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

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**Imaging materials - Colour reflection prints - Test method for
ozone gas fading stability**

影像材料 彩色反射照片 臭氧褪色稳定性的试验方法

(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 adopts ISO 18941:2020 "Photographic materials - Test methods for ozone fading stability of color reflective photographs".

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

In image durability testing, four environmental variables are known to affect the stability of photographic images. heat, light, humidity, and air pollution, such as...

Ozone (see references [13]~[26]). Although these variables are considered to be naturally aged at "real-world" environmental levels, they are also considered to be contributing factors to image retention.

Durability is the only definitive test, but the high stability of most modern photographic products makes testing them under natural environmental conditions too...

The process is too lengthy and impractical. Therefore, accelerated aging is a widely used alternative to natural aging, which involves exposing the sample to a specific environment.

Among environmental variables, the exposure level is much higher than the environmental level, forcing the image to degrade due to a single factor in a shorter time.

This document covers known devices, methods, and procedures for generating ozone, as well as the subsequent measurement and quantification of the ozone produced in photographic images due to exposure.

The change in the amount of life. It is important to note that if researchers are concerned with predicting the absolute lifespan of the product, further understanding of the accelerated ozone conditions in the experiment is necessary.

The reciprocity behavior of the test products is described in Appendix A. For more information on reciprocity behavior, please refer to Appendix A.

In addition, other known variables in ozone testing equipment can affect the rate of image degradation in the presence of ozone. These factors include...

Airflow over the sample, the nature of the ongoing chemical reaction, the relative amounts of reactants (ozone and colorant molecules), and the image recording layer.

Humidity and pH levels. Each of these variables affects the reciprocal response, therefore understanding these variables is necessary for a clear analysis of the additives.

Rapid aging data.

In certain products, such as dyes on most expandable inkjet media and silver halide

products in gelatin, ozone reaction is considered to be affected.

Diffusion-controlled, meaning ozone must first penetrate into the surrounding protective matrix before it can come into contact with and react with colorant molecules.

In addition, before unreacted fresh molecules can diffuse, adsorb, and react again, the reactant components need to be desorbed and removed from the surface. In this type...

During the reaction process, diffusion, adsorption, and in some cases desorption may be the main factors controlling the reaction rate, therefore, ozone concentration...

A simple increase in temperature may or may not lead to a proportional increase in the reaction rate.

The relative amounts of reactants (ozone and colorant) also affect the reaction rate and reciprocal behavior. Under assumed environmental conditions, relative to air...

The local concentration of ozone molecules in the atmosphere means that photographic images will undoubtedly contain a large number of colorant molecules. In this context, ozone is likely the controlling factor for the reaction rate.

The rate is limited by factors, and in the absence of other controlling factors, an increase in ozone concentration will proportionally increase the reaction rate. At a certain point...

At precise ozone concentrations, with equal amounts of reactants, the reaction proceeds at its maximum rate. However, further increases in ozone concentration will not...

Accelerated reaction rates cause the reciprocity relationships required to translate aging test data into environmental performance predictions to fail. Therefore, if you want to predict product performance...

Lifespan requires determining the ozone concentration, and this concentration must not be exceeded during testing.

This document primarily developed through inkjet image testing on porous, "instant-drying" photographic media.

Oxidizing gases present in ambient air that are proven to be easily polluted cause oxidative fading (see references [14][19][20][21]). Although pollutants While many chemicals may be present in the air, it has been shown that most fading observed in current inkjet systems can be mitigated by ozone oxidation.

This can be explained (see references [21][27][28]). Furthermore, this method can be used for the production of other digital and traditional "continuous tone" photographic materials.

Color photographic images, such as those from silver halide dyes, silver dye bleaching agents, dye transfer, "instant" dye diffusion transfer, and other similar systems. However, Because these systems have been shown to be generally less sensitive to the oxidative degradation of ozone, typical durations of such tests on these imaging systems are...

Within a given timeframe, this accelerated testing method may not be able to achieve a relatively low level of image degradation.

In summer, urban areas often have high ozone levels, which, combined with high humidity, greatly accelerates image fading. Because ozone is...

A highly reactive gas, so it will greatly reduce ozone buildup in any type of airtight enclosure, such as a glass back frame or photo album.

The resulting image fades. Therefore, this method is primarily used for unprotected photographs.

Image material color reflection photograph Test methods for ozone fading stability

1 Scope

This document describes the equipment, methods, and procedures for generating ozone, as well as the measurement and quantification of digital printed hard copy images and conventional analog color.

The amount of change in a photographic image due to this exposure.

The test method described in this document accelerates the test by increasing the ozone level. If the system's primary "gas decolorization" medium...

If it is not ozone, then this method may not be applicable and may give misleading results regarding the test images' tolerance to polluted air.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies.

This document.

gy-densitymeasurements-Part 3: Spectralconditions) Note. GB/T 12823.3-2025
Photographic and graphic techniques - Density measurement - Part 3: Spectral conditions (ISO 5-3:2009, MOD) Note. GB/T 12823.4-2008 Photographic density measurement - Part 4: Geometric conditions for reflectance density (ISO 5-4:1995, IDT) ISO 1431-3 Resistance of vulcanized or thermoplastic rubber to ozone cracking - Part 3: Determination of ozone concentration in laboratory test chambers Note. GB/T 35804-2018 Test method for ozone concentration in a test chamber for determining the ozone resistance of vulcanized or thermoplastic rubber to ozone cracking (ISO 1431-3.

2000, IDT)