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SIST EN ISO 14880-3:2006
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Optics and phonotics - Microlens arrays - Part 3: Test methods for optical properties other than wavefront aberrations (ISO 14880-3:2006)

Optik und Photonik - Mikrolinsenarrays - Teil 3: Prüfverfahren für optische Eigenschaften außer Wellenfrontaberrationen (ISO 14880-3:2006)

Optique et phonotique - Réseaux de microlentilles - Partie 3: Méthodes d'essai pour les propriétés optiques autres que les aberrations du front d'onde (ISO 14880-3:2006)

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Ta slovenski standard je istoveten z: EN ISO 14880-3:2006

ICS:

31.260	Optoelektronika, laserska oprema	Optoelectronics. Laser equipment
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ICS 31.260

English Version

Optics and phonotics - Microlens arrays - Part 3: Test methods
for optical properties other than wavefront aberrations (ISO
14880-3:2006)

Optique et phonotique - Réseaux de microlentilles - Partie
3: Méthodes d'essai pour les propriétés optiques autres
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Optik und Photonik - Mikrolinsenarrays - Teil 3:
Prüfverfahren für optische Eigenschaften außer
Wellenfrontaberrationen (ISO 14880-3:2006)

This European Standard was approved by CEN on 3 May 2006.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Foreword

This document (EN ISO 14880-3:2006) 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 14880-3:2006 has been approved by CEN as EN ISO 14880-3:2006 without any modifications.

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**Optics and photonics — Microlens
arrays —**

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

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Optique et photonique — Réseaux de microlentilles —

*Partie 3. Méthode d'essai pour les propriétés optiques autres que les
aberrations du front d'onde*

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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 14880-3 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*

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Introduction

This part of 14880 specifies methods of testing optical properties, other than wavefront aberrations, 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 testing of microlenses is in principle similar to testing any other lens. The same parameters need to be measured and the same techniques used. However, in many cases the measurement of very small lenses presents practical problems which make it difficult to use the standard equipment that is available for testing normal size lenses.

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 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 focal length is described in the body of this part of ISO 14880 and the use of an alternative technique, interferometry, is described in Annex A.

Measurement of the focal length of an array of microlenses, using a confocal technique, is described in Annex B.

Coupling efficiency and imaging quality are discussed in Annex C.

Measurement of the focal spot positions of an array of microlenses in parallel, using the Shack-Hartmann technique, is described in Annex D.

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Optics and photonics — Microlens arrays —

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

1 Scope

This part of ISO 14880 specifies methods for testing optical properties, other than wavefront aberrations, 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*

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

3 Terms and definitions

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

4 Substrate test

The optical quality of the substrate contributes to the quality of the focal positions defined by the microlenses and shall be quantified in accordance with ISO 10110-5.

5 Microscope test method

5.1 Principle

The basic principle is to locate, by optical means, the surface of the microlens under test. The effective back (front) focal length is determined by measuring the axial displacement necessary to locate the focal position.