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

GB/T 46445.1-2025

**Imaging materials and prints - Abrasion resistance - Part 1:
General rub testing methods**

影像材料和印刷品 耐磨性 第1部分：通用摩擦试验方法
(English Translation)

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document is Part 1 of GB/T 46445 "Abrasion Resistance of Imaging Materials and Printed Matter". GB/T 46445 has published the following...

part.

---Part 1: General Friction Test Methods this document adopts ISO 18947-1:2021 "Abrasion resistance of imaging materials and printed matter - Part 1: General methods of friction testing".

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Petroleum and Chemical Industry Federation.

This document is under the jurisdiction of the National Technical Committee on Standardization of Photosensitive Materials (SAC/TC102).

Introduction

GB/T 46445, "Abrasion Resistance of Imaging Materials and Printed Matter," aims to establish abrasion resistance standards applicable to a wide range of imaging materials and printed matter.

The test program is planned to consist of two parts.

---Part 1: General Friction Test Methods. The aim is to provide a general method for testing the abrasion resistance of imaging materials and printed matter.

---Part 2: Abrasion Tests on Photographic Prints. The purpose is to provide abrasion resistance tests for various types of photographic prints under mild abrasion.

method.

This document describes one of a series of methods related to the durability and longevity of printed images, namely, the application of heat and moisture to the material under conditions of use.

Resistance to physical, mechanical, chemical, and/or environmental stresses. The durability of an image under environmental stress is tested individually for each of the following stress factors. light.

(ISO 18937[11]), heat (ISO 18936[10]), ozone (ISO 18941[12]), and humidity (ISO 18946[13]). These stress factors are caused by the environment.

The environmental conditions are given (users typically have limited control over these conditions). Exposure to mechanical and physical stresses is generally controllable by the user, except...

Non-aggressive treatment is an essential component for the intended use. ISO 18947 (all parts) addresses the effects of abrasion or smudging on printed materials that cause image damage or smudging.

The rubbing test was performed. ISO 18922[8] (for film), ISO 18951[14] (all parts) (for reflective printing, currently under development) the durability tests were conducted in accordance with the standards of China National Nuclear Corporation (CNNC) and ISO 18935[9], respectively, simulating accidental water leakage or food leakage.

Surface friction processes can lead to various types of degradation, such as wear, scratches, and dirt accumulation. These degradation phenomena may manifest as changes in color intensity.

The effects include a decrease in intensity, the appearance of scratches, changes in gloss, coloration of previously colorless areas, and the transfer of pigment to the acceptor.

This document provides standardized requirements for evaluating the abrasion resistance of various types of printed images.

Wear and smudges include both accidental stress generated during image processing and stress caused by repetitive operations. Here are some examples of wear and smudges.

Example of a source.

- The friction of dirt particles on the surface of printed materials;
- Friction between papers (relative sliding);
- The sliding of printed matter on a desktop or other flat surface;
- Contact with dirt or components inside the printer;
- Magnets or other items used to display images.

The second edition transforms ISO 18947 into a partial standard, aiming to expand its application to include both analog and digital photography.

Films, graphics, and office printed materials. Furthermore, the second edition allows for the use of more types of abrasion testers. The degree of abrasion observed during testing is taken as...

It depends on a combination of many factors, including the testing printing material itself and the testing equipment.

Different testing devices vary depending on the equipment force, the relative motion of the sample (direction and velocity), the test length on the equipment, and the selection of the abrasive acceptor material.

Different factors, such as selection and geometry, result in different levels of frictional strength.

Material factors that affect the coefficient of friction and thus the sensitivity of printed images to wear conditions include surface roughness, surface elasticity, and substrate.

The porosity, chemical agents, and migration of colorants within the surface or receiving layer.

A research project aimed at expanding the applicability of this standard to various types of printed matter[24] attempted to link the degree of wear with surface roughness, surface the factors are related to the combination of elasticity, substrate porosity, paper fiber orientation, and ink composition. The sample used was a black sheet-fed offset print.

The substrate, printed materials, and test samples were all studied for the aforementioned properties. The receptors were measured using a scanning densitometer and colorimetry under diffused sample illumination.

The extent of mass transfer was examined using measurements and two different scanner-based image analysis systems. To date, an optical measurement and visual...

The correlation between assessments. This is the background for the requirement in this document to perform visual assessments on the wear sample series.

On coated photographic paper, a cyclical study was conducted by Working Group 5 of the International Organization for Standardization's Technical Committee on Photography (ISO/TC42/WG5).

A study (testing samples from the same source in multiple laboratories) revealed a correlation between wear results obtained using reciprocating and planar wear testers.

The study encompassed various imaging techniques, including silver halide, inkjet, electrophotography, and dye diffusion thermal transfer. Combined with the results of IPI[23], this study...

The study of ring abrasion provides the background for ISO 18947-2. This document is specifically for (quasi-)linear, reciprocating abrasion testing, applicable to coated photographic paper.

This includes laminated photographic paper, waterproof photographic paper, water-permeable photographic paper, and photographic film. The term (quasi) linearity refers to the properties of the film on a Sutherland type tester (see A.1).

The test motion follows the arc segment of a large-diameter circle, resulting in primarily linear motion with small orthogonal components.

Abrasion resistance of imaging materials and printed matter Part 1: General Friction Test Methods