



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 40167-2021

Paper and board - Accelerated ageing (100 degree-Celsius)

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1 Scope

This Standard specifies the accelerated ageing method of printing paper and writing paper at 100 °C, and, by evaluating the impact of ageing treatment on the two physical properties of the paper, namely folding number and tearing resistance, predicts the effect of long-term natural ageing process on paper stability.

This Standard applies to all kinds of printing paper and writing paper, including coated paper and filled paper.

2 Normative references

The following documents are indispensable for the application of this document.

For dated references, only the dated version applies to this document. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 450, Paper and board - Sampling for testing and identification of machine and cross direction, wire side and felt side (GB/T 450-2008, ISO 186:2002, MOD)

GB/T 455, Paper and board - Determination of tearing resistance (GB/T 455-2002, eqv ISO 1974:1990)

GB/T 457, Paper and board - Determination of folding endurance (GB/T 457-2008, ISO 5626:1993, MOD)

GB/T 462, Paper, board and pulp - Determination of moisture content of analytical sample (GB/T 462-2008, ISO 287:1985, ISO 638:1978, MOD)

GB/T 10739, Paper, board and pulps - Standard atmosphere for conditioning and testing (GB/T 10739-2002, eqv ISO 187:1990)

3 Principle

Put the temperature and humidity treated sample into an airtight glass tube;

after ageing treatment at 100 °C for a certain period of time, compare the changes in the folding number and tearing resistance of the sample before and after the ageing treatment, so as to measure the stability of the paper strength.

b) Use tap water to thoroughly rinse the airtight glass tube to remove residual non-ionic detergent;

c) Use distilled water to rinse three times and drain the airtight glass tube;

d) Dry the airtight glass tube in an oven at 105 °C;

e) Place the airtight glass tube (including threaded cap and "O" ring or gasket)

under the atmospheric conditions, that are specified in GB/T 10739, for temperature and humidity conditioning for 24 h

5.2.2 Unused airtight glass tube for aging treatment The unused airtight glass tube (including threaded cap and "O" ring or gasket)

shall be treated in an oven at 105 °C for at least 24 h before use. Before putting the sample, it shall be placed under the atmospheric conditions that are specified in GB/T 10739 for temperature and humidity conditioning for 24 h.

5.2.3 Storage of the airtight glass tube for aging treatment After temperature and humidity treatment, seal the airtight glass tube and store it.

6 Sampling Wear clean cotton gloves when sampling.

If the purpose of the test is to evaluate a batch of samples, samples shall be selected according to GB/T 450. If samples of other types are tested, it shall be ensured that the sample taken is representative among the samples.

When the sample size is larger than the size of an A4 paper, the sample needs to be cut into the size of an A4 paper.

Randomly select a number of samples from the samples; the number of samples shall meet the requirements of the test. If the size of the sample is smaller than the size of an A4 paper, calculate the number of samples to be cut according to the area.

7 Sample processing Under the standard atmospheric conditions that are specified in GB/T

10739, perform temperature and humidity processing for the aging and control samples.

The control sample shall always be placed under the standard atmospheric conditions that are specified in GB/T 10739.

8 Sample preparation Cut two sets of samples, one set for aging treatment and one set for control test. The size of the sample shall meet the requirements of GB/T 455 or GB/T 457. At the same time, determine the absolutely dry matter content of the sample according to the provisions of GB/T 462; calculate the absolutely dry matter.

9 Test procedure

9.1 Ageing of samples Calculate the number of airtight glass tubes (4.2) that are required to load the sample; ensure that there are (0.0278 ± 0.00007) g of absolutely dry sample per cubic centimeter in the airtight glass tube. If the calculated number of airtight glass tubes is not an integer, it shall be rounded up to the next integer.

Put the samples to be aged into the airtight glass tube; ensure that the sample masses in each airtight glass tube are the same. The samples that are used for the tearing resistance test shall be stacked together and then rolled and put into the airtight glass tube; the samples that are used for the folding endurance test shall be put into the rolled samples for the tearing resistance test.

If the mass of the absolutely dry samples per unit volume of the airtight glass tube is less than the specified value, more samples need to be cut into the airtight glass tube.

Put on the lid of the airtight glass tube and tighten it; ensure that the tube is completely airtight. Mark the outer surface of the airtight glass tube, so as to distinguish the sample in the tube.

Put the airtight glass tube that contains the sample into the blast drying oven for laboratory (4.1); perform ageing treatment of the sample for (120.0 ± 0.5) h.

9.2 Equilibrium of the sample after aging After taking the airtight glass tube out of the blast drying oven for laboratory, let the airtight glass tube cool to room temperature naturally and keep it for at least

1 h. Record any changes in the surface of the sample during this process. Do not open the threaded cap of the airtight glass tube during this process.

If the color of the sample surface becomes lighter during the cooling process, it means that the airtight glass tube is not completely sealed. These samples shall be discarded.