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

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**Paper and board - Tests for colour fastness
(English Translation)**

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1 Scope

This document describes the test methods for evaluating the colour fastness (decolouration performance) of paper and board.

This document applies to the evaluation of colour fastness of dye coloured paper and board and those printed with dye inks.

This document does not apply to the evaluation of colour fastness of paper and board printed with pigment inks.

2 Normative references

The following referenced documents are indispensable for the application 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.

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 459 Paper and board - Determination of dimensional instability (GB/T 459-2002, eqv ISO 5635:1978)

GB/T 461.1 Paper and board - Determination of capillary rise (Klemm methods) (GB/T 461.1-2002, eqv ISO 8787.1989)

GB/T 461.3 Paper and board - Determination of water absorption (immersion in water) (GB/T 461.3-2005, ISO 5637.1989, MOD)

GB/T 462 Paper, board and pulps - Determination of moisture content of analytical sample (GB/T 462-2023, ISO 287.2017, ISO 638-1.2022, ISO 638-2.2022, MOD)

GB/T 7973 Paper, board and pulps - Measurement of diffuse reflectance factor (Diff/Geometry) (GB/T 7973-2003, ISO 2469.1994, NEQ)

GB/T 10739 Paper, board and pulps - Standard atmosphere for conditioning and testing (GB/T 10739-2023, ISO 187.2022, MOD)

GB/T 22880 Paper and board - Determination of CIE whiteness, D65/10° (outdoor daylight) (GB/T 22880-2008, ISO 11475.2004, MOD)

GB/T 24326 Pulps - Preparation of laboratory sheets for physical testing - Rapid-Kothen method (GB/T 24326-2009, ISO 5269-2.2004, MOD)

GB/T 41434-2022 Paper, board and pulps - Basic terms for optical properties (ISO/TR 10688.2015, MOD)

3 Terms and definitions

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

3.1

bleaching

Process of removing or modifying the coloured components of pulp to a certain extent to improve its brightness (blue light diffuse reflectance factor).

[Source. GB/T 4687-2007, 2.8]

3.2

decolouration

Chemical destruction of colour.

3.3

pad

An opaque pulp layer obtained after pulp is deposited on a filter paper and dried using laboratory equipment.

3.4

decolouration index; DRI

A value representing the decolouration efficiency.

NOTE: Values are expressed as a percentage (%).

3.5

trimulus values

4 Abbreviations

For the purpose of this document, the following abbreviations apply.

DRI. decolouration index

DTPA. diethylene triamine pentaacetic acid

5 Principle

Dye coloured paper and board and/or those printed with dye inks are pulped according to the prescribed method. The pulp is then bleached using two bleaching methods listed in this document. Pads are prepared from the unbleached pulp and the bleached pulp, respectively. The optical properties of the pads before and after bleaching are determined. The decolouration index of the paper and board corresponding to each bleaching method is calculated to evaluate the colour fastness of the paper and board.

6.1 Sodium dithionite reducing bleaching

6.1.1

Sodium dithionite ($\text{Na}_2\text{S}_2\text{O}_4$), purity greater than 80 %.

6.1.2 Chelating agent, DTPA type, concentration approximately 40 % (some

commercially available sodium dithionite products already contain a stabilizer; in this case, no additional chelating agent is needed).

6.1.3 Nitrogen (N_2), purity 99.99 %.

6.1.4 Sulfuric acid (H_2SO_4), concentration 2 mol/L (4N).

6.1.5 Distilled water, at room temperature.

6.2 Hydrogen peroxide oxidative bleaching

6.2.1

Hydrogen peroxide (H₂O₂), peroxide concentration shall not exceed 40 g/L.

6.2.2

Sodium hydroxide (NaOH), chemically pure.

6.2.3

Chelating agent, DTPA type, concentration approximately 40 %.

6.2.4

Sodium silicate (Na₂SiO₃), chemically pure.

6.2.5

Distilled water, at room temperature.

6.3.1 High-molecular-weight, low-cationic-charge polyacrylamide, powder, prepared

as a 1 g/L aqueous solution as a flocculant.

6.3.2 Aluminum sulfate [Al₂(SO₄)₃] solution, mass concentration 330 g/L.

6.3.3 Distilled water, room temperature.

7.1 Pulping

Hydraulic pulper, 5 L capacity, capable of pulping at a relatively high pulp concentration (approximately 100 g/L).

7.2 Sodium dithionite reducing bleaching

7.2.1

Electronic balance, with a graduation value of 0.1 g.

7.2.2

pH meter.

7.2.3

Sealable glass jars (1 L or 2 L food storage containers).

7.2.4

Water bath, capable of maintaining a temperature of (50 ± 2) °C.