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Optics and photonics - Microlens array - Part 2: Test methods for wavefront aberrations

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foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part 1.Structure and Drafting Rules of Standardization Documents"

drafted.

This document is part 2 of GB/T 41869 "Optics and Photonics Microlens Arrays". GB/T 41869 has issued the following

part.

--- Part 1.Terminology;

--- Part 2.Test methods for wavefront aberrations.

This document is modified from ISO 14880-2.2006 "Optics and Photonics Microlens Arrays - Part 2.Testing of Wavefront Aberrations"

method".

Compared with ISO 14880-2.2006, this document has made the following structural adjustments.

--- Chapter 3 corresponds to Chapters 3 and 4 in ISO 14880-2.2006;

--- Chapter 4 corresponds to Chapter 5 in ISO 14880-2.2006;

--- Chapter 5 corresponds to 7.3 and 7.4 in ISO 14880-2.2006;

--- Chapter 6 corresponds to the parts of Chapter 6, Chapter 8, Appendix A, Appendix B, Appendix D and Appendix E in ISO 14880-2.2006

Contents, of which 6.1 corresponds to Chapter 6, Chapter 8 of ISO 14880-2.2006 and the Microlens Array Measurement of Normative Appendix A

Quantity requirements, 6.2.2.1 corresponds to the two methods of Mach-Zehnder interferometry in Normative Appendix B of ISO 14880-2.2006,

6.2.2.2 corresponds to the Taiman-Green microlens array measurement method in normative annex E in ISO 14880-2.2006, and 6.3 corresponds to

Normative Annex D of the Shack-Hartmann wavefront sensor measurement method in ISO 14880-2.2006;

---Chapter 7 corresponds to Chapters 9~11 in ISO 14880-2.2006, of which 7.1.1~7.1.3 correspond to ISO 14880-2.2006

Chapter 9, 7.1.4 corresponds to Chapter 10 in ISO 14880-2.2006, 7.1.5 corresponds to ISO 14880-2.2006

Chapter 11.

The technical differences between this document and ISO 14880-2.2006 and their reasons are as follows.

a) The abbreviated terms and symbols of Theta in Table 1 of ISO 14880-2.2006 are deleted, and this parameter does not appear in the full text, so it is deleted;

b) Deleted the reference document ISO 14880-1 of the introductory phrase of ISO 14880-2.2006 "Terms and Definitions", and changed the symbols in Table 1 to

Included in Chapter 3 in the form of terms and definitions;

c) Adjust the note in 5.2 of ISO 14880-2.2006 to the provisions [see 4.2d), 4.2e)] to adapt to the technical conditions of our country;

d) The relevant contents of 7.1 and 7.2 in ISO 14880-2.2006 have been deleted. The procedures for the microlens array and the microlens unit are the same, only a few

Depending on the processing method;

e) Deleted the test results example Figure B.3, Figure B.4, Figure B.5 and Figure B.6 in Annex B of ISO 14880-2.2006, because the test

The example graph of the results is special, so it is deleted to enhance the generality of the standard;

f) Changed the nature of normative appendix C and appendix F of ISO 14880-2.2006, and changed them to informative appendix (see appendix A, appendix F)

B), in order to adapt to the technical conditions of our country.

Certain contents of this document may involve patents, and the issuing authority of this document does not undertake the responsibility to identify patents.

Introduction

Microlens array is an important optical element in array optics, in the form of a single lens,

two or more lens arrays, a wide range of

Widely used in three-dimensional displays, coupling optics associated with arrayed optical radiation sources and photodetectors, intensified liquid crystal displays, and optical parallel processor elements.

With the continuous advancement of science and technology, it is necessary to formulate a set of national standards whose technical content is in line with international standards, which is conducive to promoting my country's microlens array

It can promote the orderly development of industry norms, and can better promote trade, exchanges and technical cooperation in related fields. GB/T 41869 "Optics and Photonics

It is against this background that "Microlens Array" is drafted and formulated, and the standard for microlens array is to be composed of the following parts.

--- Part 1.Terminology. The purpose is to promote the application of microlens array products by defining the basic terms of microlenses and their arrays.

It is helpful for scientific research and industry practitioners to exchange concepts on the basis of common understanding.

--- Part 2.Test methods for wavefront aberrations. The purpose is to clarify the basic principle of microlens by standardizing the test method of wavefront aberration.

performance characteristics.

--- Part 3.Test methods for optical properties. The purpose is to provide the supplier with the test method to determine the important indicators of optical characteristics.

Provide the basis for product delivery.

--- Part 4.Test methods for geometric properties. The purpose is to provide the supplier with the test method to determine the important indicators of geometric characteristics.

Provide the basis for product delivery.

Optical and Photonics Microlens Arrays

Part 2.Test methods for wavefront aberrations

1 Scope

This document describes the test device and equipment, preparation, test principle and test for the wavefront aberration test of the microlens in the microlens array

programs, etc.

This document applies to microlens arrays consisting of very small lenses formed on the interior of a common substrate or on one or more surfaces.

Wavefront aberration test.

2 Normative references

There are no normative references in this document.

3 Terms and Definitions

The following terms and definitions apply to this document.

3.1

wavefront aberration

Deviation of a wavefront from an ideal spherical or other wavefront.

Note. Wavefront aberration is measured in wavelength.

3.2

dia. p-v

The peak-to-valley deviation of a wavefront from an ideal spherical or other wavefront.

Note. The peak-to-valley value of wavefront aberration is measured in wavelength.

3.3

dia. rms

The rms value of the deviation of the wavefront from an ideal spherical wavefront or other wavefront.

Note. The root mean square value of wavefront aberration is measured in wavelength.

[Source. GB/T 41869.1-2022, 3.2.4]

3.4

wavelength wavelength

The distance a wave travels in one vibration period.

Note. The unit of wavelength is micrometer (μm).