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**NATIONAL STANDARD OF THE  
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**Photography - Transmission and reflection densitometers -  
Method for determining performance**

摄影 透射和反射光密度计 性能测定方法

**(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 14807:2001 "Methods for determining the performance of phototransmittance and reflectance densitometers".

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 recent years, the performance specifications of densitometers have been a topic of in-depth discussion. Densitometer customers have received numerous inquiries regarding their performance.

Clarity and standardization. Furthermore, different manufacturers often use different terminology when describing the same characteristics. Therefore, this document is intended to clarify these differences.

This document aims to define three performance characteristics: repeatability, stability, and bias estimation. It also provides standardized methods for evaluating these characteristics.

Method. Using any one or all of these three characteristics to describe the performance of a single density meter will help in comparing different density meters.

performance.

The first two characteristics, namely repeatability and stability, are evaluated using appropriate periodic sampling methods, and the densitometer manufacturer can report these characteristics.

The average or typical repeatability and stability of a density meter of a given category, type, or model are used as specifications. Due to the mutual cancellation of positive and negative deviations, the deviation...

The average of variance estimates across a specific category, type, or model has limited significance. Therefore, such variance estimates (e.g., as simple arithmetic mean) are not meaningful.

The value of the (fixed) value is limited and not reported. The bias determined as the arithmetic mean is only considered when there is a systematic design flaw across the entire category, type, or model.

Only then can the deviation estimate be meaningful. Currently, there is no consensus on how to provide the most meaningful deviation estimate for the category, type, or model of a densitometer.

A consensus has been reached.

Standardized methods for repeatability and stability testing provide manufacturers with a unified benchmark, using the performance characteristics of densitometers as their specifications.

In this way, customers can compare the performance of different products based on a unified and clear standard, making it easier to understand the performance of different densitometer models in repeated measurements.

Performance in terms of consistency and long-term stability allows for more informed choices. These standardized evaluation methods promote technological exchange.

This has raised industry standards and ensured that customers can obtain reliable and comparable performance metrics.

To clarify and promote mutual understanding, this document provides a list of definitions applicable to performance characteristics.

Photographic transmission and reflection densitometer Performance testing methods

## 1 Scope

This document describes the methods used to determine and represent the performance of individual densitometers and the performance reported by manufacturers, and specifies a set of common reporting standards.

Report parameters.

This document applies to transmission and reflection densitometers manufactured and used for the photography, graphics, and radiography industries.

## 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.

**Note:** GB/T 12823.1-2008 Photographic density measurement - Part 1: Terminology, symbols and representations (ISO 5-1:1984, IDT) ISO 5-2 Photographic and Graphical Techniques - Density Measurement - Part 2: Geometric Conditions of Transmission Density Note. GB/T 11500-2008 Photographic density measurement - Part 2: Geometric conditions for perspective density (ISO 5-2:2001, IDT) gy-Density measurements-Part 3: Spectral conditions) 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)

## 3 Terms and Definitions

The following terms and definitions apply to this document.

**Note:** There are many commonly used terms related to metrology, such as bias, repeatability, stability, and traceability. To avoid confusion, the use of these terms should conform to international standards.

The terms should be consistent. Definitions of such terms can be found in the International Glossary of Fundamental and General Terms in Metrology (see reference [3]), and their titles are usually abbreviated.

For VIM.

A quantity value that is consistent with the definition of a given specific quantity.

**Note 1:** The true value of a quantity can only be obtained through precise measurement.

**Note 2:** The truth value is inherently uncertain.

**Note 3:** There is not necessarily only one value that is consistent with the definition of a given specific quantity.

[Source. VIM..1993, 1.19]