



NSAI
Standards

Irish Standard
I.S. EN ISO 11670:2003

Lasers and laser-related equipment - Test methods for laser beam parameters - Beam positional stability (ISO 11670:2003)

I.S. EN ISO 11670:2003

Incorporating amendments/corrigenda issued since publication:

EN ISO 11670:2003/AC:2004

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I.S. xxx: Irish Standard – national specification based on the consensus of an expert panel and subject to public consultation.

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SWIFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

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| NSAI 1 Swift Square, Northwood, Santry Dublin 9 | T +353 1 807 3800 F +353 1 807 3838 E standards@nsai.ie W NSAI.ie | Sales: T +353 1 857 6730 F +353 1 857 6729 W standards.ie |
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English version
Version Française
Deutsche Fassung

Lasers and laser-related equipment - Test methods for laser beam parameters - Beam positional stability (ISO 11670:2003/Cor.1:2004)

Lasers et équipements associés aux lasers
- Méthodes d'essai des paramètres du faisceau laser - Stabilité de visée du faisceau (ISO 11670:2003/Cor.1:2004)

Laser und Laseranlagen - Prüfverfahren für Laserstrahlparameter - Strahlagestabilität (ISO 11670:2003/Cor.1:2004)

This corrigendum becomes effective on 8 December 2004 for incorporation in the three official language versions of the EN.

Ce corrigendum prendra effet le 8 décembre 2004 pour incorporation dans les trois versions linguistiques officielles de la EN.

Die Berichtigung tritt am 8. Dezember 2004 zur Einarbeitung in die drei offiziellen Sprachfassungen der EN in Kraft.



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

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

I.S. EN ISO 11670:2003
EN ISO 11670:2003/AC:2004 (E/F/D)

English version

Endorsement notice

The text of ISO 11670:2003/Cor.1:2004 has been approved by CEN as a European Corrigendum without any modifications.

Version française

Notice d'entérinement

Le texte de l'ISO 11670:2003/Cor.1:2004 a été approuvé par le CEN comme Corrigendum européen sans aucune modification.

Deutsche Fassung

Anerkennungsnotiz

Der Text von ISO 11670:2003/Cor.1:2004 wurde vom CEN als Europäisches Corrigendum ohne irgendeine Abänderung genehmigt.



I.S. EN ISO 11670:2003
INTERNATIONAL STANDARD ISO 11670:2003
TECHNICAL CORRIGENDUM 1

Published 2004-05-15

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Lasers and laser-related equipment — Test methods for laser beam parameters — Beam positional stability

TECHNICAL CORRIGENDUM 1

Lasers et équipements associés aux lasers — Méthodes d'essai des paramètres du faisceau laser — Stabilité de visée du faisceau

RECTIFICATIF TECHNIQUE 1

Technical Corrigendum 1 to ISO 11679:2003 was prepared by Technical Committee ISO/TC 172, *Optics and photonics*, Subcommittee SC 9, *Electro-optical systems*.

Pages 7, 8, 9

Replace equations (10), (11), (20), (21), (22), (23), (27), (28) and (33) by the following:

$$\bar{x}'_i = \frac{\iint x' E(x', y') dx' dy'}{\iint E(x', y') dx' dy'} \quad (10)$$

$$\bar{y}'_i = \frac{\iint y' E(x', y') dx' dy'}{\iint E(x', y') dx' dy'} \quad (11)$$

$$s = \sqrt{\frac{\sum_i r_i^2}{n-1}} \quad (20)$$

$$\Delta_x(z) = 4s_x \quad (21)$$

$$\Delta_y(z) = 4s_y \quad (22)$$

$$\Delta(z) = 2\sqrt{2}s \quad (23)$$

$$\zeta_{x'_i} = \frac{\iint x' E(x', y') dx' dy'}{\iint E(x', y') dx' dy'} \quad (27)$$

$$\zeta_{y'_i} = \frac{\iint y' E(x', y') dx' dy'}{\iint E(x', y') dx' dy'} \quad (28)$$

$$s_{y'}^2 = \frac{\sum_i (\zeta_{y'_i} - \zeta_{y'_M})^2}{n-1} \quad (33)$$

English version

Lasers and laser-related equipment - Test methods for laser beam parameters - Beam positional stability (ISO 11670:2003)

Lasers et équipements associés aux lasers - Méthodes d'essai des paramètres du faisceau laser - Stabilité de visée du faisceau (ISO 11670:2003)

Laser und Laseranlagen - Prüfverfahren für Laserstrahlparameter - Strahllagestabilität (ISO 11670:2003)

This European Standard was approved by CEN on 21 February 2003.

