de l'augmentation d'épaisseur après immersion dans l'eau

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Foreword
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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 5637 was developed by Technical Committee ISO/TC 6, *Paper, board and pulps*, and was circulated to the member bodies in September 1976.

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

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Austria	Hungary	Poland
Belgium	India	Romania
Bulgaria	Iran	South Africa, Rep. of
Canada	Ireland	Spain
Chile	Israel	Sweden
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No

The member body ~~of the following country~~ expressed disapproval of the document ~~on technical grounds~~.

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INTERNATIONAL STANDARD ISO 5637-1978 (E)/ERRATUM

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(Title) Paper and board - Determination of water absorption and increase in thickness after immersion in water

ERRATUM

Page 2

(Text) Sub-clause 8.7, line 3 : "main value" should read "mean value".

EW 81-07-20

Paper and board — Determination of water absorption and increase in thickness after immersion in water

1 SCOPE

This International Standard specifies a method for the determination of the water absorption and the increase in thickness of paper and board after total immersion in water for a specified time.

2 FIELD OF APPLICATION

The method is applicable to all types of paper and board that have been treated to give some degree of resistance to water absorption.

NOTE — The method is similar to that specified in ISO 769, which is applicable only to fibre building boards.

3 REFERENCES

ISO 186, *Paper and board — Sampling for testing.*

ISO 187, *Paper and board — Conditioning of test samples.*

ISO/R 534, *Determination of the thickness of single sheets of paper.* 1)

ISO 536, *Paper and board — Determination of grammage.*

4 DEFINITIONS

For the purpose of this International Standard, the following definitions apply.

4.1 water absorption : The mass of water absorbed per unit area under the specified conditions of test.

4.2 relative water absorption : The ratio of the mass of water absorbed to the mass of the conditioned test piece.

4.3 absolute thickness increase : The increase in thickness under the specified conditions of test.

4.4 relative thickness increase : The ratio of the absolute thickness increase to the thickness of the conditioned test piece.

5 REAGENT

Distilled or deionized water at 23 ± 1 °C.

6 APPARATUS

6.1 Balance, accurate to 0,1 g.

6.2 Thickness gauge, complying with ISO/R 534.

6.3 Tank of water, large enough to hold at least ten test pieces (200 mm × 250 mm) in a vertical position and thermostatically controlled without circulation.

NOTE — Take care to ensure that the tank has been carefully washed with the reagent water (see clause 5) so that it is free from surfactants.

7 SAMPLING AND PREPARATION OF TEST PIECES

7.1 Sampling

Sampling shall be carried out in accordance with ISO 186.

7.2 Cutting of test pieces

At least ten test pieces shall be cut measuring 200 ± 1 mm × 250 ± 1 mm with the longer side in the machine direction.

7.3 Conditioning

The test pieces shall be conditioned in accordance with ISO 187.

8 PROCEDURE

8.1 Weigh each test piece in a separate, dry, pre-weighed polyethylene bag to an accuracy of ± 0,01 g.

8.2 Measure the thickness of individual test pieces in accordance with ISO/R 534, after having first removed each test piece from its polyethylene bag.

1) In course of revision to include board.

8.3 Immerse the test pieces vertically in clean water (clause 5) in the tank (6.3), with the longer side vertical and the upper edge 25 ± 3 mm below the surface; take care to ensure that the test pieces are well separated from each other and from the bottom and sides of the tank.

NOTE – For thinner papers it may be advisable to suspend the test piece by means of a clip attached to the test piece.

8.4 The immersion times shall be as follows :

- Low water resistance : 5 min ± 15 s
- Medium water resistance : 30 ± 1 min
- High water resistance : 24 h ± 15 min

If the immersion time chosen causes the test pieces to be completely saturated, repeat the tests at the next shorter immersion time (unless it has been agreed not to do so).

NOTE – Saturation of a test piece is achieved when continued immersion results in no further increase in mass.

8.5 Remove the test pieces from the water and, whilst still holding them vertically from one corner, allow the water to drain off for 2 min.

Return each test piece to its polyethylene bag.

Discard test pieces that fold over upon themselves during draining.

8.6 Repeat mass and thickness determinations on each test piece.

8.7 From the measurements made, calculate for each test piece the property required, using the appropriate method given in clause 9. Report the mean value of the property. Note the range or coefficient of variation, as appropriate, of the property required.

9 EXPRESSION OF RESULTS

9.1 Water absorption

The water absorption is given, in grams per square metre, by the formula

$$(m_2 - m_1) \times 20$$

where

m_1 is the mass, in grams, of the conditioned test piece before immersion;

m_2 is the mass, in grams, of the test piece immediately after immersion for the specified period;

20 is the number of test pieces per square metre.

Express the result to the nearest 0,1 g/m².

9.2 Relative water absorption

The relative water absorption is given, as a percentage, by the formula

$$\frac{m_2 - m_1}{m_1} \times 100$$

where m_1 and m_2 are as defined in 9.1.

9.3 Absolute thickness increase

The absolute thickness increase is given, in millimetres (or micrometres), by the formula

$$t_2 - t_1$$

where

t_1 is the thickness, in millimetres (or micrometres), of the conditioned test piece before immersion;

t_2 is the thickness, in millimetres (or micrometres), of the test piece immediately after immersion for the specified period.

9.4 Relative thickness increase

The relative thickness increase is given, as a percentage, by the formula

$$\frac{t_2 - t_1}{t_1} \times 100$$

where t_1 and t_2 are as defined in 9.3.

10 TEST REPORT

The test report shall include the following particulars :

a) reference to this International Standard;

b) time of immersion (see 8.4);

c) mean value of the property required;

d) range (or coefficient of variation) of the property required;

e) number of tests;

f) temperature and relative humidity, of test atmosphere.

NOTE – This requirement is included because, at the present time, the water temperature of 23 °C may not be the same as the temperature of the conditioning room.

g) any deviation from the procedure specified in this International Standard.

NOTE – If the test pieces delaminate, the test report should be limited to a statement that this has occurred.