

Laser – Säkerhet – Del 1: Klassificering av utrustning, fordringar och användarinstruktioner

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

Som svensk standard gäller europastandarden EN 60825-1:1994 jämte Amendment A1:2002 och A2:2001. Den svenska standarden innehåller den officiella engelska språkversionen av EN 60825-1:1994 jämte Amendment A1:2002 och A2:2001.

Nationellt förord

Europastandarden EN 60825-1:1994

består av :

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 60825-1, First edition, 1993 - Safety of laser products - Part 1: Equipment classification, requirements and user's guide**

utarbetad inom International Electrotechnical Commission, IEC

Europastandarden EN 60825-1:1994/A1:2002

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **Amendment No. 1, 1997 till IEC 60825-1, 1993 - Safety of laser products - Part 1: Equipment classification, requirements and user's guide**

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Europastandarden EN 60825-1:1994/A2:2001

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- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **Amendment No. 2, 2001 till IEC 60825-1, 1993 - Safety of laser products - Part 1: Equipment classification, requirements and user's guide**

utarbetad inom International Electrotechnical Commission, IEC.

V g v

Denna utgåva skiljer sig från den föregående genom att de båda tilläggen A1 och A2 inarbetats i texten. Detta anges med lodrät streck i marginalen. Tillägget A1 ersätter det tidigare tillägget A11 och har tidigare utgivits separat.

I en nationell bilaga NA (normativ) sist i standarden ges svenska översättningar av varningstexterna i avsnitt 5 i standarden.

Texten i tillägget A1 behandlar främst lysdioder medan tillägget A2 ändrar indelningen i laserklasser, så att de tidigare klasserna 1, 2, 3A, 3B och 4 ersätts med en indelning i klasserna 1, 1M, 2, 2M, 3R, 3B och 4.

Tidigare utgiven svensk standard SS-EN 60825-1, utgåva 2, 2001 och SS-EN 60825-1/A1, utgåva 1, 2003 gäller ej fr o m 2003-09-22. Tidigare utgiven svensk standard SS-EN 60825-1, utgåva 1, 1994 gäller ej fr o m 2004-01-01, vid vilket datum även de de till nämnda standard separat utgivna tilläggen T1, T2, A11 och A11/C1 upphör att gälla.

EUROPEAN STANDARD

EN 60825-1

NORME EUROPEENNE

EUROPÄISCHE NORM

March 1994

UDC 621.375.826:620.1:614.8

Supersedes EN 60825:1991

Descriptors: Laser products, radiation safety, equipment classification,
requirements, user's guide

ENGLISH VERSION

Safety of laser products
Part 1: Equipment classification, requirements
and user's guide
(IEC 825-1:1993)

Sécurité des appareils à laser
Partie 1: Classification des
matériels, prescriptions et
guide de l'utilisateur

(CEI 825-1:1993)

Sicherheit von
Laser-Einrichtungen
Teil 1: Klassifizierung von
Anlagen, Anforderungen und
Benutzer-Richtlinien
(IEC 825-1:1993)

This European Standard was approved by CENELEC on 1993-09-22.
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,
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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

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Ref. No. EN 60825-1:1994 E

Foreword

The text of documents 76(CO)28 & 28B, as prepared by IEC Technical Committee 76, Laser equipment, was submitted to the IEC-CENELEC parallel vote in November 1992 and was approved by CENELEC as amendment A2 to EN 60825:1991 on 1993-09-22.

In November 1993, IEC published the first edition of IEC 825-1.

Upon confirmation by CLC/TC 76 that

- IEC 825-1:1993 is equivalent to IEC 825:1984 + A1:1990 + documents 76(CO)28 & 28B,
 - the common modifications accepted for EN 60825:1991 (IEC 825:1984 + A1:1990) are covered by this new IEC publication,
- the Permanent Delegates of the Technical Board of CENELEC have confirmed the ratification of IEC 825-1:1993 as EN 60825-1.

The following dates were fixed:

- latest date of publication of
an identical national standard (dop) 1995-03-01
- latest date of withdrawal of
conflicting national standards (dow) 1995-03-01

For products which have complied with EN 60825:1991 before 1995-03-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2000-03-01.

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given only for information.
In this standard, annex ZA is normative and annexes A, B, C, D, E and F are informative.

Endorsement notice

The text of the International Standard IEC 825-1:1993 was approved by CENELEC as a European Standard without any modification.

