Lasertoodete ohutus. Osa 1: Seadmete klassifikatsioon ja nõuded

Safety of laser products - Part 1: Equipment classification and requirements

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 60825-1:2014 sisaldab konsolideeritult Euroopa standardi EN 60825-1:2014 ja selle paranduse EN 60825-1:2014/AC:2017-06 ingliskeelset teksti.	This Estonian standard EVS-EN 60825-1:2014 consists of the English text of the European standard EN 60825-1:2014 and its corrigendum EN 60825-1:2014/AC:2017-06.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 08.08.2014.	Date of Availability of the European standard is 08.08.2014.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 13.110, 31.260

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60825-1

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ICS 13.110; 31.260

Supersedes EN 60825-1:2007

English Version

Safety of laser products - Part 1: Equipment classification and requirements (IEC 60825-1:2014)

Sécurité des appareils à laser - Partie 1: Classification des matériels et exigences (CEI 60825-1:2014)

Sicherheit von Lasereinrichtungen - Teil 1: Klassifizierung von Anlagen und Anforderungen (IEC 60825-1:2014)

This European Standard was approved by CENELEC on 2014-06-19. CENELEC 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 CEN-CENELEC Management Centre or to any CENELEC 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 CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 60825-1:2014 E

Foreword

The text of document 76/502/FDIS, future edition 3 of IEC 60825-1, prepared by IEC/TC 76 "Optical radiation safety and laser equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60825-1:2014.

The following dates are fixed:

– latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2015-03-19

– latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2019-06-19

This document supersedes EN 60825-1:2007.

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

Endorsement notice

The text of the International Standard IEC 60825-1:2014 was approved by CENELEC as a European Standard without any modification.

IEC 60027-1	NOTE	Harmonised in EN 60027-1.
IEC 60065	NOTE	Harmonised as EN 60065.
IEC 60079 (Series)	NOTE	Harmonised as EN 60079 (Series).
IEC 60204-1	NOTE	Harmonised as EN 60204-1.
IEC 60601-2-22	NOTE	Harmonised as EN 60601-2-22.
IEC 60825-2	NOTE	Harmonised as EN 60825-2.
IEC 60825-4	NOTE	Harmonised as EN 60825-4.
IEC 60825-12	NOTE	Harmonised as EN 60825-12.
IEC 60950 (Series)	NOTE	Harmonised as EN 60950 (Series).
IEC 61010-1	NOTE	Harmonised as EN 61010-1.
IEC 61508 (Series)	NOTE	Harmonised as EN 61508 (Series).
IEC 62115	NOTE	Harmonised as EN 62115.
IEC 62368-1	NOTE	Harmonised as EN 62368-1.
IEC/ISO 11553 (Series)	NOTE	Harmonised as EN ISO 11553 (Series).
ISO 11146-1	NOTE	Harmonised as EN ISO 11146-1.
ISO 12100	NOTE	Harmonised as EN ISO 12100.
ISO 13694	NOTE	Harmonised as EN ISO 13694.
ISO 13849 (Series)	NOTE	Harmonised as EN ISO 13849 (Series).
ISO 15004-2:2007	NOTE	Harmonised as EN ISO 15004-2:2007.
ISO 80000-1	NOTE	Harmonised as EN ISO 80000-1.

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

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60050	series	International Electrotechnical Vocabulary	-	series
IEC 62471 (mod)	-	Photobiological safety of lamps and lamp systems	EN 62471	-

CONTENTS

SAFETY OF LASER PRODUCTS –

Part 1: Equipment classification and requirements

1 Scope and object

IEC 60825-1 is applicable to safety of laser products emitting laser radiation in the wavelength range 180 nm to 1 mm.

Although lasers exist which emit at wavelengths less than 180 nm (within the vacuum ultraviolet), these are not included in the scope of the standard since the laser beam normally has to be enclosed in an evacuated enclosure, and, therefore, the potential optical radiation hazards are inherently minimal.

A laser product may consist of a single laser with or without a separate power supply or may incorporate one or more lasers in a complex optical, electrical, or mechanical system. Typically, laser products are used for demonstration of physical and optical phenomena, materials processing, data reading and storage, transmission and display of information, etc. Such systems have found use in industry, business, entertainment, research, education, medicine and consumer products.

