



SLOVENSKI STANDARD
oSIST prEN ISO 535:2022

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Papir, karton in lepenka - Določevanje absorpcije vode - Cobbova metoda (ISO/DIS 535:2022)

Paper and board - Determination of water absorptiveness - Cobb method (ISO/DIS 535:2022)

Papier und Pappe – Bestimmung des Wasserabsorptionsvermögens – Cobb-Verfahren (ISO/DIS 535:2022)

Papier et carton - Détermination de l'absorption d'eau - Méthode de Cobb (ISO/DIS 535:2022)

Ta slovenski standard je istoveten z: prEN ISO 535

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ICS:

85.060 Papir, karton in lepenka Paper and board

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Paper and board — Determination of water absorptiveness — Cobb method

Papier et carton — Détermination de l'absorption d'eau — Méthode de Cobb

ICS: 85.060

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 6, *Paper, board and pulps*, Subcommittee SC 2, *Test methods and quality specifications for paper and board*. This fourth edition cancels and replaces the third edition (ISO 535:2014), which has been technically revised.

The main changes compared to the previous edition are as follows:

- Requirements in 5.1 “Water” and 5.2 “Blotting paper” added;
- Specification for the use of ink added in 5.3 “Ink”;
- Chapter 6 “Apparatus” and 6.2 “Metal roller” revised;
- Preparation of test pieces added in chapter 9;
- 10.3 “Exposure to water and blotting” and 10.4 “Times of test” revised and requirements added;
- Several additional explanations added in 10.5 “Rejection of test pieces”;
- Editorial changes.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Paper and board — Determination of water absorptiveness — Cobb method

1 Scope

This document specifies a method of determining the water absorptiveness of paper and board, including corrugated fibreboard, under standard conditions.

This document does not apply for paper of grammage less than 50 g/m² or embossed paper. It is not applicable for porous papers such as newsprint or papers such as blotting paper or other papers having a relatively high water absorptiveness for which ISO 8787 is more suitable.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 186, *Paper and board — Sampling to determine average quality*

ISO 187, *Paper, board and pulps — Standard atmosphere for conditioning and testing and procedure for monitoring the atmosphere and conditioning of samples*

ISO 14487, *Pulps — Standard water for physical testing*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

water absorptiveness

Cobb value calculated mass of water absorbed in a specified time by 1 m² of paper or board under specified conditions

Note 1 to entry: The test area is normally 100 cm².

4 Principle

A test piece is weighed immediately before and immediately after exposure for a specified time of one surface to water, followed by blotting. The result of the increase in mass is expressed in grams per square metre (g/m²).

Particular attention shall be paid if any water penetrates through the test piece or the test piece shows signs of leakage.

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5 Reagents and materials

5.1 Water, distilled or deionized, having the temperature of laboratory conditioning i.e. $23\text{ °C} \pm 1\text{ °C}$ or $27\text{ °C} \pm 1\text{ °C}$ in tropical countries. The temperature of the water is important and should be maintained during the test at the temperature used for conditioning and testing. The water should fulfil the requirements of ISO 14487.

5.2 Blotting paper, having a grammage of $250\text{ g/m}^2 \pm 25\text{ g/m}^2$.

Blotting papers as described in ISO 5269-1 are acceptable for the purposes of this document, see Annex B.

The blotting paper shall have the dimensions of at least $140\text{ mm} \times 140\text{ mm}$ either circular or rectangular.

5.3 Ink, $0,15\% \pm 0,015\%$ of commercially available waterbased ink can be added to the water (5.1) to support the visibility of penetrated water.

A differing pH-value of the ink can increase or decrease the pH-value of the water (5.1) and can have a negative impact on some papers, especially on some coatings. The addition of ink shall not change the pH-value of water more than $\pm 0,5$ units from the original pH-value.

The electrical conductivity of the water (5.1) shall not exceed $0,2625\text{ mS/m}$ at 25 °C when ink was added (ISO 14487). The use of ink and the description of the latter shall be mentioned in the test report.

The addition of the ink shall not affect the surface tension of the water.

6 Apparatus

6.1 Absorptiveness tester for the determination of water absorptiveness (3.1).

Any type of apparatus may be used which permits

- an immediate and uniform contact of the water with the part of the test piece submitted to the test;
- controlled rapid removal of the unabsorbed water from the test piece at the end of the contact period; and
- the rapid removal of the test piece without the risk of contact with water outside the test area.

In its simplest form, the apparatus consists of a rigid base with a smooth, planar surface, and a rigid metal cylinder of $112,8\text{ mm} \pm 0,2\text{ mm}$ internal diameter (corresponding to a test area of 100 cm^2) and with a means of clamping it firmly to the base plate. The edge of the cylinder in contact with the test piece shall be flat and machined smooth with a thickness sufficient to prevent the cylinder cutting into the test piece. The height of the cylinder is not important provided it is sufficient to contain a water depth of 10 mm .

For materials where leakage between the cylinder and the upper surface of the test piece may occur during the test, a soft, elastic, non-absorbent gasket may be interposed to prevent this. This gasket should have the same internal diameter as the cylinder after clamping.

If a gasket is used, it shall be used for all test pieces.

NOTE The diameter of the gasket can be tested as follows: mount a piece of noncarbon paper into the absorptiveness tester which has roughly the same dimensions as the test piece and close the cylinder as for the test. If the pressure is not high enough for an adequate impression use a usual test piece and the noncarbon paper to increase the thickness of the arrangement. In some cases, a compressible, blotter-like paper or other papers might be more suitable to test the diameter of the gasket.

