SLOVENSKI STANDARD

SIST EN 60825-4:1999/A1:2003

01-julij-2003

Safety of laser products - Part 4: Laser guards; Amendment A1 (IEC 60825-4:1997/A1:2002)

Safety of laser products -- Part 4: Laser guards

Sicherheit von Lasereinrichtungen -- Teil 4: Laserschutzwnde

Scurit des appareils laser -- Partie 4: Protecteurs pour lasers

Ta slovenski standard je istoveten z: **EN 60825-4:1997/A1:2002**

ICS:

13.280	Varstvo pred sevanjem	Radiation protection
31.260	Optoelektronika, laserska oprema	Optoelectronics. Laser equipment

SIST EN 60825-4:1999/A1:2003 **en**

EUROPEAN STANDARD **EN 60825-4/A1**

NORME EUROPÉENNE

EUROPÄISCHE NORM October 2002

ICS 31.260

English version

Safety of laser products
Part 4: Laser guards
(IEC 60825-4:1997/A1:2002)

Sécurité des appareils à laser
Partie 4: Barrières laser
(CEI 60825-4:1997/A1:2002)

Sicherheit von Laser-Einrichtungen
Teil 4: Laserschutzwände
(IEC 60825-4:1997/A1:2002)

This amendment A1 modifies the European Standard EN 60825-4:1997; it was approved by CENELEC on 2002-10-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment 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 Central Secretariat or to any CENELEC member.

This amendment 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 Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees 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.

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Ref. No. EN 60825-4:1997/A1:2002 E

Foreword

The text of document 76/242/FDIS, future amendment 1 to IEC 60825-4:1997, prepared by IEC TC 76, Optical radiation safety and laser equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A1 to EN 60825-4:1997 on 2002-10-01.

The following dates were fixed:

– latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2003-07-01

– latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2005-10-01

Annexes designated "normative" are part of the body of the standard.
In this standard, annex D is normative.

Endorsement notice

The text of amendment 1:2002 to the International Standard IEC 60825-4:1997 was approved by CENELEC as an amendment to the European Standard without any modification.

INTERNATIONAL STANDARD

IEC 60825-4

1997

AMENDMENT 1
2002-08

Amendment 1

Safety of laser products –

Part 4: Laser guards

Amendement 1

Sécurité des appareils à laser –

Partie 4:
Barrières laser

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PRICE CODE B

For price, see current catalogue

FOREWORD

This amendment has been prepared by IEC technical committee 76: Optical radiation safety and laser equipment.

The text of this amendment is based on the following documents:

FDIS	Report on voting
76/242/FDIS	76/252/RVD

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

The committee has decided that the contents of the base publication and its amendments will remain unchanged until 2003. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

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CONTENTS

Add the title of the new Annex D as follows:

Annex D (normative) Proprietary laser guard testing

Page 10

3.4.2 Sample testing

Replace subclauses 3.4.2.1 and 3.4.2.2 by the following new text:

Sample guard testing shall be performed by irradiating the front surface of the guard material using the procedure and methodology as specified in Annex D.

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Add, after Annex C, the new Annex D as follows:

Annex D
(normative)

Proprietary laser guard testing

D.1 General

It should be noted that it is inappropriate to use higher power lasers to simulate low power laser parameters by adjustment of the distance from the focal point, because beam quality and other characteristics of the laser beam are likely to be different or unexpected.

The evidence of the tests described herein is relevant only for, and is limited to, the laser parameters used. Thus the results of these tests should serve only as a guide for laser guard comparison purposes.

The protective exposure limit (PEL W·m^{-2}) shall be applicable only for the beam dimensions at the guard used in the tests. These dimensions at the guard shall be stated by the laser guard manufacturer because the limiting irradiance value, which indicates protection, decreases as the laser beam dimensions increase.

D.2 Test conditions

The tested exposure limit (W·m^{-2} for CW lasers or J·m^{-2} for pulsed lasers) shall be determined by tests performed when irradiating one surface of a sample of representative thickness and composition and of dimensions not less than 3 times the maximum beam dimension (1/e^{2}) encountered at the exposure location (thereby guaranteeing that the radiant heat flow is taken into account.) Structural connecting elements shall only be included in the tests if they are necessary to ensure the construction and integrity of the guard. In the case of non-circular beams, the geometry of the beam used in the test shall be specified. Non-circular beams are those where the difference between the major and the minor dimension is greater than 10 %.

NOTE The geometry of the test beam is required to be specified because it affects the distribution of heat in the sample.

If a sample holder is necessary for the tests then its maximum overlap on the sample edge shall not exceed 3 mm from the edge of the sample. The holding arrangement in contact with the sample shall be thermally insulating (e.g. ceramic, etc.) compatible with use at the temperatures generated.

The sample shall be normal (±3° to avoid retro-reflections) to the laser beam with the beam axis centred on the sample at a distance F1 as shown in Figure D.1. The distance F1 past the focal point shall be not greater than 3 times the focal length (F) of the focusing lens.

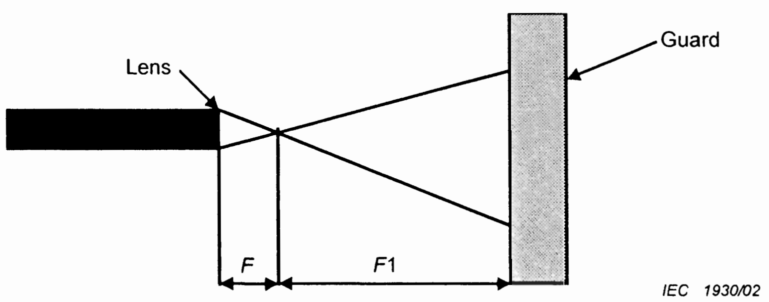

Figure D.1 – Simplified diagram of the test arrangement

For passive guards: the accessible laser radiation at the rear surface of the sample shall not exceed class 1 AEL during the test exposure, the duration of which is dependant on the period of exposure set by the manufacturer of the proprietary guard.

NOTE Maintenance inspection intervals of proprietary laser guards should be specified by their manufacturer using classifications T1, T2 or T3 as defined in Table D.1.

Table D.1 – Laser guard classification

Test classification	Maintenance inspection intervals	Suggested laser guard usage
T1	30 000	For automated machine usage
T2	100	For short cycle operation and intermittent inspection
T3	10	For continuous inspection by observation

For active guards two tests shall be satisfied:

a) the active laser guard shall output the laser termination signal, (which is intended to lead to automatic termination of the laser radiation) in response to any exposure of its front surface to laser radiation in excess of the specified exposure. A reasonably foreseeable fault within the active guard system shall not lead to the loss of the safety function. The reasonably foreseeable fault within the guard element shall be detected at or before the next demand upon the safety function.

b) the accessible laser radiation at the rear surface of a sample of the passive laser guard, incorporated in the active laser guard, shall not exceed class 1 AEL in response to any exposure of its front surface to laser radiation up to and including the specified exposure for an exposure duration greater than the specified active protection time (as defined in 1.3.1).

D.3 Protective exposure limit (PEL)

The protective exposure limit (PEL) (as defined in 1.3.13) specified by the manufacturer shall be equal to the tested exposure limit, which satisfies the above conditions, multiplied by a correction factor of 0,7,

i.e. $$PEL = 0{,}7 \times \text{tested exposure limit}$$