

**Optics and optical instruments - Test
methods for radiation scattered by optical
components**

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radiation scattered by optical components

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN ISO 13696:2003 sisaldab Euroopa standardi EN ISO 13696:2002 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 18.02.2003 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN ISO 13696:2003 consists of the English text of the European standard EN ISO 13696:2002.</p> <p>This document is endorsed on 18.02.2003 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p>Käsitlusala: This International Standard specifies procedures for the determination of the total scattering by coated and uncoated optical surfaces</p>	<p>Scope: This International Standard specifies procedures for the determination of the total scattering by coated and uncoated optical surfaces</p>
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Võtmesõnad: area, definition, definitions, determination, dispersion, light scatter measurement, measurement, measuring techniques, optics, radii of curvature, surfaces

English version

Optics and optical instruments

Test methods for radiation scattered by optical components
(ISO 13696 : 2002)

Optique et instruments d'optique –
Méthodes d'essai du rayonnement
diffusé par les composants optiques
(ISO 13696 : 2002)

Optik und optische Instrumente –
Bestimmung von Streustrahlung,
hervorgerufen durch optische
Komponenten (ISO 13696 : 2002)

This European Standard was approved by CEN on 2002-06-08.

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 Management Centre or to any CEN member.

The European Standards exist 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 Management Centre has the same status as the official versions.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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

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Foreword

International Standard

ISO 13696 : 2002 Optics and optical instruments – Test methods for radiation scattered by optical components,

which was prepared by ISO/TC 172 'Optics and optical instruments' of the International Organization for Standardization, has been adopted by Technical Committee CEN/TC 123 'Lasers and laser-related equipment', the Secretariat of which is held by DIN, as a European Standard.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, and conflicting national standards withdrawn, by January 2003 at the latest.

In accordance with the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard:

Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 13696 : 2002 was approved by CEN as a European Standard without any modification.

Introduction

In most applications, scattering in optical components reduces the efficiency and deteriorates the image-forming quality of optical systems. Scattering is predominantly produced by imperfections of the coatings and the optical surfaces of the components. Common surface features which contribute to optical scattering are imperfections of substrates, thin films and interfaces, surface and interface roughness, or contamination and scratches. These imperfections deflect a fraction of the incident radiation from the specular path. The spatial distribution of this scattered radiation is dependent on the wavelength of the incident radiation and on the individual optical properties of the component. For most applications in laser technology and optics, the amount of total loss produced by scattering is a useful quality criterion of an optical component.

This International Standard describes a testing procedure for the corresponding quantity, the total scattering (TS) value, which is defined by the measured values of backward scattering and forward scattering. The measurement principle described in this International Standard is based on an Ulbricht sphere as the integrating element for scattered radiation. An alternative apparatus with a Coblentz hemisphere, which is also frequently employed for collecting scattered light, is described in annex A. Currently, advanced studies on the comparability and the limitations of both light collecting elements are being performed (e.g. round robin tests, EUREKA-project EUROLASER: CHOCLAB).

1 Scope

This International Standard specifies procedures for the determination of the total scattering by coated and uncoated optical surfaces. Procedures are given for measuring the contributions of the forward scattering and backward scattering to the total scattering of an optical component.

This International Standard applies to coated and uncoated optical components with optical surfaces that have a radius of curvature of more than 10 m. The wavelength range includes the ultraviolet, the visible and the infrared spectral regions.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 11145, *Optics and optical instruments — Lasers and laser-related equipment — Vocabulary and symbols*

ISO 14644-1:1999, *Cleanrooms and associated controlled environments — Part 1: Classification of air cleanliness*

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in ISO 11145 and the following apply.

3.1.1

scattered radiation

fraction of the incident radiation that is deflected from the specular optical path

3.1.2

front surface

optical surface that interacts first with the incident radiation

3.1.3

rear surface

surface that interacts last with the transmitted radiation