To prevent damage to the machined edge of the cylinder caused by clamping it upside down it is advisable to mark the top in some way so that it can be identified readily. If a cylinder of a small area is used it is recommended that this should not be less than 50 cm². The water depth shall be still 10 mm.

When corrugated fibreboard, it is advisable to use an apparatus with adjustable pressure to adjust the cylinder according to the structural conditions of the test piece.

6.2 Metal roller, with a smooth face, 200 mm ± 10 mm wide, a diameter of 90 mm ± 10 mm and a mass of 10 kg ± 0,5 kg.

6.3 Balance, which can be read to the nearest 1 mg.

6.4 Timer, reading in seconds and capable of timing up to at least 30 min.

6.5 Graduated cylinder, or other means of measuring appropriate aliquots.

7 Sampling

If the tests are being made to evaluate a lot, the sample shall be selected in accordance with ISO 186. If the tests are made on another type of sample, make sure that the test pieces taken are representative of the sample received.

8 Conditioning

Condition the test pieces as specified in ISO 187. Keep them in the conditioning atmosphere throughout the test.

9 Preparation of test pieces

Prepare the test pieces in the same atmospheric conditions used to condition the sample. Avoiding contact of the test area with hands or fingers, cut from the sample at least 5 test pieces for each required face to be tested. The test pieces shall be of sufficient size to exceed the diameter of the cylinder by at least 10 mm from any edge, ensuring that the test area is free from visible folds, creases, cracks or other defects.

If printed areas are present, these areas should be avoided if possible. If not possible, it shall be mentioned in the test report.

When the test pieces available are too small to allow the common apparatus to be used, a smaller test area may be agreed upon between the interested parties and depending on the corresponding equipment availability.

10 Procedure

10.1 General

Carry out the test in the same atmospheric conditions used to condition the test pieces (see [Clause 8](#)).

10.2 Mounting of the test pieces

Ensure that the surface of the base plate and the edge of the cylinder which will come in contact with the test piece are clean and dry before commencing each test. Weigh the specimen to the nearest 1 mg and place it with the surface to be tested in such a way that it will be in contact with the water during the test. Bring the cylinder with the machined edge in contact with the test piece and clamp sufficiently firm to prevent any leakage of water between it and the test piece.

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10.3 Exposure to water and blotting

For the purposes of this document, the time of test is defined as the time between first contact between water and test piece and the commencement of blotting.

Pour 100 ml \pm 5 ml of water (5.1) or proportionately less for a smaller test area, into the cylinder, thus providing a head of 10 mm and start the timer (6.4) immediately. Use new water for each determination.

Note: On some types of instruments the timer will start automatically after the water is brought in contact with the test sample.

The test procedure for any selected exposure time should conform to the conditions summarized in 10.4. The Exposure time is being selected according to the expected water absorptiveness of the paper and board (3.1). If, for example, a test time of 60 s has been selected, pour off the excess water after 50 s \pm 2 s (see Table 1), taking care that no water comes into contact with the surface of the test piece outside the test area. Quickly unclamp the cylinder and remove it. Remove the test piece and place it, test face uppermost, on a sheet of dry blotting paper (5.2) previously placed on a flat rigid surface. 60 s \pm 2 s after commencement of the test, place a second sheet of blotting paper (5.2) on top of the test piece and remove the excess water, using the metal roller (6.2) with two rollings (once forward and once back) without exerting any pressure on the roller.

Using a rotatable test device¹⁾, it is recommended to place the test piece with the test face, face down on a sheet of dry blotting paper (5.2) to avoid excess water to spill outside the test area.

Use new blotting paper (5.2) for each test piece.

On corrugated fibreboard the roller should be applied with its axis parallel to the flutes.

Where corrugated fibreboard is indented by the cylinder edge or where corrugated fibreboard exhibits “washboarding” it may not be possible for the blotting paper (5.2) to contact the entire wet area of the test piece. In such cases it is recommended after using the roller, to gently blot possible remains of water with the edge of the blotting paper (5.2). Instead of using the roller, it is also possible to gently rub the back of the blotting paper (5.2) over the test piece by hand. In all cases it is important to work without any pressure to avoid any water to be pressed into the surface of the test piece.

Immediately after blotting, fold the test piece with the wet side inside, and weigh again so that the increase in mass due to absorption of water can be determined before any loss by evaporation occurs.

In the case of board or corrugated fibreboard it may not be possible to fold the test piece. In such cases the second weighing shall be carried out with the least possible delay.

Repeat the processes described in 10.2 and above for all the other test pieces so that at least five tests have been carried out on each face of the paper or board required to be tested.

To increase the visibility of possibly penetrated water through the test piece or signs of leakage, a black rubber base or underlayer can be helpful.

10.4 Times of test

Table 1 specifies the times of tests together with the times at which excess water is removed and the times at which blotting is carried out.

The times of test can be increased according to the water absorptiveness (3.1) and to the special nature of the paper or board under consideration and by agreement of the interested parties.

All test pieces shall be tested using the same test time. For unknown samples it might be necessary to execute a pretest to determine the test time.

1) The rotatable device is also called cobb-unger tester. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of this product. Equivalent products may be used if they can be shown to lead to the same results.