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

GB/T 12823.2-2026

Replacing GB/T 11500-2008

**Photography and graphic technology - Density measurements -
Part 2: Geometric conditions for transmittance density**

摄影和图形技术 密度测量 第2部分：透射密度的几何条件

(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 2 of GB/T 12823 "Photographic and Graphic Techniques - Density Measurement". GB/T 12823 has been published as follows.

part.

---Part 1: Geometric and Functional Notation;

---Part 2: Geometric Conditions of Transmission Density;

---Part 3: Spectral Conditions;

---Part 4: Geometric conditions for reflectance density.

This document supersedes GB/T 11500-2008 "Photographic Density Measurement Part 2: Geometric Conditions for Transmission Density" and is consistent with...

Compared with GB/T 11500-2008, apart from structural adjustments and editorial changes,

the main technical changes are as follows.

- a) The scope of the document has been changed (see Chapter 1, Chapter 1 of the 2008 edition);
- b) Some terms and definitions have been added or deleted (see Chapter 3, Chapter 3 of the 2008 edition);
- d) Added standardized function notation (see 6.5);
- e) The terms "ISO 5 standard diffuse density" and "ISO 5 standard projected density" have been changed (see Chapters 6 and 7, and Chapter 5 of the 2008 edition).
Chapter 6);
- f) Added content and methods related to "consistency testing" (see Chapter 8);
- g) A method for determining whether actual parameters meet the deviation requirements has been added (see Appendix B).

This document is equivalent to ISO 5-2:2009 "Photographic and graphic techniques - Measurement of density - Part 2: Geometric conditions for transmission density".

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 12823 "Density Measurement in Photographic and Graphic Techniques" aims to establish standards applicable to density measurement in the fields of photographic and graphic techniques.

Therefore, it is proposed to consist of four parts.

---Part 1: Geometric and Functional Notation. The aim is to establish the geometric conditions involved in density measurements and the representation of related functions.

---Part 3: Spectral Conditions. The purpose is to establish the spectral correlation conditions for density measurements.

---Part 4: Geometric Conditions for Reflection Density. The aim is to establish the geometric conditions for reflection density in density measurements.

This document specifies the geometric conditions for transmission density measurement, which is primarily applied to black-and-white and color photography and graphics

technology, and can also be used for other purposes.

This document aims to specify the geometric conditions for optical density measurement that approximate practical application conditions. Diffuse transmission density, in particular, is related to contact printing and...

The evaluation of films on a viewing box is closely related to activities such as viewing films. Viewing films on a lightbox is one of the important applications of diffuse transmission density. Therefore, for diffuse transmission...

The conditions specified for diffuse transmission density measurement take into account the diffuse characteristics of the viewing box and the spectral reflectance factor. Another important application is the measurement of diffuse transmission density.

This document describes the degree of opacity in black and white film used in printing technology, thereby measuring the percentage of opaque areas. It also describes the geometric conditions for two projection densities.

The spectral conditions are specified in ISO 5-3.

The main change between the first edition (GB/T 11500-1989) and the second edition (GB/T 11500-2008) of this document is the adoption of a diffuser.

(Usually "opaque glass") is used as an alternative to the integrating sphere method as the basis for the diffuse transmittance density in the ISO 5 standard. Although meeting any of the requirements specified in this document...

Diffuse methods can all be used, but for simplicity, they are usually labeled "milky glass" to distinguish them from the integrating sphere diffuse method. Because of the milky white glass...

The mutual reflection between the white glass and the sample results in a density value that is typically slightly lower than that obtained using the integrating sphere method.

The actual effect depends on the reflectivity of the opal glass and the sample surface facing the diffuser.

Diffuse transmission density is a measure of a film's ability to control light. A film is diffusely illuminated on one side and viewed from the other; this is analogous to diffuse transmission density.

Viewing a film on a transmitted radiation source (illuminator) is the same. Projection geometry with diffuse illumination is almost equivalent to viewing a film on a diffuse radiation source.

The geometric conditions of the film are simply that the projection lens replaces the human eye. When the film is placed on a diffuse radiation source or in contact with the printing material, the light reflects off the sample and...

There is mutual reflection between the nearby surfaces. This mutual reflection affects the density value, and it is best to use a measuring instrument with opaline glass as the light condenser.

The integrating sphere takes this effect into account, while the integrating sphere does not. In addition to the main reasons mentioned above, the use of opalescent glass in the densitometer is also due to its greater durability.

It is easy to use, has low manufacturing cost, and is convenient to use.

Project the image. Use a device with a condenser lens to view microfilm, movies, slides, and printed photographs. The projection density defined in this document...

The geometric conditions simulate this condition. in a typical projection system with a condenser lens, the transmission characteristics of a small area of the negative or slide at the center of the frame...

Conditions that affect sexuality. It can be defined by a small aperture called a sampling aperture or an opaque membrane within the frame.

The density being measured depends on the half-angle of the cone of the incident light and the half-angle subtended by the projection lens towards the sampling aperture. This half-angle can be expressed using an angle meter.

The projection density is indicated by either the f-number or the f-number itself. Since the f-number is often marked on the projection lens, this document uses the f-number to represent the two projection density types.

f/4.5 and f/1.6. The f/4.5 model is widely used because it is used in microfilm readers. The f/1.6 model is representative of movie projectors.

This document has undergone significant changes compared to the previous version, as detailed below.

a) For diffuse transmission density and projected density, the term "transmission (factor) density" has been replaced by "transmission (ratio) density." Both types of density...

All measurements need to be performed relative to the incident flux (total incident flux), therefore it is necessary to measure the regular transmittance or diffuse transmittance of the sample.

The correct density term corresponding to a regular transmittance ratio, as stated in GB/T 12823.1, is "transmittance (ratio) density".

Unless otherwise specified, "transmission density" in this document refers to "transmission (ratio) density".

b) A distinction is made between the ideal and actual parameters of transmission density. The ISO 5 standard definition of transmission density is based on the parameters...