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Microscopes — Designation of microscope objectives —

Part 3: Spectral transmittance

Microscopes — Désignation des objectifs de microscope —

Partie 3: Facteur de transmission spectrale

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

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

ISO 19012 consists of the following parts, under the general title *Microscopes — Designation of microscope objectives*:

— *Part 1: Flatness of field/Plan*

— *Part 2: Chromatic correction*

— *Part 3: Spectral transmittance*

Introduction

The spectral transmittance of microscope objectives is an important parameter that allows users to choose the appropriate product for a given application. Certain elements of glass material, cements, coatings, and optical design will have an effect on the spectral transmittance characteristics of microscope objectives. For example, one can choose to emphasize broad ranges of wavelengths or peak transmission in narrow bands or trade-off aberrations vs wavelength range. Therefore, the design of the lens set determines its spectral transmittance. A standard way to represent the spectral transmittance as a result of its design criteria was developed to address this important requirement.

Microscopes — Designation of microscope objectives —

Part 3: Spectral transmittance

1 Scope

This part of ISO 19012 specifies the relation of spectral characteristics between optical design and the description to microscope users for the spectral transmittance of objectives, as the guideline.

NOTE This part of ISO 19012 does not apply to objectives exclusively used on stereomicroscopes.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 10934-1, *Optics and optical instruments — Vocabulary for microscopy — Part 1: Light microscopy*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 10934-1 and the following apply.

3.1
OSTD
objective spectral transmittance by design
spectral transmittance calculated under the following conditions:

a) on-axis light path;

b) internal absorption of transparent materials according to specifications by the materials manufacturer is included;

c) reflectance of thin film coatings on optical surfaces according to their nominal value is included;

d) internal absorption and surface reflectance of immersion media and specimen covering is neglected

Note 1 to entry: OSTD is usually expressed as a percentage.

4 Requirements

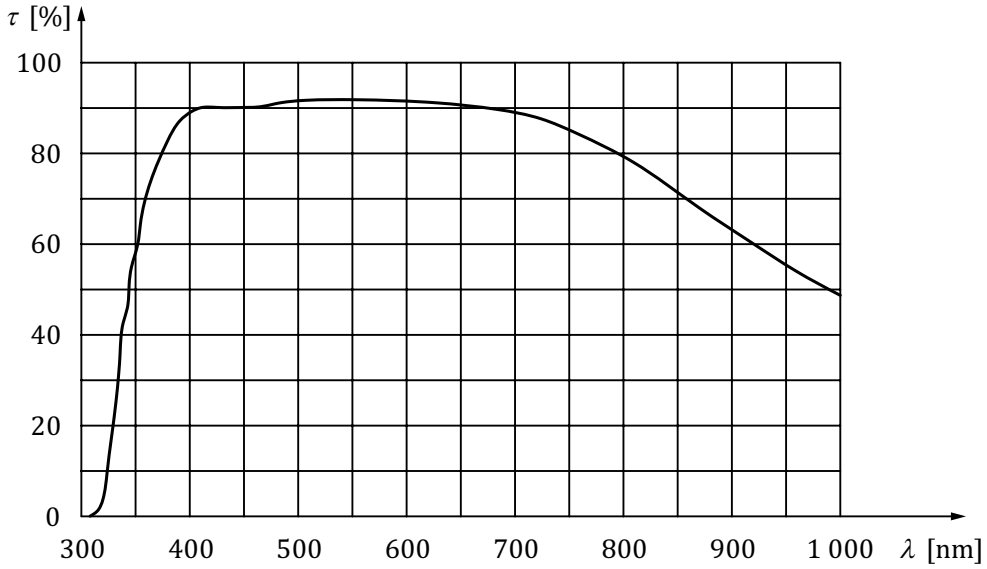
4.1 General

Transmittance data for microscope objectives given in catalogues, instruction manuals, websites, or other sources shall be labelled as OSTD.

When OSTD is used in the designation of microscope objectives according to this part of ISO 19012, then it shall be made in either of two ways described in 4.2 and 4.3.

4.2 Spectral transmittance table or diagram

See Figure 1 for an example of an appropriate transmittance diagram.



Key

λ wavelength

τ transmittance

Figure 1 — Example of spectral transmittance diagram

4.3 OSTD description

The OSTD description shall be in accordance with Table 1.

Table 1 — OSTD of objectives

Spectral transmittance	Description[a]	Examples
$\tau_{OSTD} \geq 80$ %	◎ $\lambda_1 - \lambda_2$ or High OSTD in $\lambda_1 - \lambda_2$	EXAMPLE 1 Designation of an objective with transmittance $\tau_{OSTD} \geq 80$ % in the wavelength range 400 nm to 700 nm: ◎ 400 - 700 or High OSTD in 400 – 700
	◎ λ_3 or High OSTD at λ_3	EXAMPLE 2 Designation of an objective with transmittance $\tau_{OSTD} \geq 80$ % at the wavelength 1 064 nm: ◎ 1 064 or High OSTD at 1 064
[a] $\lambda_1, \lambda_2, \lambda_3$ are indications of wavelengths, in nanometres, and shall be included in the description.		

Table 1 *(continued)*

Spectral transmittance	Description[a]	Examples
$\tau_{OSTD} \geq 25\ \%$	O$\lambda_1 - \lambda_2$ or Nominal OSTD in $\lambda_1 - \lambda_2$	EXAMPLE 3 Designation of an objective with transmittance $\tau_{OSTD} \geq 25\ \%$ in the wavelength range 340 nm to 1 100 nm: O 340 – 1 100 or Nominal OSTD in 340 – 1 100
	Oλ_3 or Nominal OSTD at λ_3	EXAMPLE 4 Designation of an objective with transmittance $\tau_{OSTD} \geq 25\ \%$ at the wavelength 340 nm: O 340 or Nominal OSTD at 340
[a] $\lambda_1, \lambda_2, \lambda_3$ are indications of wavelengths, in nanometres, and shall be included in the description.		