

**SLOVENSKI  
STANDARD**

**SIST EN 60825-4:1999**

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

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English version

**Safety of laser products**  
**Part 4: Laser guards**  
(IEC 60825-4:1997)

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

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

This European Standard was approved by CENELEC on 1997-10-01. 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 Central Secretariat 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 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, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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**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

## Foreword

The text of document 76/159/FDIS, future edition 1 of IEC 60825-4, 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 EN 60825-4 on 1997-10-01.

The following dates were fixed:

- latest date by which the EN has to be implemented  
at national level by publication of an identical  
national standard or by endorsement (dop) 1998-08-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 1998-08-01

For products which have complied with the relevant national standard before 1998-08-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2003-08-01.

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annex ZA is normative and annexes A, B and C are informative.

Annex ZA has been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 60825-4:1997 was approved by CENELEC as a European Standard without any modification.

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## Annex ZA (normative)

### Normative references to international publications with their corresponding 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: When 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/HD</u>                            | <u>Year</u>          |
|--------------------|-------------|--|---|----------------------|
| IEC 60825-1        | 1993        | Safety of laser products<br>Part 1: Equipment classification,<br>requirements and user's guide                   | EN 60825-1<br>+ corr. February<br>+ A11 | 1994<br>1995<br>1996 |
| ISO/TR 12100-1     | 1992        | Safety of machinery - Basic concepts,<br>general principles for design<br>Part 1: Basic terminology, methodology | -                                       | -                    |
| ISO/TR 12100-2     | 1992        | Part 2: Technical principles and<br>specifications   | -                                       | -                    |
| ISO 11553          | 1996        | Safety of machinery - Laser processing<br>machines - Safety requirements   | -                                       | -                    |

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# INTERNATIONAL STANDARD

**IEC**  
**60825-4**

First edition  
1997-11

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## Safety of laser products –

### Part 4: Laser guards

*Sécurité des appareils à laser –  
Partie 4: Barrières laser*

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International Electrotechnical Commission  
Международная Электротехническая Комиссия

PRICE CODE

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## SAFETY OF LASER PRODUCTS –

## Part 4: Laser guards

## FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60825-4 has been prepared by IEC technical committee 76: Optical radiation safety and laser equipment.

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

| FDIS        | Report on voting |
|-------------|------------------|
| 76/159/FDIS | 76/168/RVD       |

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

[SIST EN 60825-4:1999](https://standards.iteh.ai/catalog/standards/sist/8cd10243-6493-46f4-8e76-037776e6ed82/sist-en-60825-4-1999)

Annexes A, B and C are for information only.

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The French version of this standard will be issued separately.

## INTRODUCTION

At low levels of irradiance or radiant exposure, the selection of material and thickness for shielding against laser radiation is determined primarily by a need to provide sufficient optical attenuation. However, at higher levels, an additional consideration is the ability of the laser radiation to remove guard material – typically by melting, oxidation or ablation; processes that could lead to laser radiation penetrating a normally opaque material.

IEC 60825-1 deals with basic issues concerning laser guards, including human access, interlocking and labelling, and gives general guidance on the design of protective housings and enclosures for high-power lasers.

This part of IEC 60825 deals with protection against laser radiation only. Hazards from secondary radiation that may arise during material processing are not addressed.

Laser guards may also comply with standards for laser protective eyewear, but such compliance is not necessarily sufficient to satisfy the requirements of this standard.

Where the term “irradiance” is used, the expression “irradiance or radiant exposure, as appropriate” is implied.

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## SAFETY OF LASER PRODUCTS –

### Part 4: Laser guards

#### 1 General

##### 1.1 Scope

This part of IEC 60825 specifies the requirements for laser guards, permanent and temporary (for example for service), that enclose the process zone of a laser processing machine, and specifications for proprietary laser guards.

This standard applies to all component parts of a guard including clear (visibly transmitting) screens and viewing windows, panels, laser curtains and walls. Requirements for beam path components, beam stops and those other parts of a protective housing of a laser product which do not enclose the process zone are contained in IEC 60825-1.

In addition this part of IEC 60825 indicates:

- a) how to assess and specify the protective properties of a laser guard; and
- b) how to select a laser guard.

##### 1.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60825. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 60825 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60825-1: 1993, *Safety of laser products – Part 1: Equipment classification, requirements and user's guide*

ISO/TR12100-1: 1992, *Safety of machinery – Basic concepts, general principles for design – Part 1: Basic terminology, methodology*

ISO/TR12100-2: 1992, *Safety of machinery – Basic concepts, general principles for design – Part 2: Technical principles and specifications*

ISO 11553: 1996, *Safety of machinery – Laser processing machines – Safety requirements*  
*SIST EN 60825-4:1999*

##### 1.3 Definitions

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For the purpose of this part of IEC 60825, the following definitions apply in addition to the definitions given in IEC 60825-1.

##### 1.3.1

###### **active guard protection time**

for a given laser exposure of the front surface of an active laser guard, the minimum time, measured from the issue of an active guard termination signal, for which the active laser guard can safely prevent laser radiation accessible at its rear surface from exceeding the class 1 AEL.