SLOVENSKI STANDARD
SIST EN ISO 14880-4:2006

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Optika in fotonska tehnologija - Vrste mikroleļ - 4. del: Preskusne metode za geometriļne lastnosti (ISO 14880-4:2006)

Optics and photonics - Microlens arrays - Part 4: Test methods for geometrical properties (ISO 14880-4:2006)

Optik und Photonik - Mikrolinsenarrays - Teil 4: Prüfverfahren für geometrische Eigenschaften (ISO 14880-4:2006)

Optique et photonique - Réseaux de microlentilles - Partie 4: Méthodes d'essai pour les propriétés géométriques (ISO 14880-4:2006)

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31.260	Optoelektronika, laserska oprema	Optoelectronics. Laser equipment

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Optics and photonics - Microlens arrays - Part 4: Test methods for geometrical properties (ISO 14880-4:2006)

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Foreword

This document (EN ISO 14880-4:2006) has been prepared by Technical Committee ISO/TC 172 "Optics and optical instruments" in collaboration with Technical Committee CEN/TC 123 "Lasers and photonics ", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2006, and conflicting national standards shall be withdrawn at the latest by December 2006.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Endorsement notice

The text of ISO 14880-4:2006 has been approved by CEN as EN ISO 14880-4:2006 without any modifications.

INTERNATIONAL STANDARD

ISO 14880-4

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Optics and photonics — Microlens arrays —

Part 4: Test methods for geometrical properties

Optique et photonique — Réseaux de microlentilles —
Partie 4: Méthodes d'essai pour les propriétés géométriques

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Contents

Page

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 14880-4 was prepared by Technical Committee ISO/TC 172, *Optics and photonics*, Subcommittee SC 9, *Electro-optical systems*.

ISO 14880 consists of the following parts, under the general title *Optics and photonics — Microlens arrays*:

— *Part 1: Vocabulary*

— *Part 2: Test methods for wavefront aberrations*

— *Part 3: Test methods for optical properties other than wavefront aberrations*

— *Part 4: Test methods for geometrical properties*

Introduction

This part of ISO 14880 specifies methods for testing geometrical properties of microlens arrays. Examples of applications for microlens arrays include three-dimensional displays, coupling optics associated with arrayed light sources and photo-detectors, enhanced optics for liquid crystal displays, and optical parallel processor elements.

The market in microlens arrays has generated a need for agreement on basic terminology and test methods. Standard terminology and clear definitions are needed not only to promote applications but also to encourage scientists and engineers to exchange ideas and new concepts based on common understanding.

This part of ISO 14880 contributes to the purpose of the series of ISO 14880 standards, which is to improve the compatibility and interchangeability of lens arrays from different suppliers and to enhance development of the technology using microlens arrays.

The measurement of physical characteristics of pitch and surface modulation depth can be made using a stylus instrument and non-contact optical probe system. Physical thickness can be measured with a micrometer. The measurement processes are described in the body of this part of ISO 14880.

Optics and photonics — Microlens arrays —

Part 4: Test methods for geometrical properties

1 Scope

This part of ISO 14880 specifies methods for testing geometrical properties of microlenses in microlens arrays. It is applicable to microlens arrays with very small lenses formed on one or more surfaces of a common substrate and to graded index microlenses.

2 Normative references

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

ISO 14880-1, *Optics and photonics — Microlens arrays — Part 1. Vocabulary*

3 Terms, definitions and symbols

For the purposes of this document, the terms, definitions given in ISO 14880-1 and the following apply.

NOTE 1 The symbols adopted for this part of ISO 14880 are chosen for clarity in this application to microlens arrays but some may not be those commonly used for surface texture measurement.

NOTE 2 The parameters P_x, P_y and h are used in this part of ISO 14880 to describe geometrical parameters encountered in the measurement of surface texture. P_x, P_y are spacing parameters and are defined as the average value of the length of the mean line section containing a profile peak and adjacent valley. An amplitude parameter, h, is defined as the average difference between peak of the lens profile and the rim. Figure 1 illustrates the geometrical properties of microlens arrays which are to be measured.

3.1
pitch
P_x, P_y
distance between the centres of adjacent lenses which may vary across and will vary with direction

See Figure 1.

NOTE 1 The pitch is expressed in millimetres.

[ISO 14880-1:2001, term 6.2.1.5]

NOTE 2 For a stylus instrument this will generally equate to the mean width of the profile elements calculated from the roughness profile, RS_m (see 3.2.2 and 4.3.1 in ISO 4287:1997).

3.2
surface modulation depth
h
peak-to-valley variation of the surface height

See Figure 1.

NOTE 1 For a purely refractive microlens, this will be the same as the lens sag.

NOTE 2 The surface modulation depth is expressed in millimetres.

[ISO 14880-1:2001, term 6.2.1.8]

NOTE 3 For stylus instruments this will generally equate to Rz (see 4.1.3 in ISO 4287:1997).

3.3
physical thickness
T_c
maximum local thickness of the array

See Figure 1.

NOTE The physical thickness is expressed in millimetres.

[ISO 14880-1:2001; term 6.2.1.9]

3.4
radius of curvature
R_c
distance from the vertex of the microlens to the centre of curvature of the lens surface

See Figure 1.

NOTE 1 The radius of curvature is expressed in millimetres.

[ISO 14880-1:2001; term 6.1.4]

NOTE 2 For rotationally invariant microlenses or cylindrical microlenses.