



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

GB/T 40278-2021

Paper and board - Accelerated ageing (exposure to light)

Issued on: May 21, 2021

Implemented on: December 1, 2021

Issued by: SAMR; SAC

Table of Contents

Foreword	3
1 Scope	5
2 Normative references	5
3 Principle	5
4 Instruments	6
5 Sample collection	6
6 Sample processing	7
7 Sample preparation	7
8 Analysis steps	7
9 Result calculation	8
10 Test report	9

1 Scope

This Standard specifies the test method for accelerated ageing of paper and board exposed to high light irradiance conditions, and predicts the effect of light ageing process on paper stability under natural conditions by evaluating the effect of ageing treatment on the optical properties of paper.

This Standard applies to all kinds of white or nearly white paper and board.

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

GB/T 21245, Paper and board - Determination of color (C/2°diffuse reflectance method) (GB/T 21245-2007, ISO 5631:2000, IDT)

GB/T 40277, Paper, board and pulps - Measurement of diffuse blue reflectance factor (ISO brightness) - Indoor daylight conditions (GB/T 40277-2021, ISO 2470-1:2016, MOD)

3 Principle

Expose the samples to high light irradiance conditions for ageing treatment;

compare the changes in ISO brightness and CIE-b* values before and after the ageing treatment of the samples, to measure the stability of the samples under natural light conditions.

If the front and back sides of the sample cannot be distinguished, a mark shall be made on the sample to ensure that the test surface of the sample is the same side.

6 Sample processing Take the sample out from the dark, and immediately perform temperature and humidity treatment on the sample under the standard atmospheric conditions that are specified in GB/T 10739.

7 Sample preparation The preparation of samples shall be carried out under the standard atmospheric conditions that are specified in Chapter 6. Cut two stacks of samples; the size of the sample shall meet the requirements of optical performance testing. One stack is used as the test sample and the other stack is used as the backing paper of the test sample. The number of test samples is not less than 10 pieces.

8 Analysis steps Under the standard atmospheric conditions that are specified in GB/T 10739, test the ISO brightness and CIE-b* value of the front side of the sample according to the requirements of GB/T 40277 and GB/T 21245 respectively. Be careful not to use the backing paper as the test sample during the test. Use an appropriate method to mark the test area of the sample, so as to ensure that the test is still performed in the same area after the sample is aged. Keep the backing paper for testing the optical properties of the sample after ageing.

After the test is completed, immediately put the sample into the light chamber (4.2), so that the surface of each sample is exposed to the same light irradiance (4.1). When placing the sample, be careful not to make it touch the inner wall of the light chamber. When placing and processing samples, the light chamber shall be under the standard atmospheric conditions that are specified in GB/T 10739.

After placing the sample in the light chamber, immediately expose the sample to the specified light irradiance for (120.0 ± 0.5) h; ensure that the surface temperature of each sample is between $22\text{ }^{\circ}\text{C} \sim 26\text{ }^{\circ}\text{C}$. Under the guarantee of the ratio of total irradiance to ultraviolet light content, an irradiance lower than the irradiance that is specified in 4.1 can be used, in which case the exposure time needs to be extended.

During the ageing process, the light chamber shall not be opened to put in or take out the sample.