

INTERNATIONAL  
STANDARD

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**Optics and optical instruments —  
Microscopes — Spectral filters**

*Optique et instruments d'optique — Microscopes — Filtres colorés*

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Reference number  
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## Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 8577 was prepared by Technical Committee ISO/TC 172, *Optics and optical instruments*, Subcommittee SC 5, *Microscopes and endoscopes*.

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## Introduction

The objective of this International Standard is to define the diameters of spectral filters used in microscopes in order to make an exchange of these filters possible.

In addition, qualitative specifications are given for the optical properties of two kinds of filters: filters which can be used in the observation light path, and others with larger optical tolerances which are used in the illumination light path.

By choosing appropriate filters, optical microscope illumination can be modified in order to make it possible to view specific details or to improve their observation.

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# Optics and optical instruments — Microscopes — Spectral filters

## 1 Scope

This International Standard specifies recommended diameters to allow the interchangeability of spectral filters used in microscopes, as well as permissible filter material defects and processing faults.

This International Standard differentiates between two forms of spectral filters:

Form A: Filters to be used both in the observation light path and in the illumination light path;

Form B: Filters to be used solely in the illumination light path.

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 10110-3:1996, *Optics and optical instruments — Preparation of drawings for optical elements and systems — Part 3: Material imperfections — Bubbles and inclusions.*

ISO 10110-4:—<sup>1)</sup>, *Optics and optical instruments — Preparation of drawings for optical elements and systems — Part 4: Material imperfections — Inhomogeneity and striae.*

ISO 10110-5:1996, *Optics and optical instruments — Preparation of drawings for optical elements and systems — Part 5: Surface form tolerances.*

ISO 10110-7:1996, *Optics and optical instruments — Preparation of drawings for optical elements and systems — Part 7: Surface imperfection tolerances.*

ISO 10110-8:—<sup>1)</sup>, *Optics and optical instruments — Preparation of drawings for optical elements and systems — Part 8: Surface texture.*

1) To be published.

### 3 Requirements

The requirements for interchangeable spectral filters for microscopes are given in table 1.

**Table 1 — Spectral filter diameters, permissible material defects and processing faults**

Parameter	Parameter value					
	Filter form A		Filter form B			
Recommended diameter $\bar{d}$ mm	20	25	20	25	32	45
Tolerance on $\bar{d}$ mm	0 — 0,13		0 — 0,13		0 — 0,16	
Diameter of test region for permissible defects mm	$\bar{d} - 1$		$\bar{d} - 1$			
Impurities <sup>1)</sup> in accordance with ISO 10110-7	5/2 × 0,10	5/4 × 0,16	5/2 × 0,25	5/4 × 0,25	5/3 × 0,40	5/5 × 0,40
Striae <sup>2)</sup> in accordance with ISO 10110-4	2/—;4		2/—;1			
Surface form tolerance <sup>3)</sup> in accordance with ISO 10110-5	3/3 (0,5)		3/20 (10)			
Surface quality <sup>4)</sup> in accordance with ISO 10110-8						
Bubbles <sup>5)</sup> in accordance with ISO 10110-3	1/2 × 0,10		1/2 × 0,25		1/3 × 0,40	
Parallelism tolerance	≤ 5'		≤ 20'			
Permissible deflection <sup>6)</sup>	≤ 2,5'		≤ 10'			

NOTE — The currently used diameters 18 mm, 30 mm, 40 mm and 50 mm should be avoided in new designs. Data for diameters apply only to unmounted filters.

1) This indicates the code number for surface imperfections (5) followed by the number of permissible defects multiplied by the square root, expressed in millimetres, of the area of the maximum allowed defect.

#### EXAMPLE

2 × 0,10 stands for 2 defects with a maximum area of 0,01 mm<sup>2</sup> (the sum for both sides of the filter).

2) This indicates the code number for striae (2), the specification for inhomogeneity (—) and the striae class, i.e. referred to the diameter of the filter, the following permissible effective area of striae:

For filter diameters 20 mm, 25 mm, 32 mm and 45 mm, permissible effective areas of class 4 striae are, respectively, ≤ 3,0 mm<sup>2</sup>, ≤ 4,5 mm<sup>2</sup>, ≤ 7,5 mm<sup>2</sup> and ≤ 15 mm<sup>2</sup>; for class 1 striae the areas are, respectively, ≤ 30 mm<sup>2</sup>, ≤ 45 mm<sup>2</sup>, ≤ 75 mm<sup>2</sup> and ≤ 150 mm<sup>2</sup>.

3) In accordance with ISO 10110-5, the first number represents the code number for surface form tolerance (3), followed by the number of interference fringes; the number in brackets indicates the permissible deviation from rotational symmetry.

4) This indicates that a polished surface is required with less than 16 (P3) or 80 (P2) microdefects per 10 mm linear scan.

5) This indicates the code number for bubbles (1), the permissible number of bubbles, multiplied by the square root, in millimetres, of the area of the largest permissible bubble.

6) In some cases, e.g. compound filters, it may be advisable to state the permissible deflection instead of the parallelism tolerance.

### 4 Marking

Filters of form A shall be marked with the indication "ISO 8577 A". The marking shall be placed on the filter itself or on the packaging.

Marking of filters of form B is not required.