Laser products that are sold to other manufacturers for use as components of any system for subsequent sale are not subject to IEC 60825-1, since the final product will itself be subject to this standard. Laser products that are sold by or for manufacturers of end products for use as repair parts for the end products are also not subject to IEC 60825-1. However, if the laser system within the laser product is operable when removed from the end product, the requirements of this Part 1 apply to the removable laser system.

NOTE 1 Operable equipment does not require a tool to prepare for operation.

Any laser product is exempt from all further requirements of this Part 1 if classification by the manufacturer of that product according to Clauses 4 and 5 shows that the emission level does not exceed the AEL (accessible emission limit) of Class 1 under all conditions of operation, maintenance, service and failure. Such a laser product may be referred to as an exempt laser product.

NOTE 2 The above exemption is to ensure that inherently safe laser products are exempt from Clauses 6,7,8 and 9.

In addition to the adverse effects potentially resulting from exposure to laser radiation, some laser equipment may also have other associated hazards, such as electricity, chemicals and high or low temperatures. Laser radiation may cause temporary visual impairment, such as dazzle and glare. Such effects depend on the task and ambient lighting level and are beyond the scope of this Part 1. The classification and other requirements of this standard are intended to address only the laser radiation hazards to the eyes and skin. Other hazards are not included within its scope.

This Part 1 describes the minimum requirements. Compliance with this Part 1 may not be sufficient to achieve the required level of product safety. Laser products may also be required to conform to the applicable performance and testing requirements of other applicable product safety standards.

NOTE 3 Other standards may contain additional requirements. For example, a Class 3B or Class 4 laser product may not be suitable for use as a consumer product.

Where a laser system forms a part of equipment which is subject to another IEC product safety standard, e.g. for medical equipment (IEC 60601-2-22), IT equipment (IEC 60950 series), audio and video equipment (IEC 60065), audio-video and IT equipment (IEC 62368-1), equipment for use in hazardous atmospheres (IEC 60079), or electric toys (IEC 62115), this Part 1 will apply in accordance with the provisions of IEC Guide 104[2)] for hazards resulting from laser radiation. If no product safety standard is applicable, then IEC 61010-1 may be applied.

For ophthalmic instruments, to ensure patient safety, ISO 15004-2 should be consulted and the principles of the limits provided there should be applied for laser radiation (see also Annex C and D).

In previous editions, light-emitting diodes (LEDs) were included in the scope of IEC 60825-1, and they may be still included in other parts of the IEC 60825 series. However, with the development of lamp safety standards, optical radiation safety of LEDs in general can be more appropriately addressed by lamp safety standards. The removal of LEDs from the scope of this Part 1 does not preclude other standards from including LEDs whenever they refer to lasers. IEC 62471 may be applied to determine the risk group of an LED or product incorporating one or more LEDs. Some other (vertical) standards may require the application of the measurement, classification, engineering specifications and labelling requirements of this standard (IEC 60825-1) to LED products.

Laser products with accessible radiance below the criteria specified in 4.4, designed to function as conventional light sources, and which satisfy the requirements specified in 4.4 may alternatively be evaluated under the IEC 62471 series of standards, "Photobiological safety of lamps and lamp systems". Such a product remains within the scope of this part of IEC 60825, except that the above-described optical radiation emission need not be considered for classification.

The MPE (maximum permissible exposure) values provided in Annex A were developed for laser radiation and do not apply to collateral radiation. However, if a concern exists that accessible collateral radiation might be hazardous, the laser MPE values may be applied to conservatively evaluate this potential hazard, or the exposure limit values in IEC 62471 should be consulted.

The MPE values in Annex A are not applicable to intentional human exposure to laser radiation for the purpose of medical or cosmetic/aesthetic treatment.

NOTE 4 Informative Annexes A to G have been included for purposes of general guidance and to illustrate many typical cases. However, the annexes are not regarded as definitive or exhaustive.

The objectives of this part of IEC 60825 are the following:

- to introduce a system of classification of lasers and laser products emitting radiation in the wavelength range 180 nm to 1 mm according to their degree of optical radiation hazard in order to aid hazard evaluation and to aid the determination of user control measures;
- to establish requirements for the manufacturer to supply information so that proper precautions can be adopted;
- to ensure, through labels and instructions, adequate warning to individuals of hazards associated with accessible radiation from laser products;
- to reduce the possibility of injury by minimizing unnecessary accessible radiation and to give improved control of the laser radiation hazards through protective features.

2) IEC Guide 104:2010, *The preparation of safety publications and the use of basic safety publications and group safety publications*