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.

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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.



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

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

I.S. EN ISO 11670:2003

EN ISO 11670:2003 (E)

CORRECTED 2003-06-25

Foreword

This document (EN ISO 11670:2003) has been prepared by Technical Committee ISO/TC 172 "Optics and optical instruments" in collaboration with Technical Committee CEN/TC 123 "Lasers and laser-related equipment", 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 October 2003, and conflicting national standards shall be withdrawn at the latest by October 2003.

This document supersedes EN ISO 11670:1999.

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

Endorsement notice

The text of ISO 11670:2003 has been approved by CEN as EN ISO 11670:2003 without any modifications.

NOTE Normative references to International Standards are listed in Annex ZA (normative).

Annex ZA
(normative)**Normative references to international publications
with their relevant European publications**

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE Where an International Publication has been modified by common modifications, indicated by (mod.), the relevant EN/HD applies.

| <u>Publication</u> | <u>Year</u> | <u>Title</u> | <u>EN</u> | <u>Year</u> |
|--------------------|-------------|---|--------------|-------------|
| ISO 11145 | 2001 | Optics and optical instruments - Lasers and laser-related equipment - Vocabulary and symbols | EN ISO 11145 | 2001 |
| ISO 11146 | 1999 | Lasers and laser related equipment - Test methods for laser beam parameters - Beam widths, divergence angle and beam propagation factor | EN ISO 11146 | 1999 |

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I.S. EN ISO 11670:2003
**INTERNATIONAL
STANDARD**

**ISO
11670**

Second edition
2003-04-01

**Lasers and laser-related equipment —
Test methods for laser beam
parameters — Beam positional stability**

*Lasers et équipements associés aux lasers — Méthodes d'essai des
paramètres du faisceau laser — Stabilité de visée du faisceau*



Reference number
ISO 11670:2003(E)

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Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
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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 11670 was prepared by Technical Committee ISO/TC 172, *Optics and optical instruments*, Subcommittee SC 9, *Electro-optical systems*.

This second edition cancels and replaces the first edition (ISO 11670:1999), Clauses 3 and 9 of which have been technically revised. Annexes A and B have been added.

Introduction

The centre of a laser beam is defined as the centroid or first-order spatial moment of the power density distribution. The current propagation axis of a beam is then the straight line connecting two centroids measured at two different planes simultaneously in a uniform, homogeneous medium. Beam axis instability may be characterized by transverse displacements and angular movements that are either monotonic, periodic or stochastic in time.

The movement of a laser beam may be randomly distributed and uniform in amplitude in all directions. In general, the beam may move a greater amount in one direction. If one direction predominates, the procedures specified in this International Standard can be used to identify that dominant direction (the beam x -axis) and its azimuthal location relative to the axes of the laboratory system.

This International Standard provides general principles for the measurement of these quantities. In addition, definitions of terminology and symbols to be used in referring to beam position are provided.

I.S. EN ISO 11670:2003

Lasers and laser-related equipment — Test methods for laser beam parameters — Beam positional stability

1 Scope

This International Standard specifies methods for determining laser beam positional as well as angular stability. The test methods given in this International Standard are intended to be used for the testing and characterization of lasers.

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 11145:2001, *Optics and optical instruments — Lasers and laser-related equipment — Vocabulary and symbols*

ISO 11146:1999, *Lasers and laser-related equipment — Test methods for laser beam parameters — Beam widths, divergence angle and beam propagation factor*

IEC 61040:1990, *Power and energy measuring detectors, instruments and equipment for laser radiation*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61040, ISO 11145 and ISO 11146 and the following apply.

3.1

angular movement

α_x, α_y

angular movement of the laser beam in the x - z and y - z planes, respectively

NOTE These quantities are defined in the beam axis system x, y, z . If the ratio of the quantity in the x direction to that in the y direction does not exceed 1,15:1, the quantity is regarded as rotationally symmetric and only one number may be given. The symbol α without index is used in that case.

3.2

beam angular stability

$\delta\alpha_x, \delta\alpha_y$

twice the standard deviation of the measured angular movement

NOTE These quantities are defined in the beam axis system x, y, z . If the ratio of the quantity in the x direction to that in the y direction does not exceed 1,15:1, the quantity is regarded as rotationally symmetric and only one number may be given. The symbol $\delta\alpha$ without index is used in that case.

3.3

pivot

point of intersection of all momentary beam axes with the z -axis

NOTE The measurement of the pivot is not a subject of this International Standard, because it does not necessarily exist.

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