In the official version, for annex F, Related IEC Standards, the following information has to be added:

Add after the first paragraph:

NOTE: When the international publication has been modified by CENELEC common modifications, the relevant EN/HD applies.

Add:

EN 41003:1993, Particular safety requirements for equipment to be connected to telecommunication networks

Add the following notes for the standards indicated:

- | | |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IEC 65 | NOTE: Harmonized as EN 60065:1993 (modified). |
| IEC 204-1 | NOTE: Harmonized as EN 60204-1:1992 (modified).
Although the title of IEC 204 indicates that its use is restricted to "industrial machines", the scope of EN 60204 has been broadened to include those machines covered by the EEC Directives relating to safety of machinery. This change is reflected in the title of EN 60204. |
| IEC 601-2-22 | NOTE: Harmonized as EN 60601-2-22:1992 (not modified). |
| IEC 950 | NOTE: Harmonized as EN 60950:1992 + A1:1993 + A2:1993 (modified). |
| IEC 1010-1 | NOTE: Harmonized as EN 61101-1:1993 (modified). |

Annex ZA (normative)

Other international publications quoted in this standard
with the references of the relevant 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.

NOTE: When the international publication has been modified by CENELEC common modifications, indicated by (mod), the relevant EN/HD applies.

IEC				
<u>Publication</u>	<u>Date</u>	<u>Title</u>	<u>EN/HD</u>	<u>Date</u>
27-1	1992*	Letter symbols to be used in electrical technology - Part 1: General	-	-
50(845)	1987	International Electrotechnical Vocabulary (IEV) - Chapter 845: Lighting	-	-
601-2-22	1992	Medical electrical equipment Part 2: Particular requirements for the safety of diagnostic and therapeutic laser equipment	EN 60601-2-22	1992
825-2	1993	Safety of laser products Part 2: Safety of optical fibre communication systems	EN 60825-2	1994
1010-1	1990	Safety requirements for electrical equipment for measurements, control and laboratory use Part 1: General requirements	EN 61010-1	1993
A1 (mod)	1992			
1040	1990	Power and energy measuring detectors, instruments and equipment for laser radiation	EN 61040	1992

Other publications

ISO 1000	1992	SI units and recommendations for the use of their multiples and of certain other units	-	-
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* IEC 27-1:1971 + A1:1974 + A2:1977 was harmonized as HD 245.1 S3:1979.

EUROPEAN STANDARD

EN 60825-1/A1

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2002

ICS 13.110; 31.260

Supersedes EN 60825-1:1994/A11:1996

English version

Safety of laser products
Part 1: Equipment classification,
requirements
and user's guide
(IEC 60825-1:1993/A1:1997)

Sécurité des appareils à laser
Partie 1: Classification des matériels,
prescriptions et guide de l'utilisateur
(CEI 60825-1:1993/A1:1997)

Sicherheit von Laser-Einrichtungen
Teil 1: Klassifizierung von Anlagen,
Anforderungen und Benutzer-Richtlinien
(IEC 60825-1:1993/A1:1997)

This amendment A1 modifies the European Standard EN 60825-1:1994; it was approved by CENELEC on 2002-07-02. 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

Foreword

The text of amendment 1:1997 to the International Standard IEC 60825-1:1993, prepared by IEC TC 76, Optical radiation safety and laser equipment, was approved by CENELEC as amendment A1 to EN 60825-1:1994 on 2002-07-02 without any modification.

This amendment A1 replaces amendment A11:1996 to EN 60825-1:1994.

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) 2004-01-01

Endorsement notice

The text of amendment 1:1997 to the International Standard IEC 60825-1:1993 was approved by CENELEC as an amendment to the European Standard without any modification.

EUROPEAN STANDARD

EN 60825-1/A2

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2001

ICS 13.110; 31.260

English version

Safety of laser products
Part 1: Equipment classification, requirements and user's guide
(IEC 60825-1:1993/A2:2001)

Sécurité des appareils à laser
Partie 1: Classification des matériels,
prescriptions et guide de l'utilisateur
(CEI 60825-1:1993/A2:2001)

Sicherheit von Laser-Einrichtungen
Teil 1: Klassifizierung von Anlagen,
Anforderungen und Benutzer-Richtlinien
(IEC 60825-1:1993/A2:2001)

This amendment A2 modifies the European Standard EN 60825-1:1994; it was approved by CENELEC on 2001-01-01. 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.

