Irish Standard
I.S. EN ISO 21254-3:2011

Lasers and laser-related equipment - Test methods for laser-induced damage threshold - Part 3: Assurance of laser power (energy) handling capabilities (ISO 21254-3:2011)

I.S. EN ISO 21254-3:2011

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Supersedes EN ISO 11254-3:2006

English Version

Lasers and laser-related equipment - Test methods for laser-induced damage threshold - Part 3: Assurance of laser power (energy) handling capabilities (ISO 21254-3:2011)

Lasers et équipements associés aux lasers - Méthodes d'essai du seuil d'endommagement provoqué par laser - Partie 3: Possibilités de traitement par puissance (énergie) laser (ISO 21254-3:2011)

Laser und Laseranlagen - Prüfverfahren für die laserinduzierte Zerstörschwelle - Teil 3: Zertifizierung der Belastbarkeit hinsichtlich Laserleistung (-energie) (ISO 21254-3:2011)

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Foreword

This document (EN ISO 21254-3:2011) has been prepared by Technical Committee ISO/TC 172 "Optics and photonics" 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of an identical text or by endorsement, at the latest by January 2012, and conflicting national standards shall be withdrawn at the latest by January 2012.

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

This document supersedes EN ISO 11254-3:2006.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, 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 the United Kingdom.

Endorsement notice

The text of ISO 21254-3:2011 has been approved by CEN as a EN ISO 21254-3:2011 without any modification.

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I.S. EN ISO 21254-3:2011

INTERNATIONAL STANDARD

ISO 21254-3

First edition
2011-07-15

Lasers and laser-related equipment — Test methods for laser-induced damage threshold —

Part 3: Assurance of laser power (energy) handling capabilities

Lasers et équipements associés aux lasers — Méthodes d'essai du seuil d'endommagement provoqué par laser —

Partie 3: Possibilités de traitement par puissance (énergie) laser

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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 21254-3 was prepared by Technical Committee ISO/TC 172, *Optics and photonics*, Subcommittee SC 9, *Electro-optical systems*.

This first edition of ISO 21254-3:2011 cancels and replaces ISO 11254-3:2006, which has been technically revised.

ISO 21254 consists of the following parts, under the general title *Lasers and laser-related equipment — Test methods for laser-induced damage threshold*:

— *Part 1: Definitions and general principles*

— *Part 2: Threshold determination*

— *Part 3: Assurance of laser power (energy) handling capabilities*

— *Part 4: Inspection, detection and measurement* [Technical Report]

Introduction

This part of ISO 21254 describes two methods of verifying the power density (energy density) handling capability of optical components, both coated and uncoated.

The methods will give consistent measurement results and can therefore be used for acceptance testing or to produce results which can be compared between test laboratories.

The methods are applicable to all combinations of laser wavelengths and pulse lengths. Comparison of laser damage threshold data can, however, be misleading unless the measurements have been carried out at identical wavelengths and pulse lengths.

Lasers and laser-related equipment — Test methods for laser-induced damage threshold —

Part 3:
Assurance of laser power (energy) handling capabilities

WARNING — The extrapolation of damage data can lead to an overestimation of the laser-induced damage threshold. In the case of toxic materials (e.g. ZnSe, GaAs, CdTe, ThF_4, chalcogenides, Be, Cr, Ni), this can lead to serious health hazards. See ISO 21254-1:2011, Annex A, for further comments.

1 Scope

This part of ISO 21254 specifies two methods of verifying the power density (energy density) handling capability of optical surfaces.

The first method provides a rigorous test that fulfils the requirements at a specified confidence level in the knowledge of potential defects.

The second method provides a simple, and hence inexpensive, test for an empirically derived test level.

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, *Optics and photonics — Lasers and laser-related equipment — Vocabulary and symbols*

ISO 21254-1:2011, *Lasers and laser-related equipment — Test methods for laser-induced damage threshold — Part 1: Definitions and general principles*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11145 and ISO 21254-1 and the following apply.

3.1
assurance level
ϕ
energy density/power density/linear power density of the laser radiation incident on the optical surface of the component being tested

3.2
assurance area
A_ϕ
area over which the value of $H(x,y,z)$ is equal to or greater than the assurance level ϕ