INTERNATIONAL STANDARD

ISO 19012-1

Third edition
2013-05-15

Microscopes — Designation of microscope objectives —

Part 1:
Flatness of field/Plan

Microscopes — Désignation des objectifs de microscope —

Partie 1: Planéité du champ/Plan

Reference number
ISO 19012-1:2013(E)

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Published in Switzerland

Contents

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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. www.iso.org/directives

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

This third edition cancels and replaces the second edition (ISO 19012-1:2011) by the addition of “Petzval curvature”.

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*

The following parts are under preparation:

- *Part 3: Spectral transmittance*

Microscopes — Designation of microscope objectives —

Part 1:
Flatness of field/Plan

1 Scope

This part of ISO 19012 specifies the use of the marking “Plan” on microscope objectives, and defines the diameter of the sharp region of the primary image of a flat object surface. This part of ISO 19012 applies to visual observation using the combination of objective lens, tube lens and eyepiece, as specified by the manufacturer.

This marking is consistent with ISO 8578.

NOTE The flatness of the image field does not imply any degree of correction for other aberrations (ISO 10934-1).

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
tangential structured object
object containing short lines perpendicular to the radii of the object field

3.2
tangential image surface
surface on which all tangential structured objects are focused and sharply imaged in the primary image space subject to no aberrations other than astigmatism and Petzval curvature

3.3
sagittal structured object
object containing short lines parallel to the radii of the object field

3.4
sagittal image surface
surface on which all sagittal structured objects are focused and sharply imaged in the primary image space subject to no aberrations other than astigmatism and Petzval curvature

3.5
astigmatic difference
dimensional difference along the optical axis in the tangential plane between the tangential and sagittal image surfaces

3.6

plan field number

PFN

number which specifies the diameter, in millimetres, of the sharp region of the primary image of a flat object surface

3.7

objective field number

OFN

maximum field of view number of the eyepiece for which the objective is designed to be used

3.8

plan field ratio

PFR

ratio of the plan field number to the objective field number, defined as PFR = PFN/OFN

3.9

Petzval curvature

curvature of the Petzval surface, which denotes the basic field curvature

4 Requirements

4.1 Indication

Objective lenses named Plan or with Plan as part of the name in the markings shall also indicate the objective field number on the body of the lens. If the words "flat field" are used in the name in the marking, then the lenses shall also be marked "Plan" with an indication of the OFN on the body of the lens. The indication of objective field number does not apply to objective lenses sold before the year 2014.

Objective field numbers shall be expressed as follows:

18, 19, 20, 21, 22, 23, 24, 25, 26, 26.5, 27, 28, 29, 30 and so on

EXAMPLE In the case of the objective field number 25:

OFN25

4.2 Definition of plan objectives

The plan field ratio of a plan objective lens shall be at least 0,85.

4.3 Determination of plan field number

Let τ_t and τ_s be the respective distances of the tangential and sagittal image surfaces from the image plane, along the optical axis in a tangential plane. Using τ_t and τ_s, the average image surface distance, Δ, is defined as shown in Formula (1):

$$\Delta = (\tau_t + \tau_s)/2 \tag{1}$$

The plan field number shall be specified by the maximum field of view of the primary image which satisfies the following conditions: the absolute values of both Δ and astigmatic difference $(\tau_t - \tau_s)$ are