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

GB/T 44268.1-2024

**Microscopes - Definition and measurement of illumination
properties - Part 1: Image brightness and uniformity in
brightfield microscopes**

显微镜 照明特性的定义和测量 第1部分：明场显微镜的图像亮度和均匀性

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part

1. Structure and drafting rules for standardization documents" Drafting is required. This document is part 1 of GB/T 44268 "Definition and measurement of microscope illumination characteristics". GB/T 44268 has been published. The following parts. Part

1 Scope

GB/T 44268.1-2024 is the first part of the Chinese standard on the illumination properties of microscopes and it covers image brightness and uniformity in brightfield microscopy. It addresses a gap that has become a practical problem now that microscope images are measured rather than merely looked at: a digital image whose illumination falls off towards the edges gives different intensity readings for identical objects at different positions in the field, and in quantitative pathology, in materials analysis and in automated screening that is a measurement error rather than an aesthetic one. The standard defines the quantities, image brightness and the uniformity of illumination across the field, states how each is to be measured, the instrumentation required and its calibration, the alignment and the setting of the microscope before measurement, the sampling of the field, the calculation and the

expression of the result, and the reporting. For a microscope maker, a laboratory validating an imaging system or a buyer comparing instruments in China, this is the reference method.

This document specifies the image brightness and uniformity when the image plane or intermediate image plane of a brightfield microscope is suitable for inspection using electronic imaging equipment. Measurement procedure. This document defines how to measure the brightness and uniformity of an image and provide related information to the user. NOTE. This document is limited to testing the illumination characteristics of the microscope using electronic imaging equipment. If visual testing is performed through the eyepiece, additional measurement procedures are required. This should therefore be made clear in the description of the measurement procedure. Nevertheless, visual observation of the intermediate image plane through the eyepiece will provide an effective indication of image brightness. assessment.

2 Normative references

This document has no normative references.

3 Terms and definitions

There are no terms or definitions that require definition in this document.

4 Measurement parameters

4.1 General To achieve the desired image quality in optical microscopy, image brightness and uniformity play an important role. It's all like that. This document is limited to electronic imaging equipment used to test image brightness and uniformity, and transmissive or laser illumination. Reflected bright-field microscopy.

4.2 Brightness The image to be measured should be bright enough to detect the details of the object to be measured. NOTE. This applies in particular to microscopic contrast-enhancing techniques such as phase contrast, differential interference contrast, darkfield microscopy, or fluorescence microscopy. Beyond the scope of this paper, but the concepts given can be easily extended. Since this document is based on a measurement procedure, image brightness should be expressed in the corresponding SI units. In the spectral range (380 nm to 780 nm), the light sources are usually incandescent lamps, halogen lamps and fluorescent white LEDs, and the unit of illumination should be used. The unit of irradiance (W/m^2) for radiometric measurements is used for all other sources of illumination (e.g. discharge arc lamps, lasers, and single-lens LEDs) and more generally in the UV and IR spectral ranges.

4.3 Uniformity The optical system of the microscope should achieve a certain degree of image brightness uniformity to facilitate the detection of details of the object being

measured. The brightness of the image will decrease, which will cause the image brightness value to fail to meet the above requirements.

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