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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 76/220/FDIS, future amendment 2 to IEC 60825-1:1993, 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 A2 to EN 60825-1:1994 on 2001-01-01.

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) 2001-11-01
- latest date by which the national standards conflicting
with the amendment have to be withdrawn (dow) 2004-01-01

Endorsement notice

The text of amendment 2:2001 to the International Standard IEC 60825-1:1993 was approved by CENELEC as an amendment to the European Standard without any modification.

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SAFETY OF LASER PRODUCTS –

Part 1: Equipment classification, requirements and user's guide

Section One – General

1 Scope and object

1.1 Scope

IEC 60825-1 is applicable to safety of laser products. For convenience it is divided into three separate sections: Section One (General) and the annexes; Section Two (Manufacturing requirements); and Section Three (User's guide*).

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 and medicine. However, laser products which 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.

Throughout this part 1 light emitting diodes (LED) are included whenever the word "laser" is used. See also annex G which describes information which should be provided by manufacturers of LEDs.

Any laser product or LED product is exempt from all further requirements of this part 1 if

- classification by the manufacturer according to clauses 3, 8 and 9 shows that the emission level does not exceed the AEL of Class 1 under all conditions of operation, maintenance, service and failure, and
- it does not contain an embedded laser or embedded LED.

In addition to the hazards resulting from laser radiation, laser equipment may also give rise to other hazards such as fire and electric shock.

This part 1 describes the minimum requirements.

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), audio and video equipment (IEC 60065), equipment for use in hazardous atmospheres), this part 1 will apply in accordance with the provisions of IEC Guide 104**, for hazards resulting from laser radiation.

However, if the laser system is operable when removed from the equipment, all the requirements of this part 1 will apply to the removed unit.

If no product safety standard is applicable, then IEC 61010-1 shall apply.

* Some countries have requirements which differ from Section Three of this part 1. Therefore, contact the appropriate national agency for these requirements.

** IEC Guide 104:1984, *Guide to the drafting of safety standards, and the role of Committees with safety pilot functions and safety group functions.*

It gives guidance to IEC technical committees and to writers of specifications concerning the manner in which safety publications should be drafted.

This guide does not constitute a normative reference but reference to it is given for information only.

The MPE (maximum permissible exposure) values of this part 1 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 risk.

The MPE values shall not be applicable to patient exposure to laser radiation for the purpose of medical treatment.

NOTE Annexes A to D have been included for purposes of general guidance and to illustrate many typical cases. However, the annexes must not be regarded as definitive or exhaustive and reference should always be made to the appropriate clause(s) in Sections One to Three.

1.2 Object

1.2.1 To protect persons from laser radiation in the wavelength range 180 nm to 1 mm* by indicating safe working levels of laser radiation and by introducing a system of classification of lasers and laser products according to their degree of hazard.

1.2.2 To lay down requirements for both user and manufacturer to establish procedures and supply information so that proper precautions can be adopted.

1.2.3 To ensure adequate warning to individuals of hazards associated with accessible radiation from laser products through signs, labels and instructions.

1.2.4 To reduce the possibility of injury by minimizing unnecessary accessible radiation and to give improved control of the laser radiation hazards through protective features and provide safe usage of laser products by specifying user control measures.

1.2.5 To protect persons against other hazards resulting from the operation and use of laser products.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60825. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, 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. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60027-1:1992, *Letter symbols to be used in electrical technology – Part 1: General*
Amendment 1, 1997

IEC 60050(845):1987, *International Electrotechnical Vocabulary (IEV) – Chapter 845: Lighting*

IEC 60601-2-22:1995, *Medical electrical equipment – Part 2: Particular requirements for the safety of diagnostic and therapeutic laser equipment*

IEC 60825-2:2000, *Safety of laser products – Part 2: Safety of optical fibre communication systems*

IEC 61010-1:2001, *Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements*

IEC 61040:1990, *Power and energy measuring detectors, instruments and equipment for laser radiation*

ISO 1000:1992, *SI units and recommendations for the use of their multiples and of certain other units*

* In this part 1, the wavelength range λ_1 to λ_2 means $\lambda_1 \leq \lambda < \lambda_2$ (e.g. 180 nm to 1 mm means $180 \text{ nm} \leq \lambda < 1 \text{ mm}$).