

INTERNATIONAL STANDARD



287

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

Paper and board – Determination of moisture content – Oven-drying method

Papier et carton – Détermination de l'humidité – Méthode par séchage à l'étuve

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Paper and board — Determination of moisture content — Oven-drying method

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies an oven-drying method for the determination of the moisture content of paper and board at the time of sampling.

The method is applicable to all paper and board, including corrugated fibreboard and solid fibreboard, provided that the paper or board does not contain any substance, other than water, that will escape at the temperature specified for the test.

2 REFERENCE

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

3 DEFINITIONS

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

3.1 moisture content : The amount of water in a paper or board. In practice, it is regarded as the ratio of the loss of mass of a test piece when dried according to the standard method of test to its mass at the time of sampling; it is normally expressed as a percentage.

3.2 constant mass : The mass reached by a test piece of paper or board after drying at the specified temperature until the difference between two successive weighings does not exceed 0,1% of the initial mass of the test piece.

4 PRINCIPLE

Weighing of the test piece at the time of sampling, and again after drying to constant mass.

5 APPARATUS

5.1 Balance, having an accuracy of 0,05 % of the mass to be weighed, or better.

5.2 Test piece containers, for the transport and weighing of test pieces, which shall be water-vapour proof and made in a light-weight construction from a material not subject to change under the conditions of test.

5.3 Oven, capable of maintaining the air temperature at 105 ± 2 °C, and suitably ventilated to maintain uniform temperature in the usable volume whilst extracting the moisture driven off the paper.

6 PREPARATION OF CONTAINERS

Before sampling, a sufficient number of clean, dry containers shall be numbered and allowed to attain temperature equilibrium with the atmosphere. Each container shall then be weighed and kept closed until the sample is about to be taken.

7 SAMPLING

The units to be sampled shall be selected in accordance with ISO 186.

NOTE — If the atmosphere at the place of sampling is warm and damp, precautions shall be taken in handling the paper or board to avoid contamination and any gain or loss of moisture. In particular, it is recommended that rubber gloves be worn; to avoid moisture changes due to atmospheric exposure, it is important also to enclose all test pieces in their containers immediately after taking them.

8 SELECTION, PREPARATION AND WEIGHING OF TEST PIECES

8.1 When the unit is a ream or parcel

8.1.1 Determination of the average value of moisture content in the lot

a) For a paper or board of a grammage less than or equal to 224 g/m²

From the centre of each ream or parcel, take at least four consecutive sheets; quickly fold or cut them and enclose them together in one of the containers. The contents of a container constitute a test piece, which shall have a mass of at least 50 g. Weigh the container with its contents and calculate the mass of the test piece.

b) For a paper or board of a grammage greater than 224 g/m²

From the centre of each ream or parcel, take one or more sheets to provide sufficient strips, of width 50

9 PROCEDURE

Dry the test piece in the oven (5.3), either in its container (5.2) with the lid removed, or after being removed from the container and spread out, maintaining the air temperature at $105 \pm 2^\circ\text{C}$. Ensure that, if the test piece comprises more than one strip, the strips are separated to permit full air circulation during drying. If the test piece is removed from its container, also dry the container, preferably in the same oven.

NOTE – Ensure that, while the test pieces are being dried, other test pieces are not introduced into the oven.

When the test piece is considered to be completely dry, enclose it quickly in the container and allow the container to cool in a desiccator. This may require an appreciable time with certain types of container. Equalize the air pressures inside and outside the container by momentarily opening and reclosing the container. Re-weigh the container and contents and calculate the mass of the dried test piece. Replace the test piece and container in the oven and allow a further period of drying, equal to at least one-half of the initial drying period. Re-weigh the test piece in its container. Repeat this process of further drying and re-weighing as necessary until constant mass is reached, the drying period between consecutive weighings being in all instances not less than one-half of the total drying time previously received. Consider the test piece to have reached constant mass when two consecutive weighings at the required time interval do not differ by more than 0,1 % of the original mass of the test piece. The initial drying period shall be not less than 30 min for material of grammage less than or equal to 224 g/m² and not less than 60 min for grammages greater than 224 g/m².

Make a duplicate determination by repeating the procedure given in clauses 8 and 9 as necessary.

10 EXPRESSION OF RESULTS

Express the result, based upon the mass of the test piece as sampled, as a percentage, rounded to the nearest 0,1 %.

11 PRECISION OF THE METHOD

The accuracy and precision of the method will be affected by

- variations in moisture content throughout the lot,
- the number of test values averaged,
- handling and atmospheric exposure,
- drying errors,
- weighing errors.

No value can at present be given for the precision of the method.

12 TEST REPORT

The test report shall include the following particulars :

12.1 When an average value of moisture content in the lot is required

- a) mean value
- b) maximum and minimum values
- c) standard deviation
- d) number of tests

for the total selected

12.2 When information on variations in moisture content across the sheet or reel is required

- a) mean value
- b) maximum and minimum values
- c) standard deviation
- d) number of tests
- e) sampling positions

for each of the selections made according to the scheme in 8.1.2 or 8.3.2, as appropriate

Where alternative procedures are given, state which has been adopted, and give particulars of any circumstance or influence thought to have affected the results.

It is recommended that 95 % confidence limits of the mean be given.