

**Optics and optical instruments - Lasers and  
laser-related equipment - Lifetime of lasers**

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related equipment - Lifetime of lasers

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN ISO 17526:2004 sisaldab Euroopa standardi EN ISO 17526:2003 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 23.11.2004 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 17526:2004 consists of the English text of the European standard EN ISO 17526:2003.</p> <p>This document is endorsed on 23.11.2004 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><b>Käsitlusala:</b></p> <p>This International Standard covers terms and definitions as well as test methods and evaluation procedures to characterize, estimate and predict the longterm behaviour of various types of lasers. This International Standard defines terms for the lifetime of lasers and specifies test procedures and fundamental aspects for the determination of lifetime. It applies for all types of lasers for which lifetime is a critical issue, including diode lasers except those used in telecommunications.</p>	<p><b>Scope:</b></p> <p>This International Standard covers terms and definitions as well as test methods and evaluation procedures to characterize, estimate and predict the longterm behaviour of various types of lasers. This International Standard defines terms for the lifetime of lasers and specifies test procedures and fundamental aspects for the determination of lifetime. It applies for all types of lasers for which lifetime is a critical issue, including diode lasers except those used in telecommunications.</p>
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ICS 31.260

Võtmesõnad:

ICS 31.260

**English version**

Optics and optical instruments  
**Lasers and laser-related equipment**

Lifetime of lasers  
(ISO 17526 : 2003)

Optique et instruments d'optique –  
Lasers et équipements associés aux  
lasers – Durée de vie des lasers  
(ISO 17526 : 2003)

Optik und optische Instrumente –  
Laser und Laseranlagen – Lebens-  
dauer von Lasern (ISO 17526 : 2003)

This European Standard was approved by CEN on 2003-05-20.

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.

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

**CEN**

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

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

## Foreword

International Standard

ISO 17526 : 2003 Optics and optical instruments – Lasers and laser-related equipment – Lifetime of lasers, 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 December 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, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, the Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland, and the United Kingdom.

## Endorsement notice

The text of the International Standard ISO 17526 : 2003 was approved by CEN as a European Standard without any modification.

NOTE: Normative references to international publications are listed in Annex ZA (normative).

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## Introduction

There are many different types of lasers with very different attributes and very different areas of application; not all types of lasers can be treated by the same means and measures to characterize and specify their longterm behaviour and lifetime.

This International Standard covers many types of laser, but not all methods and procedures can be applied to all types.

There are lasers, primarily laser diodes in the lower power range, which are produced in large quantities and which allow the performance of lifetime tests on large quantities to gain results on a statistically significant level. In this case and if more than approximately 50 lasers are used for testing, lifetime predictions using informative annex B of IEC 61751:1998, may be applied alternatively to this International Standard.

High-power lasers are manufactured in low quantities and lifetime tests cannot be carried out on statistically significant sample sizes.

There are types of laser of which the main components cannot be repaired, e.g. sealed-tube gas lasers or semiconductor lasers. There are others that can easily be repaired, e.g. CO<sub>2</sub> lasers. The former class may be characterized by "lifetime", the latter more appropriately characterized by "meantime to failure".

## 1 Scope

This International Standard covers terms and definitions as well as test methods and evaluation procedures to characterize, estimate and predict the longterm behaviour of various types of lasers.

This International Standard defines terms for the lifetime of lasers and specifies test procedures and fundamental aspects for the determination of lifetime. It applies for all types of lasers for which lifetime is a critical issue, including diode lasers except those used in telecommunications.

## 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 11554:2003, *Optics and optical instruments — Lasers and laser-related equipment — Test methods for laser beam power, energy and temporal characteristics*

IEC 60050-191:1990, *International Electrotechnical Vocabulary. Chapter 191: Dependability and quality of service*

IEC 61703:2001, *Mathematical expressions for reliability, availability, maintainability and maintenance support terms*

## 3 Terms and definitions

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

**NOTE** For simplicity, in all following parts of this International Standard the term “power” refers to cw or repetitive-cw mode, whereas “energy” refers to pulse and quasi-cw mode.

### 3.1 Modes of operation

**NOTE 1** The following modes of operation define the temporal and pulsed characteristics of the laser.

**NOTE 2** There might be modes of operation that are not covered by the subsequent classification. These modes should be described in detail in the test report.

#### 3.1.1

##### **cw-mode**

mode where the laser emits radiation continuously over periods of time longer than or equal to 0,25 s