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Microscopes — Definition and measurement of illumination properties —

Part 1: Image brightness and uniformity in bright field microscopy

Microscopes — Définition et mesurage des propriétés d'éclairage —

Partie 1: Luminosité et uniformité de l'image en microscopie à champ clair

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Foreword

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The committee responsible for this document is ISO/TC 172, *Optics and photonics*, Subcommittee SC 5, *Microscopes and endoscopes.*

ISO 19056 consists of the following parts, under the general title *Microscopes — Definition and measurement of illumination properties*:

— *Part 1: Image brightness and uniformity in bright field microscopy*

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Microscopes — Definition and measurement of illumination properties —

Part 1: Image brightness and uniformity in bright field microscopy

1 Scope

This part of ISO 19056 specifies procedures for the measurement of image brightness and uniformity for bright field light microscopy. These measurements for image brightness and uniformity are defined in image planes or intermediate image planes only, when these planes are suitable for detection by electronic imaging devices.

This part of ISO 19056 defines how image brightness and uniformity are measured and how this information is provided to the user.

NOTE The scope is intentionally limited to electronic imaging devices and (intermediate) image planes. The visual observation by means of eyepieces would require a different measurement procedure and hence result in unambiguities in the description of measurement procedures. Nevertheless, this part of ISO 19056 will give useful estimates for the image brightness with visual observation as in this case, an eyepiece is used to observe an intermediate image plane (which is under the scope of this part of ISO 19056).

2 Measurands

2.1 General

For obtaining the desired image quality when using a light microscope, the brightness and uniformity of the image play an important role. This holds true for different applications and various types of instruments.

Intentionally, this part of ISO 19056 is limited to bright field microscopy and detection by means of electronic imaging devices but within this limitation, this part of ISO 19056 does apply to transmitted or reflected light microscopy and conventional or laser illumination.

2.2 Brightness

The image shall be bright enough to allow the detection of the details of the object under investigation.

NOTE This is especially true for microscopic contrasting techniques like phase contrast, differential interference contrast, dark field microscopy, or fluorescence microscopy. Although these contrasting techniques are beyond the scope of this part of ISO 19056, the given concepts can be easily extended.

As this part of ISO 19056 is based on measurement procedures, the image brightness shall be expressed in the corresponding SI units. The photometric unit Illuminance (measured in lm/m^2) shall be used whenever the illumination source covers the visible spectral range (380 nm to 780 nm) continuously, which is usually the case for filament and halogen lamps as well as for phosphor-type white LEDs. The radiometric unit irradiance (measured in W/m^2) shall be used for all other illumination sources (like discharge arc lamps, lasers, and single colour LEDs) and are more generally applicable, e.g. to the ultraviolet and infrared spectral range.

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